

## Supporting Information for

### **The Isolation of Water-Soluble Natural Products - Challenges, Strategies and Perspectives**

Roberto G. S. Berlinck, Camila M. Crnkovic, Juliana R. Gubiani, Darlon I. Bernardi, Laura P. Ióca, Jairo I. Quintana-Bulla

Page S4 - 1. **Additional examples of isolation of water-soluble alkaloids other than guanidines.**

Page S8 - 2. **Additional examples of isolation of  $\beta$ -lactam antibiotics.**

Page S10 - 3. **Additional examples of isolation of glycosylated compounds.**

Page S13 - 4. **Additional examples of isolation of guanidines, amidines and 2-aminoimidazoles.**

Page S13 - 4.1 **Bromopyrrole alkaloids with a guanidine moiety**

Page S14 – 4.2. **Additional examples of isolation of macrocyclic lactones with an alkyl-guanidine side chain.**

Page S15 – 4.3. **Additional examples of isolation of plant guanidines.**

Page S17 – 4.4 **Additional examples of isolation of streptothricins.**

Page S19 – 5. **Additional examples of isolation of modified nucleosides.**

Page S19 - 5.1 **Marine-derived nucleosides**

Page S19 – 5.2 **Microbial nucleosides**

Page S22 - 6. **Additional examples of isolation of mycosporines and mycosporine-like amino acids.**

Page S24 - 7. **Additional examples of isolation of phosphorus-containing water-soluble metabolites.**

Page S25 - 8. **Additional examples of isolation of polyamine alkaloids and polyamine conjugates.**

Page S27 - 9. **Additional examples of isolation of polyhydroxylated metabolites other than glycosides.**

Page S29 - 10. **Additional examples of isolation of water-soluble peptides.**

Page S32 - 11. **Additional examples of isolation of sulfated metabolites.**

Page S37 - 12. **Selected literature examples on the “capture” of hydrophobic natural products using adsorptive resins.**

Page S41 - 13. **Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the isolation of natural products using a column with aminopropyl-bonded Si-gel as stationary phase in at least one of the isolation steps.**

Page S42 - 14. **Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the isolation of natural products using a column with cyanopropyl-bonded Si-gel as stationary phase in at least one of the isolation steps.**

Page S44 - 15. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using a column with DIOL-bonded Si-gel as stationary phase** in at least one of the isolation steps.

Page S46 - 16. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using a column with phenyl-, phenyl-hexyl, and fluorophenyl bonded Si-gel as stationary phase** in at least one of the isolation steps.

Page S48 - 17. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with HP-20 as stationary phase** in at least one of the isolation steps.

Page S50 - 18. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products by column chromatography with Amberlite XAD-2, -7 and -16 as stationary phase** in at least one of the isolation steps, or for capturing the compounds from aqueous extracts.

Page S53 -19. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with the macroporous resin D101 as stationary phase** in at least one of the isolation steps.

Page S54 - 20. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with polyamide resin as stationary phase** in at least one of the isolation steps.

Page S55 - 21. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with the macroporous resin polychrome (Teflon powder) as stationary phase** in at least one of the isolation steps.

Page S55 - 22. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of saponins using normal-phase chromatography and aqueous mixtures as eluents**.

Page S58 - 23. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of glycosides other than saponins using normal-phase chromatography** and aqueous mixtures as eluents.

Page S61 - 24. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products other than glycosides and saponins using normal-phase chromatography** and aqueous mixtures as eluents.

Page S62 - 25. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using only C<sub>18</sub> reversed-phase chromatography**.

Page S64 - 26. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using countercurrent separation in at least one of the separations steps**.

Page S65 - 27. Articles reporting additional examples of **isolation of water-soluble alkaloids other than guanidines**.

Page S65 - 28. Articles reporting additional examples of **isolation of water-soluble bleomycin-related glycopeptides**.

Page S66 - 29. Articles reporting additional examples of **isolation of water-soluble saponins from brittle-stars, holothurians (sea-cucumbers), sea-stars and marine sponges**.

Page S68 - 30. Articles reporting additional examples of **isolation of water-soluble saponins from brittle-stars, holothurians (sea-cucumbers), sea-stars and marine sponges using polychrome (Teflon powder)** in the first separation step.

Page S70 - 31. Articles reporting additional examples of **isolation of water-soluble guanidine, amidine and 2-aminoimidazole bromopyrrole alkaloids**.

Page S72 - 32. Articles reporting additional examples of **isolation of water-soluble macrocyclic lactones with an alkyl-guanidine side chain**.

Page S73 - 33. Additional articles reporting additional examples of **isolation of water-soluble guanidines**.

Page S74 - 34. Additional articles reporting additional examples of **isolation of water-soluble peptides**.

## 1. Additional examples of isolation of water-soluble alkaloids other than guanidines.

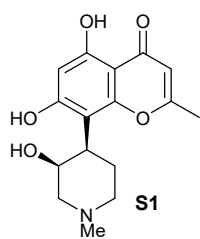
The water-soluble rohitukine (**S1**) has been isolated from different plant sources, but procedures involving chromatography separations proved as time-consuming and with unsatisfactory purity. An improved separation and purification procedure involved obtaining a water-soluble fraction from the defatted MeOH/CHCl<sub>3</sub> extract. Purified **S1** (98.6% purity) was obtained by three precipitation and re-crystallization steps. Rohitukine (**S1**) displayed cytotoxic activity against several leukemia, pancreas, prostate, breast and CNS cancer cell lines.<sup>1</sup>

Several isoquinoline alkaloids claimed as water-soluble (e.g., **S2**) were obtained from the aerial parts of *Portulaca oleracea* using a rather complex isolation procedure.<sup>2</sup> The 60% EtOH extract was fractionated by chromatography on polyamide using a gradient of EtOH in H<sub>2</sub>O ending with 1:7 25% NH<sub>4</sub>OH/85% EtOH. The most polar fractions were extracted with n-BuOH and the latter was separated by column chromatography on Si-gel (gradient of MeOH in EtOAc). The fractions obtained were then fractionated by column chromatography on polyamide, MCI gel, Sephadex LH-20, C<sub>18</sub> RP Sigel and purified by C<sub>18</sub> RP HPLC.<sup>2</sup>

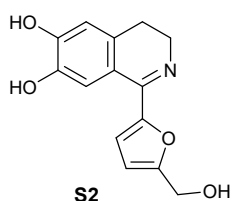
Water-soluble clathriroles A (**S3**) and B were isolated from the aqueous fraction of the 2:1 MeOH/acetone extract of the marine sponge *Clathria prolifera*. The H<sub>2</sub>O fraction was separated by chromatography on HP-20, then on Sephadex LH-20 and purified by RP preparative TLC eluted with 1:1:2 MeOH/MeCN/H<sub>2</sub>O.<sup>3</sup> The growth medium of the cyanobacterium *Leptolyngbya* sp. yielded polar leptazolines A–D (e.g., A and B, **S4** and **S5**) after the medium adsorption on HP-20 and desorption with MeOH, followed by a series of separations and purifications by C<sub>18</sub> RP HPLC.<sup>4</sup>

Some alkaloids are C-, O- or N-glycosylated, conferring an improved solubility in water. Such is the case of surugatoxin (**S6**), isolated from the Japanese ivory shell *Babylonia japonica* by chromatography on Sephadex G-25 and on CM Sephadex C-25 (cationic exchange resin).<sup>5</sup> N-glycosylated alkaloids such as **S7** have been isolated from the 80% MeOH extract of the fruiting bodies of the basidiomycete

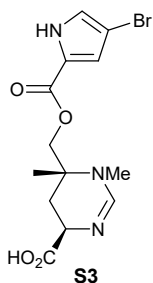
*Cortinarius brunneus*. The extract was separated by chromatography on HP-20, then by C<sub>2</sub> reversed-phase chromatography, followed by Sephadex LH-20 and purified by C<sub>18</sub> reversed-phase HPLC.<sup>6</sup> Indoline glucosides such as oleracein K (**S8**) were isolated from the 60% EtOH extract of the aerial parts of *Portulaca oleracea*.<sup>7</sup> Although such compounds are not strictly alkaloids, since the nitrogen constitutes an amide group, the carboxylic acid group and the two sugar residues confer water-solubility to these metabolites. Isolation included chromatography on polyamide (gradient of MeOH in H<sub>2</sub>O, ending with 25% NH<sub>4</sub>OH/85% EtOH), Sephadex LH-20 (distinct eluents for different fractions obtained from the separation on polyamide), chromatography on MCI gel and purification by RP C<sub>18</sub> HPLC. Oleracein K (**S8**) displayed DPPH<sup>•</sup> scavenging twice as potent as of vitamin C, at 15.3 μM.<sup>7</sup> Betacyanins (e.g. amaranthine, **S9**) were isolated from flowers, leaves and stems of *Celosia* spp. by extracting with 30% acetone + 1% HCO<sub>2</sub>H and separation by IEC (unspecified) and two separations by HSCCC, using *tert*-butylmethyl ether/*n*-BuOH/MeCN/H<sub>2</sub>O (+ 0.7% heptafluorobutyric acid) (2:2:1:5) and EtOH/MeCN/*n*-PrOH/(NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> saturated H<sub>2</sub>O (0.5:0.5:0.5:1.2:1).<sup>8</sup>



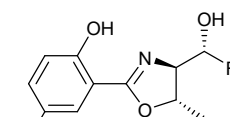
1. MeOH-CHCl<sub>3</sub>
2. H<sub>2</sub>O
3. acetone
4. MeOH-acetone (2 x)



1. 60% EtOH
2. polyamide
3. *n*-BuOH extraction
4. Si-gel (MeOH in EtOAc)
5. Polyamide, MCI gel, Sephadex LH-20, C<sub>18</sub> RP CC

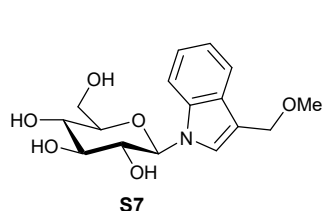


1. 2:1 MeOH/acetone
2. H<sub>2</sub>O/EtOAc
3. HP-20 (MeOH/H<sub>2</sub>O)
4. Sephadex LH-20 (7:3 CH<sub>2</sub>Cl<sub>2</sub>/MeOH)
5. prep RP TLC (1:1:2 MeOH/MeCN/H<sub>2</sub>O)

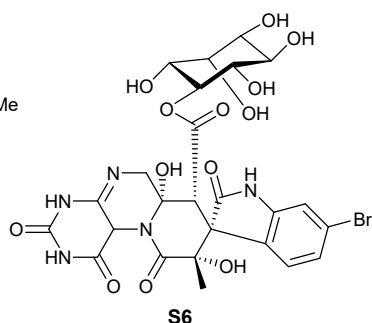


- S4** R = CH<sub>2</sub>CO<sub>2</sub>H  
**S5** R = (S)-CH(OH)-CO[NH-CH(CH<sub>2</sub>OH)<sub>2</sub>]

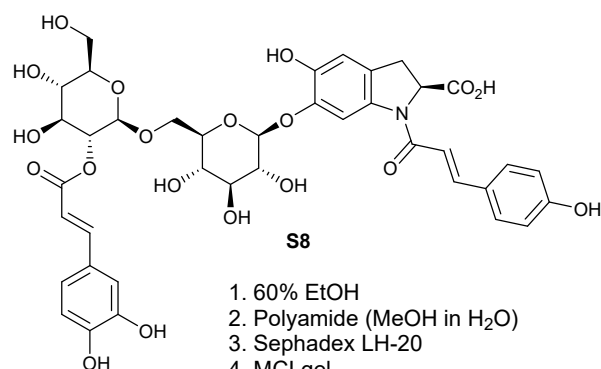
1. HP-20 (MeOH)
2. C<sub>18</sub> RP HPLC



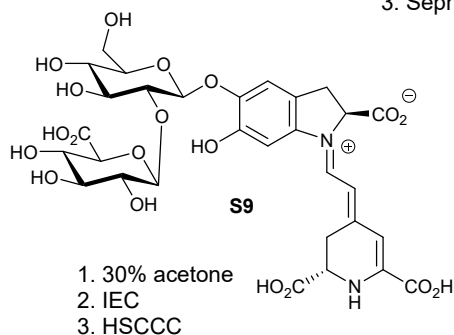
1. 80% MeOH
2. HP-20
3. C<sub>2</sub> RP CC
4. Sephadex LH-20
5. C<sub>18</sub> HPLC



1. Sephadex G-25 (H<sub>2</sub>O, pH 3.9)
2. CM C-25 (H<sub>2</sub>O, pH 3.9)
3. Sephadex G-25 (H<sub>2</sub>O)



1. 60% EtOH
2. Polyamide (MeOH in H<sub>2</sub>O)
3. Sephadex LH-20
4. MCI gel
5. C<sub>18</sub> RP HPLC



1. 30% acetone
2. IEC
3. HSCCC

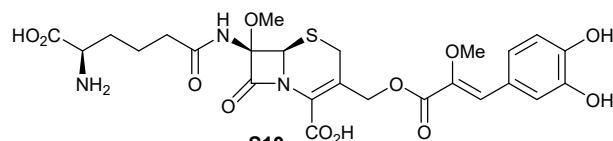
1. V. Kumar, S. K. Guru, S. K. Jain, P. Joshi, S. G. Gandhi, S. B. Bharate, S. Bhushan, S. S. Bharate, R. A. Vishwakarma, *Bioorg. Med. Chem. Lett.* 2016, **26**, 3457-3463.
2. T. Y. Jin, S. Q. Li, C. R. Jin, H. Shan, R. M. Wang, M. X. Zhou, A. L. Li, L. Y. Li, S. Y. Hu, T. Shen, L. Xiang, *J. Nat. Prod.*, 2018, **81**, 768-777.
3. S. Y. Woo, N. N. Win, C. P. Wong, T. Ito, S. Hoshino, H. Ngwe, A. A. Aye, N. M. Han, H. Zhang, F. Hayashi, I. Abe, H. Morita, *J. Nat. Med.*, 2018, **72**, 803-807.
3. J. B. Neupane, R. P. Neupane, Y. Luo, W. Y. Yoshida, R. Sun, P. G. Williams, *Org. Lett.* 2019, **21**, 8449-8453.
5. T. Kosuge, H. Zenda, A. Ochiai, N. Masaki, M. Noguchi, S. Kimura, H. Narita, *Tetrahedron Lett.* 1972, 2545-2548.
6. A. Teichert, J. Schmidt, A. Porzel, N. Arnold, L. Wessjohann, *Chem. Biodiv.* 2008, **5**, 664-669.

7. Z. Z. Jiao, S. Yue, H. X. Sun, T. Y. Jin, H. N. Wang, R. X. Zhu, L. Xiang, *J. Nat. Prod.* 2015, **78**, 2588-2597.

8. A. Spórna-Kucab, A. Milo, A. Kumorkiewicz, S. Wybraniec, *J. Chromatogr. B* 2018, **1073**, 96-103.

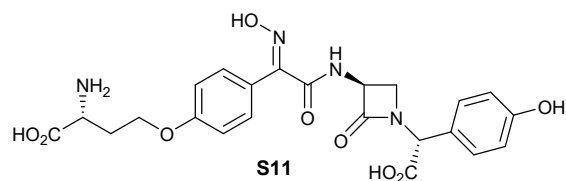
## 2. Additional examples of isolation of $\beta$ -lactam antibiotics

Additional examples of isolation of water-soluble  $\beta$ -lactam antibiotics include C-2801X (**S10**),<sup>9</sup> nocardicins (e.g., nocardicin B, **S11**),<sup>10,11</sup> MM17880 (**S12**),<sup>12</sup> MM4550 (**S13**),<sup>13</sup> MM 17880 (**S14**)<sup>14</sup> and related derivatives with no details regarding isolation procedures,<sup>14,15</sup> PS-5 (**S15**)<sup>16</sup> and related antibiotics,<sup>17</sup> sulfazecin (**S16**)<sup>18</sup> and isosulfazecin,<sup>19</sup> formadicins (e.g., formadicin A, **S17**),<sup>20</sup> as well as clavamycins (e.g., clavamycin A, **S18**).<sup>21</sup>



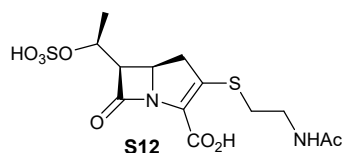
**S10**

1. XAD-2
2. Dowex 50WX4
3. XAD-2
4. DEAE-cellulose
4. XAD-2

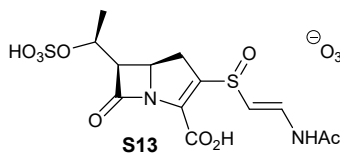


**S11**

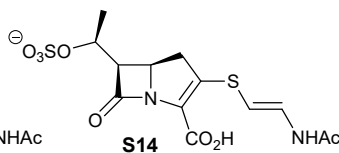
1. HP-20
2. HCl (pH 2.5)
3. NaOH (pH 7.0)
4. HP-20 (3% NaCl)



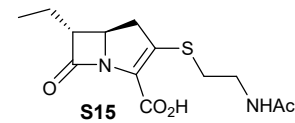
**S12**



**S13**

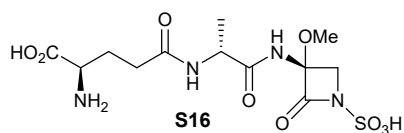


**S14**

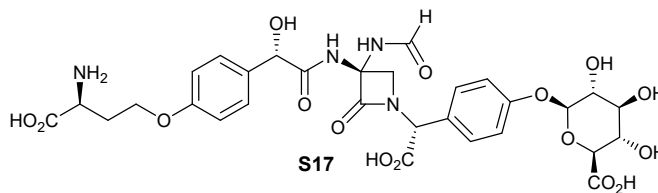


**S15**

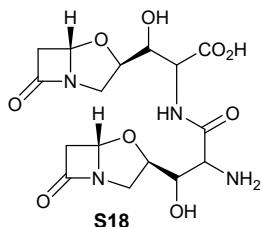
1. Diaion PA306
2. HP-20
3. QAE-Sephadex A-25
4. HP-20
5. Sephadex G-10



1. Charcoal
2. Dowex 1X2
3. Charcoal
4. DEAE Sephadex A-25
5. Charcoal
6. MeOH



1. IRA-402
2. Charcoal
3. IRA-68
4. Charcoal
5. QAE-Sephadex A-25
6. Charcoal
7. HPLC YMC-Pack S-30 ODS
8. Charcoal



1. centrifugation
2. Dowex 50WX2
3. Charcoal (3 x)

9. H. Fukase, T. Hasegawa, K. Hatano, H. Iwasaki, M. Yoneda, *J. Antibiot.*, 1976, **29**, 113-20.
10. M. Kurita, K. Jomon, T. Komori, N. Miyairi, H. Aoki, S. Kuge, T. Kamiya, H. Imanaka, *J. Antibiot.*, 1976, **29**, 1243-1245.
11. H. Aoki, H.-I. Sakai, M. Kohsaka, T. Konomi, J. Hosoda, Y. Kubochi, E. Iguchi, H. Imanaka, *J. Antibiot.*, 1976, **29**, 492-500.
12. D. F. Corbett, A. J. Eglington, T. T. Howarth, *J. Chem. Soc., Chem. Comm.*, 1977, 953-954.
13. A. G. Brown, D. F. Corbett, A. J. Eglington, T. T. Howarth, *J. Chem. Soc., Chem. Comm.*, 1977, 523-525.
14. J. D. Hood, S. J. Box, M. S. Verrall, *J. Antibiot.*, 1979, **32**, 295-304.
15. A. G. Brown, D. F. Corbett, A. J. Eglington, T. T. Howarth, *J. Antibiot.*, 1979, **32**, 961-963.
16. K. Okamura, S. Hirata, Y. Okumura, Y. Fukagawa, Y. Shimauchi, K. Kouno, T. Ishikura, J. Lein, *J. Antibiot.*, 1978, **31**, 480-482.
17. N. Shibamoto, A. Koki, M. Nishino, K. Nakamura, K. Kiyoshima, K. Okamura, M. Okabe, R. Okamoto, Y. Fukagawa, Y. Shimauchi, T. Ishikura, J. Lein, *J. Antibiot.*, 1980, **33**, 1128-1137.
18. M. Asai, K. Haibara, M. Muroi, K. Kintaka, T. Kishi, *J. Antibiot.*, 1981, **34**, 621-627.

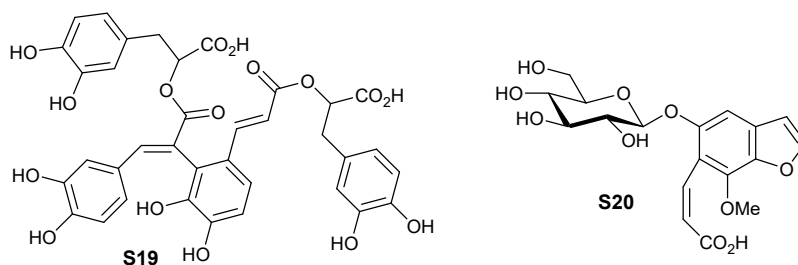


19. K. Kintaka, K. Haibara, M. Asai, A. Imada, *J. Antibiot.*, 1981, **34**, 1081-1089.
20. a) N. Katayama, Y. Nozaki, K. Okonogi, H. Ono, S. Harada, H. Okazaki, *J. Antibiot.*, 1985, **38**, 1117-1127; b) T. Hida, S. Tsubotani, N. Katayama, H. Okazaki, S. Harada, *J. Antibiot.*, 1985, **38**, 1128-1140.
21. a) H. D. King, J. Langhärig, J. J. Sanglier, *J. Antibiot.*, 1986, **39**, 510-515; b) H. U. Naegeli, H.-R. Loosli, A. Nussbaumer, *J. Antibiot.*, 1986, **39**, 516-524.

### 3. Additional examples of isolation of glycosylated compounds

#### 3.1 Glycosylated polyphenols

Water-soluble phenylpropanoids have also been reported as polyphenol derivatives. Examples include salvianolic acids (e.g., salvianolic acid E, **S19**) from the roots of *Salvia miltiorrhiza*, extracted with 70% EtOH. The acidified aqueous fraction was partitioned against EtOAc and the organic fraction was separated by chromatography on Sephadex LH-20 (twice).<sup>22</sup> Since salvianolic acids display biological activities as antioxidants, as free radicals scavengers, as well as protection of neural cell injuries promoted by anoxia, an improved method was developed for the isolation of these compounds by HSCCC.<sup>23</sup> The isolation of 6-(2-carboxyvinyl)-7-methoxy-5-hydroxy-benzofuran-5-O- $\beta$ -D-glucopyranoside (**S20**) from the H<sub>2</sub>O fraction of the MeOH extract from the stems of *Ficus tikoua* included chromatography on D101 macroporous resin, IEC and purification by HPLC.<sup>24</sup>

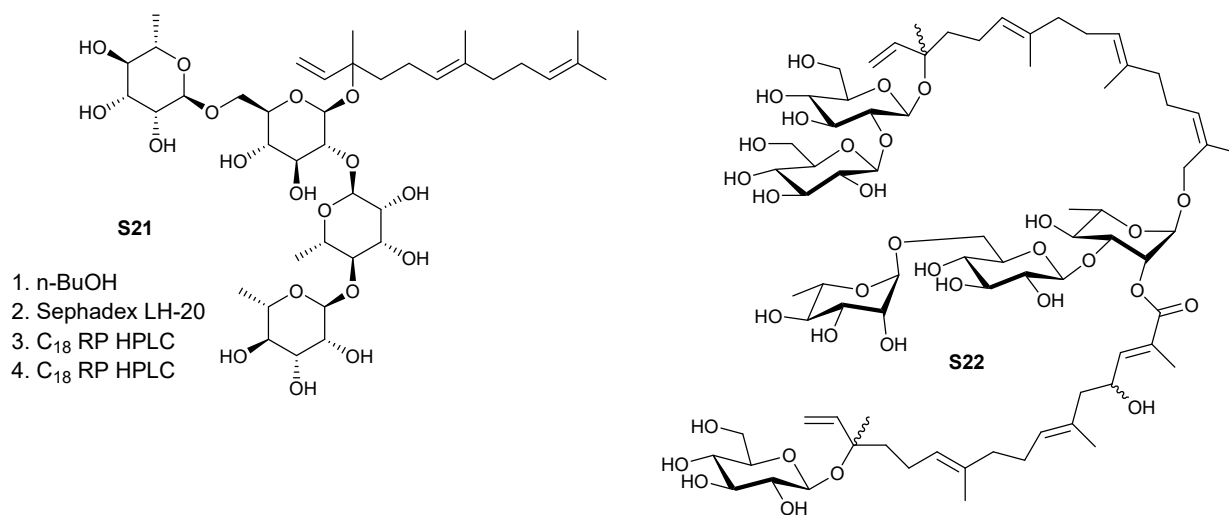


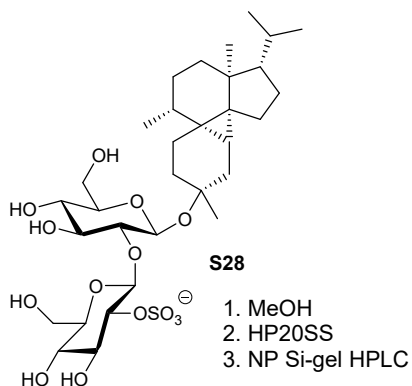
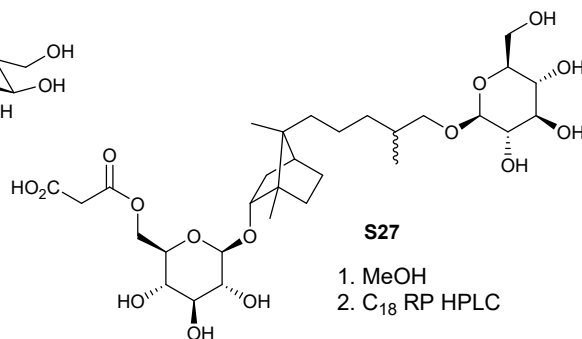
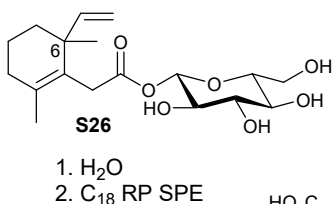
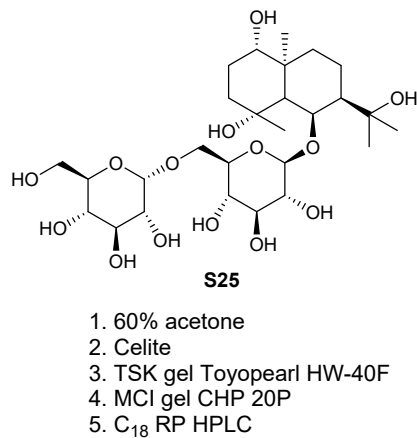
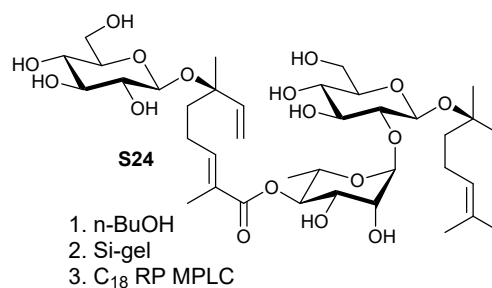
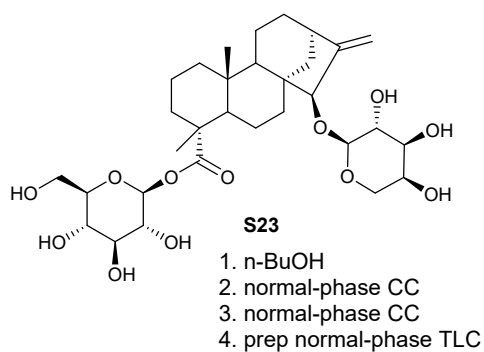
22. C.-b. Ai, L.-n. Li, *Planta Med.*, 1992, **58**, 197-199.

23. a) J. Chen, F. Wang, F. S.-C. Lee, X. Wang, M. Xie, *Talanta* 2006, **69**, 172-179; b) Y. Sun, H. Zhu, J. Wang, Z. Liu, J. Bi, *J. Chromatogr. B* 2009, **877**, 733-737.
24. S. Wei, J. Zhang, W. Wu, Z. Ji, *Chem. Nat. Compd.* 2014, **49**, 1134-1136.

### 3.2 Water-soluble terpenoid glycosides other than saponins

Examples of non-iridoid water-soluble terpene glycosides are loquatifolin A (**S21**) from the leaves of *Eriobotrya japonica*,<sup>25</sup> capsianside A (**S22**, no isolation procedures reported) from fresh fruits of *Capsicum annuum* var. *fasciculatum*,<sup>26</sup> rufusoside B (**S23**) from the aerial parts of *Senecio rufus*,<sup>27</sup> anatolioside B (**S24**) from the leaves of *Viburnum orientale*,<sup>28</sup> dictamnocide M (**S25**) from the root bark of *Dictamnus dasycarpus*,<sup>29</sup> epimeric suspensoside A (6R-**S26**) and suspensoside B (6S-**S26**) from saliva of the Caribbean fruit fly *Anastrepha suspensa*,<sup>30</sup> compound **S27** and similar metabolites from the glandular trichomes of *Solanum habrochaites*,<sup>31</sup> and peyssonoside B (**S28**) from the marine red alga *Peyssonnelia* sp.<sup>32</sup>





25. H. Yanagisawa, Y. Ohshima, Y. Okada, K. Takahashi, S. Shibata, *Chem. Pharm. Bull.*, 1988, **36**, 1270-1274.
26. S. Yahara, Y. Izumitani, T. Nohara, *Tetrahedron Lett.*, 1988, **29**, 1943-1946.
27. D.-L. Cheng, X.-P. Cao, J.-K. Cheng, E. Roeder, *Phytochem.*, 1993, **32**, 151-153.
28. I. Çaliş, A. Yürüker, H. Rügger, A. D. Wright, O. Sticher, *Helv. Chim. Acta*, 1993, **76**, 416-424.
29. J. Chang, L.-J. Xuan, Y.-M. Xu, J.-S. Zhang, *J. Nat. Prod.*, 2001, **64**, 935-938.
30. S. S. Walse, F. Lu, P. E. A. Teal, *J. Nat. Prod.*, 2008, **71**, 1726-1731.

31. E. A. P. Ekanayaka, C. Li, A. D. Jones, *Phytochem.*, 2014, **98**, 223-231.

32. B. K. Chhetri, S. Lavoie, A. M. Sweeney-Jones, N. Mojib, V. Raghavan, K. Gagaring, B. Dale, C. W. McNamara, K. Soapi, C. L. Quave, P. L. Polavarapu, J. Kubanek, *J. Org. Chem.*, 2019, **84**, 8531-8541.

#### 4. Additional examples of isolation of guanidines, amidines and 2-aminoimidazoles

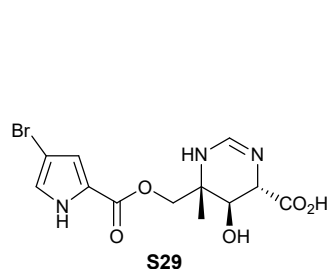
##### 4.1 Bromopyrrole alkaloids with a guanidine moiety

The amidine-bearing manzacidins A-C (e.g., manzacidin B, **S29**) were isolated from the H<sub>2</sub>O extract of the sponge *Hymeniacidon* sp. by NP Si-gel chromatography followed by purification by C<sub>18</sub> RP HPLC.<sup>33</sup>

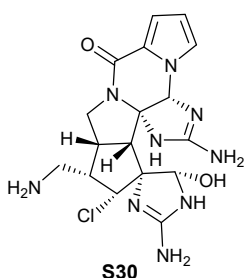
Styloguanidines (e.g., styloguanidine A, **S30**) were isolated from the sponge *Stylorella aurantium*.<sup>34</sup>

Additional examples of water-soluble members of this class include clathramides (e.g., clathramide A, **S31**) from the sponge *Agelas clathrodes*,<sup>35</sup> konbu'acidin A (**S32**) from *Hymeniacidon* sp.,<sup>36</sup>

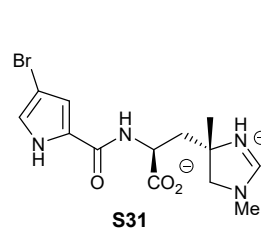
taurodiscapamide A (**S33**) from *Agelas oroides*,<sup>37</sup> stylissadine A (**S34**) from *Stylissa caribica*,<sup>38</sup> as well as several additional alkaloids isolated mainly from marine sponges.



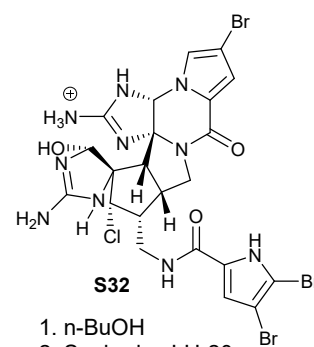
1. H<sub>2</sub>O
2. n-BuOH
3. Si-gel
4. C<sub>18</sub> RP HPLC



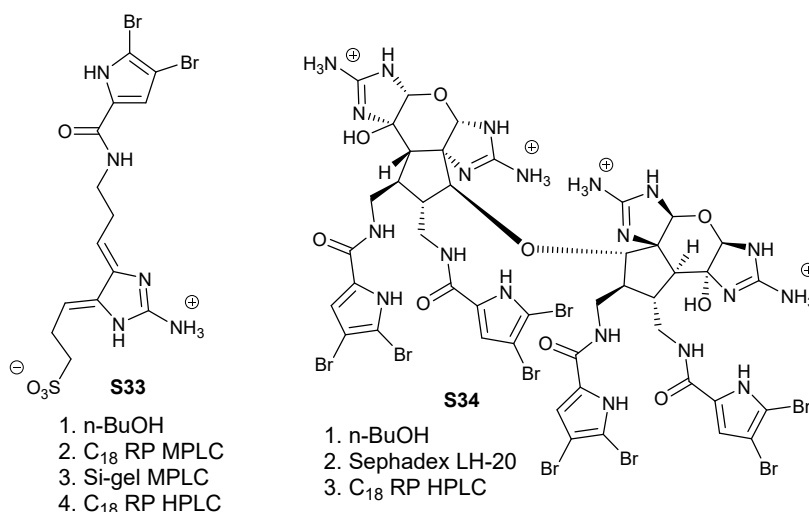
1. H<sub>2</sub>O
2. IEC Cellex CM
3. Sephadex LH-20
4. C<sub>18</sub> RP HPLC



1. n-BuOH
2. C<sub>18</sub> RP cc
3. MPLC Si-gel
4. C<sub>18</sub> RP HPLC



1. n-BuOH
2. Sephadex LH-20
3. C<sub>18</sub> RP MPLC
4. C<sub>18</sub> RP HPLC



33. J. Kobayashi, F. Kanda, M. Ishibashi, H. Shigemori, *J. Org. Chem.*, 1991, **56**, 4574-4576.

34. T. Kato, Y. Shizuri, H. Izumida, A. Yokoyama, M. Endo, *Tetrahedron Lett.*, 1995, **36**, 2133-2136.

35. F. Cafieri, E. Fattorusso, A. Mangoni, O. Taglialatela-Scafati, *Tetrahedron*, 1996, **52**, 13713-13720.

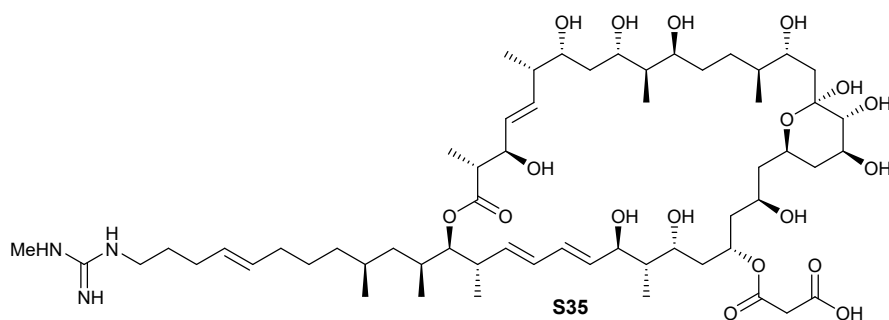
36. J. Kobayashi, M. Suzuki, M. Tsuda, *Tetrahedron*, 1997, **53**, 15681-15684.

37. E. Fattorusso, O. Taglialatela-Scafati, *Tetrahedron Lett.*, 2000, **41**, 9917-9922.

38. A. Grube, M. Köck, *Org. Lett.*, 2006, **8**, 4675-4678.

#### 4.2 Additional examples of isolation of macrocyclic lactones with an alkyl-guanidine side chain

Several macrocyclic lactones bearing an alkyl-guanidine side chain have been isolated, including scopafungin (C<sub>18</sub> RP CC and C<sub>18</sub> RP HPLC),<sup>39</sup> niphithricins (XAD-2, n-BuOH, NP Si-gel, CCC, LH-20, DCCC),<sup>40</sup> copiamycins (precipitation and NP Si-gel CC;<sup>41</sup> NP Si-gel CC and NP Si-gel prep TLC;<sup>42</sup> NP Si-gel CC, LH-20, NP Si-gel prep TLC and LH-20<sup>43</sup>). The most recent report of macrocyclic lactones bearing an alkyl-guanidine side chain is that of niphimycins C–E (e.g., niphimycin C, **S35**) from cultures of a marine-derived *Streptomyces* sp. IMB7-145.<sup>44</sup>



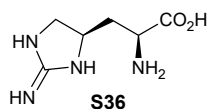
1. Culture medium XAD-7HP
2. Si-gel CC
3. Sephadex LH-20
4. C<sub>18</sub> RP HPLC

39. D. Samain, J. C. Cook, Jr., K. L. Rinehart, Jr., *J. Am. Chem. Soc.*, 1982, **104**, 4129-4141.
40. H.-P. Fiedler, W. Wörner, H. Zähler, H. P. Kaiser, W. Keller-Schierlein, A. Müller, *J. Antibiot.*, 1981, **34**, 1107-1118.
41. T. Arai, S. Kuroda, H. Ohara, Y. Katoh, H. Kaji, *J. Antibiot.*, 1965, **18A**, 63-67.
42. T. Arai, J. Uno, I. Horimi, K. Fukushima, *J. Antibiot.*, 1984, **37**, 103-109.
43. T. Fukai, T. Nomura, J. Uno, T. Arai, *Heterocycles*, 1986, **24**, 3351-3358.
44. Y. Hu, M. Wang, C. Wu, Y. Tan, J. Li, X. Hao, Y. Duan, Y. Guan, X. Shang, Y. Wang, C. Xiao, M. Gan, *J. Nat. Prod.*, 2018, **81**, 178-187.

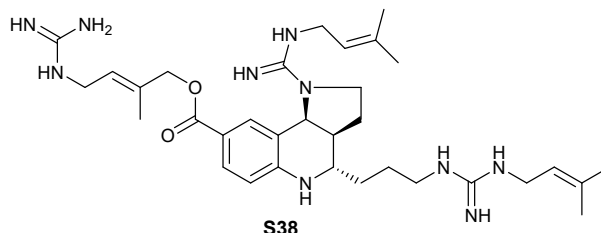
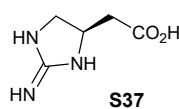
### 4.3 Additional examples of isolation of plant guanidines

Enduracididine (**S36**) and 2-[2-amino-2-imidazolin-4(5)-yl] acetic acid (**S37**) have been isolated from the seeds of *Lonchocarpus sericeus* by a series of separations by IEC.<sup>45</sup> Martinelline (**S38**) has been isolated from the roots of *Martinella iquitosensis* by C<sub>18</sub> RP CC and C<sub>18</sub> RP HPLC.<sup>46</sup> Cimipronidine (**S39**) was isolated from the roots of *Cimicifuga racemosa*.<sup>47</sup> The bis-guanidines 1,1-bis-*N*<sup>1</sup>,*N*<sup>1'</sup>-tetramethylguanidinomethane (**S40**) and 1,4-bis-*N*<sup>1</sup>,*N*<sup>1'</sup>-tetramethylguanidinobutane (**S41**) have been isolated from the leaves of *Verbesina peraffinis*.<sup>48</sup> Nitensidine E (**S42**) was isolated from the leaves of *Pterogyne nitens*.<sup>49</sup> Plantagouguanidinic acid (**S43**) was isolated from the seeds of *Plantago asiatica*.<sup>50</sup>

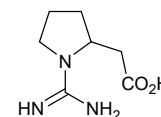
Cernumidine (**S44**) was isolated from the leaves of *Solanum cernuum*.<sup>51</sup> A series of guanidine alkaloids have been isolated from *Plumbago zeylanica*, among which plumbagine F (**S45**).<sup>52</sup> Plantadeprate A (**S46**) was isolated from the seeds of *Plantago depressa*.<sup>53</sup>



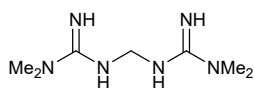
1. 70% EtOH
2. IEC Dowex 2X8
3. IEC Amberlite CG-50
4. IEX Dowex 50X8
5. IEC Amberlite CG-50
6. IEC Dowex 50W-X8
7. MeOH/1:1 EtOH-Et<sub>2</sub>O, crystallization



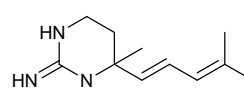
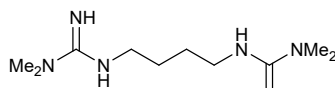
1. 1:1 CH<sub>2</sub>Cl<sub>2</sub>/MeOH
2. C<sub>18</sub> RP CC
3. C<sub>18</sub> RP HPLC



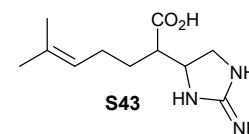
1. n-BuOH
2. XAD-2
3. MCI gel CHP20P
4. C<sub>18</sub> RP HPLC



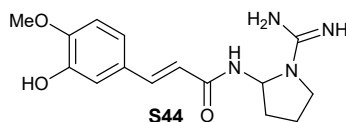
1. H<sub>2</sub>O
2. lyophilization
3. MeOH, filtration
4. Sephadex LH-20
5. C<sub>18</sub> RP SPE



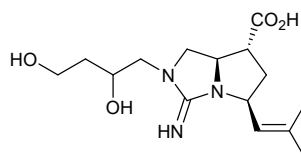
1. n-BuOH
2. Sephadex LH-20
3. C<sub>18</sub> RP CC
4. C<sub>18</sub> RP HPLC



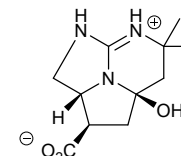
1. n-BuOH
2. NP Si-gel
3. Sephadex LH-20
4. Aminopropyl HPLC



1. EtOH
2. Sephadex LH-20
3. C<sub>18</sub> RP HPLC (2 x)



1. 70% acetone
2. H<sub>2</sub>O
3. MCI gel
4. C<sub>18</sub> RP CC
5. C<sub>18</sub> RP HPLC



1. 70% EtOH
2. AB-8 resin
3. MCI gel
4. DEAE Sephadex A-25
5. C<sub>18</sub> RP CC
6. Sephadex LH-20

45. L. E. Fellows, R. C. Hider, E. A. Bell, *Phytochem.*, 1977, **16**, 1957-1959.

46. K. M. Witherup, R. W. Ransom, A. C. Graham, A. M. Bernard, M. J. Salvatore, W. C. Lumma, P. S. Anderson, S. M. Pitzenberger, S. L. Varga, *J. Am. Chem. Soc.*, 1995, **117**, 6682-6685.

47. D. S. Fabricant, D. Nikolic, D. C. Lankin, S.-N. Chen, B. U. Jaki, A. Kronic, R. B. van Breemen, H.

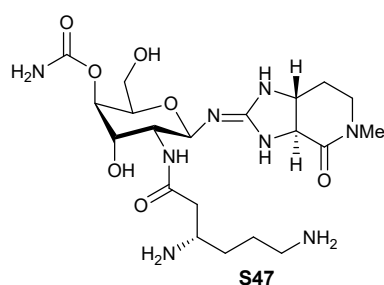
H. S. Fong, N. R. Farnsworth, G. F. Pauli, *J. Nat. Prod.*, 2005, **68**, 1266-1270.

48. R. S. Compagnone, J. Bermudez, G. Ibáñez, B. Díaz, M. R. Garrido, A. Israel, A. I. Suárez, *Nat. Prod. Commun.*, 2008, **3**, 511-514.
49. L. O. Regasini, I. Castro-Gamboa, D. H. S. Silva, M. Furlan, E. J. Barreiro, P. M. P. Ferreira, C. Pessoa, L. V. Costa-Lotufo, M. O. Moraes, M. C. M. Young, V. S. Bolzani, V. S. *J. Nat. Prod.*, 2009, **72**, 473-476.
50. Y. Goda, N. Kawahara, F. Kiuchi, K. Hirakura, Y. Kikuchi, H. Nishimura, M. Takao, M. Marumoto, H. Kitazaki, *J. Nat. Med.*, 2009, **63**, 58-60.
51. L. C. Lopes, B. Roman, M. A. Medeiros, A. Mukhopadhyay, P. Utrilla, J. Gálvez, S. G. Mauriño, V. Moltiva, A. Lourenço, A. San Feliciano, *Tetrahedron Lett.*, 2011, **52**, 6392-6395.
52. H.-J. Cong, S.-W. Zhang, Y. Shen, Y. Zheng, Y.-J. Huang, W.-Q. Wang, Y. Leng, L.-J. Xuan, *J. Nat. Prod.*, 2013, **76**, 1351-1357.
53. X.-M. Zheng, F.-W. Meng, F. Geng, M. Qi, C. Luo, L. Yang, Z.-T. Wang, *J. Nat. Prod.*, 2015, **78**, 2822-2826.

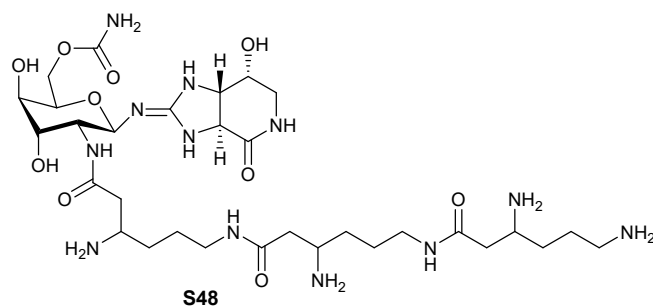
#### 4.4 Additional examples of isolation of streptothricins

Alternative separation procedures for streptothricins included chromatography on cellulose powder. Ion-exchange chromatography was preferably performed with solutions of a strictly defined concentration of NaCl. Later on, chromatography on Sephadex LH-20 was also utilized with 9:1 MeOH/H<sub>2</sub>O as eluent.<sup>54</sup> Isolation procedures other than using exclusively ion-exchange chromatography and chromatography on cellulose powder were subsequently developed for albothricin (**S47**),<sup>55</sup> 12-carbamoylstreptothricin D (**S48**)<sup>56</sup> and streptothricin acids (e.g., streptothricin acid D, **S49**),<sup>57</sup> as well as for additional streptothricins.<sup>58-60</sup>

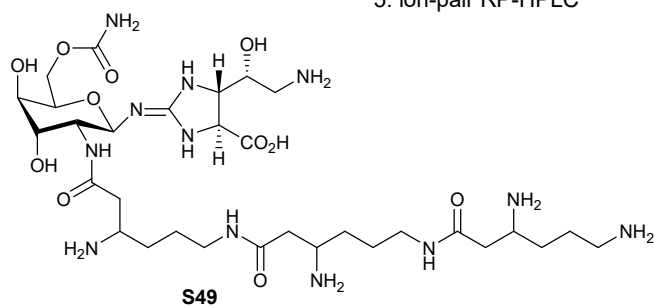




1. Filtered medium, pH 2
2. pH 6, IEC Amberlite IRC-50
3. IEC CM-Sephadex C-25
4. Diaion CHP-20
5. Sephadex G-10



1. Filtered medium, pH 3.5
2. pH 8, IEC HD-2
3. IEC CM-Sephadex C-25
4. active charcoal
5. ion-pair RP-HPLC

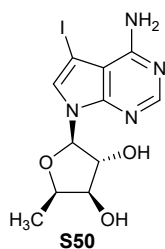


54. H. Taniyama, Y. Sawada, T. Kitagawa, *J. Chromatogr.*, 1971, **56**, 360-362.
55. K. Ohba, H. Nakayama, K. Furihata, K. Furihata, A. Shimazu, H. Seto, N. Otake, Y. Zhao-Zhong, X. Li-Sha, X. Wen-Si, *J. Antibiot.*, 1986, **39**, 872-875.
56. Z. Ji, M. Wang, J. Zhang, S. Wei, W. Wu, *J. Antibiot.*, 2007, **60**, 739-744.
57. Z. Ji, M. Wang, S. Wei, J. Zhang, W. Wu, *J. Antibiot.*, 2009, **62**, 233-237.
58. M. Gan, X. Zheng, L. Gan, Y. Guan, X. Hao, Y. Liu, S. Si, Y. Zhang, L. Yu, C. Xiao, *J. Nat. Prod.*, 2011, **74**, 1142-1147.
59. M. Gan, Y. Guan, X. Zheng, Y. Yang, X. Hao, Y. Liu, L. Yu, C. Xiao, *J. Antibiot.*, 2012, **65**, 513-516.
60. M. Gan, X. Zheng, Y. Liu, Y. Guan, C. Xiao, *Bioorg. Med. Chem. Lett.*, 2012, **22**, 6151-6154.

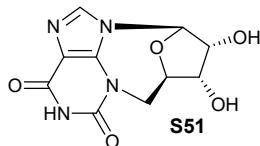
## 5. Additional examples of isolation of modified nucleosides

### 5.1 Marine-derived nucleosides

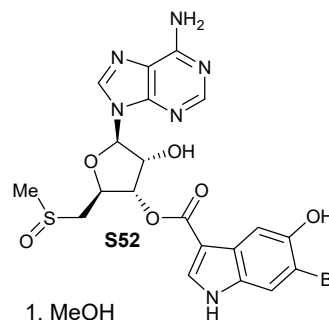
The iodinated nucleoside 4-amino-7-(5'-deoxy- $\beta$ -D-xylofuranosyl)-5-iodopyrrolo[2,3-*d*]pyrimidine (**S50**) was isolated from the ascidian *Diplosoma* sp.,<sup>61</sup> the first internally cyclized nucleoside  $N^3,5'$ -cycloxanthosine (**S51**) from an *Eryus* sp. marine sponge<sup>62</sup> and methylsulfinyladenosine nucleosides (e.g., **S52**) from the ascidian *Herdmania momus*.<sup>63</sup>



1. acetone
2.  $\text{CHCl}_3$
3. Si-gel CC
4.  $\text{C}_{18}$  RP CC
5. NP Si-gel HPLC
6.  $\text{C}_{18}$  RP HPLC



1. EtOH
2.  $\text{H}_2\text{O}$
3. Sephadex G-10
4.  $\text{C}_{18}$  RP HPLC



1. MeOH
2. n-BuOH
3. MPLC YMC gel ODS-A
4. MPLC Shodex-packed NH-5E
5. MPLC YMC-packed C-8 column

61. P. Margiastuti, T. Ogi, T. Teruya, J. Taira, K. Suenaga, K. Ueda, *Chem. Lett.*, 2008, **37**, 448-449.

62. R. J. Capon, N. S. Trotter, *J. Nat. Prod.*, 2005, **68**, 1689-1691.

63. J. L. Li, E. L. Kim, H. Wang, J. Hong, S. Shin, C.-K. Lee, J. H. Jung, *Bioorg. Med. Chem. Lett.*, 2013, **23**, 4701-4704.

## 8.2 Microbial nucleosides

Agrocin 84 (**S53**) produced by *Agrobacterium radiobacter* var. *radiobacter* is an antibacterial modified nucleoside that is active against phytopathogenic *Agrobacterium tumefaciens* which causes crown gall disease.<sup>64</sup>

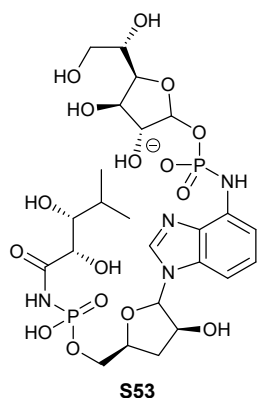
Nikkomycins (e.g., nikkomycin Z, **S54**) are antifungal agents produced by *Streptomyces*

*tendae*.<sup>65</sup> The antibiotic and cytotoxic showdomycin (**S55**) is produced by *Streptomyces showdoensis*.<sup>66</sup>

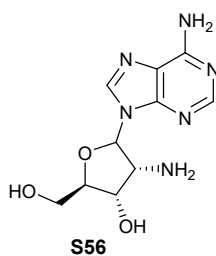
2'-Amino-2'-deoxyadenosine (**S56**) was isolated from cultures of *Actinomadura* sp. and showed good antibacterial activity against *Mycoplasma gallisepticum* that causes avian respiratory diseases.<sup>67</sup>

Oxetanocin (**S57**), isolated from cultures of *Bacillus megaterium* NK84-0218, is the only known example of an oxetane-bearing nucleoside. It is a potent anti-bacterial and anti-viral agent.<sup>68</sup> Neplanocins (e.g.,

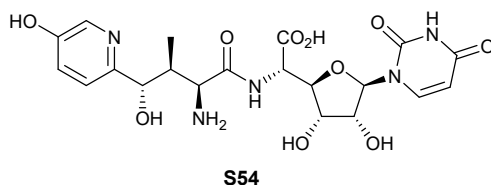
neplanocin A, **S58**) are nucleosides bearing a carbocyclic ring which are either an epoxy-cyclopentane or a cyclopentene ring with potent anti-tumor and anti-viral activity.<sup>69</sup> Oxanosine (**S59**) is a potent anti-tumor agent isolated from cultures of *Streptomyces capreolus*.<sup>70</sup> Peptidyl nucleosides are also known, some of which have a guanidine-bearing amino acid derivative, such as blasticidin S (**S60**), which is an anti-fungal agent against *Pyricularia oryzae* that causes rice blast disease.<sup>71</sup> The same biological activity has been observed for amipurimycin (**S61**).<sup>72</sup>



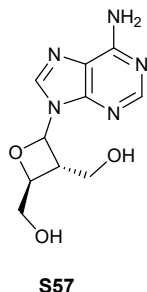
1. H<sub>2</sub>O
2. Active charcoal
3. DEAE Sephadex A-50
4. BioGel P-2
5. Electrophoresis
6. BioGel P-2



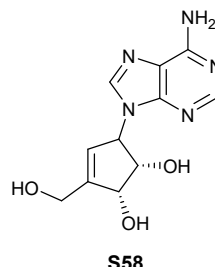
1. Broth filtrate (20 L)
2. IEC Amberlite IRC-50
3. Si-gel
4. Si-gel Prep TLC



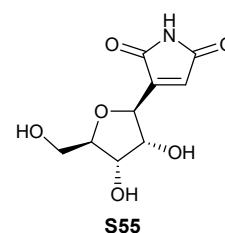
1. H<sub>2</sub>O, pH 4.0
2. Celite filtration
3. IEC Dowex 50WX4
4. Amberlite IRA 401 S
5. SP Sephadex C25
6. BioGel P-2 (2 x)



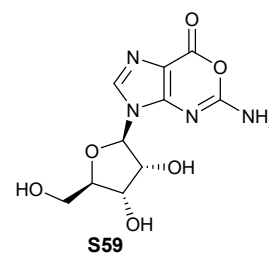
1. Broth filtrate (290 L)
2. IEC Dowex 50WX8
3. Diaion HP-20
4. Si-gel CC
5. Diaion HP-20
6. crystallization



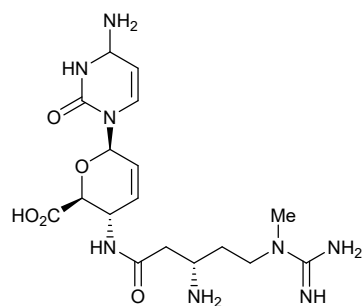
1. Broth filtrate, pH 6.0 (200 L)
2. IEC Amberlite IR-120-B
3. pH 8.0, active carbon
4. Si-gel CC (2 x)
5. Hot H<sub>2</sub>O, recrystallization



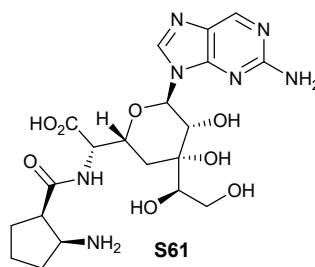
1. Filtered broth (15 L)
2. pH 5.0, activated carbon
3. n-BuOH partition
4. Si-gel CC



1. Broth filtrate
2. Active charcoal
3. carbon chromatography
4. Avicel chromatography

**S60**

1. Broth filtrate pH 4.0 (200 L)
2. Activated charcoal
3. pH 7.0, oxalic acid, filtration
4. IEC IR 4 B
5. IEC IR-50
6. acetone, precipitation
7. Al<sub>2</sub>O<sub>3</sub> CC
8. acetone, recrystallization

**S61**

1. Broth filtrate
2. IEC IRA-410
3. Activated charcoal
4. Si-gel CC
5. IEC CG-50
6. 1:1 EtOH/H<sub>2</sub>O, crystallization

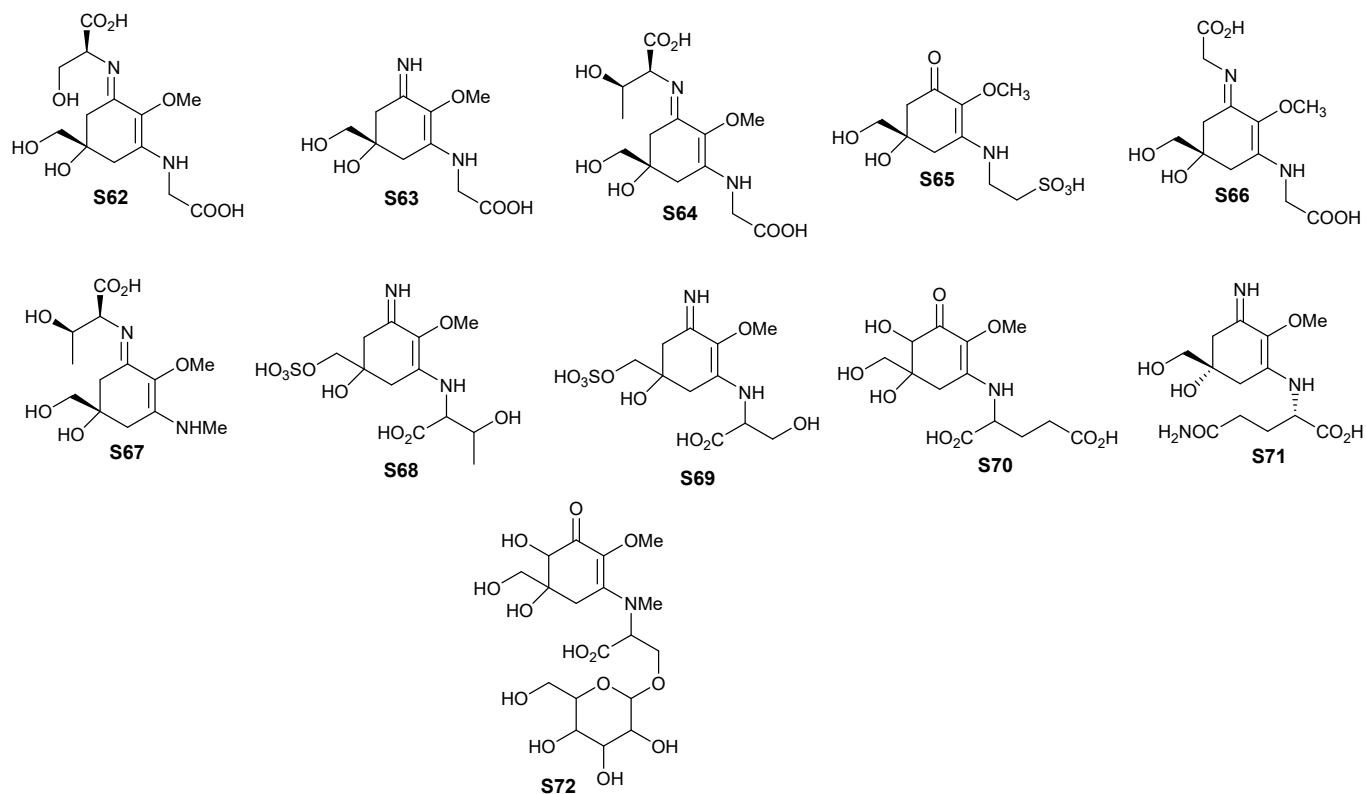
64. a) W. P. Roberts, M. E. Tate, A. Kerr, *Nature*, 1977, **265**, 379-381; b) R. J. Thompson, R. H. Hamilton, C. F. Pootjes, *Antimicrob. Agent. Chemother.*, 1979, **16**, 293-296; c) J. G. Ellis, A. Kerr, M. Van Montagu, J. Schell, *Physiol. Plant Pathol.*, 1979, **15**, 311-316.
65. a) H.-P. Fiedler, R. Kurth, J. Langhärig, J. Delzer, H. Zähner, *J. Chem. Tech. Biotechnol.*, 1982, **32**, 271-280; b) C. Bormann, W. Huhn, H. Zäehner, R. Rathmann, H. Hahn, W. A. Köenig, *J. Antibiot.*, 1985, **38**, 9-16.
66. a) H. Nishimura, M. Mayama, Y. Komatsu, H. Kato, N. Shimaoka, Y. Tanaka, *J. Antibiot.*, 1964, **17**, 148-55; b) K. R. Darnall, L. B. Townsend, R. K. Robins, *Proc. Natl. Acad. Sci. USA*, 1967, **57**, 548-553.
67. Y. Iwai, A. Nakagawa, A. Nagai, K. Matsuyama, Y. Takahashi, M. Yamashita, A. Hirano, S. Omura, *J. Antibiot.*, 1979, **32**, 1367-1369.
68. a) N. Shimada, S. Hasegawa, T. Harada, T. Tomisawa, A. Fujii, T. Takita, *J. Antibiot.*, 1986, **39**, 1623-1625; b) N. Shimada, S. Hasegawa, N. Shimada, A. Fujii, T. Takita, Y. Iitaka, *J. Antibiot.*, 1986, **39**, 1626-1629.
69. a) S. Yaginuma, N. Muto, M. Tsujino, Y. Sudate, M. Hayashi, M. Otani, *J. Antibiot.*, 1981, **34**, 359-366; b) M. Hayashi, S. Yaginuma, H. Yoshioka, K. Nakatsu, *J. Antibiot.*, 1981, **34**, 675-680; c) R. T.

- Borchardt, B. T. Keller, U. Patel-Thombre, *J. Biol. Chem.*, 1984, **259**, 4353-4358; d) E. De Clercq, M. Cools, J. Balzarini, V. E. Marquez, D. R. Borcharding, R. T. Borchardt, J. C. Drach, S. Kitaoka, T. Konno, *Antimicrob. Agents Chemother.*, 1989, **33**, 1291-1297; e) E. De Clercq, *Viruses*, 2010, **2**, 1322-1339; doi:10.3390/v2061322.
70. N. Shimada, N. Yagisawa, H. Naganawa, T. Takita, M. Hamada, T. Takeuchi, H. Umezawa, *J. Antibiot.*, 1981, **34**, 1216-1218.
71. a) S. Takeuchi, K. Hirayama, K. Ueda, H. Sakai, H. Yonehara, *J. Antibiot. A*, 1958, **11**, 1-5; b) M. Kimura, I. Yamaguchi, *Pest. Biochem. Physiol.*, 1996, **56**, 243-248.
72. a) S. Harada, T. Kishi, *J. Antibiot.*, 1977, **30**, 11-16; b) T. Iwasa, T. Kishi, K. Matsuura, O. Wakae, *J. Antibiot.*, 1977, **30**, 1-10; c) S. Wang, Q. Zhang, Y. Zhao, J. Sun, W. Kang, F. Wang, H. Pan, G. Tang, B. Yu, *Angew. Chem. Int. Ed.*, 2019, **58**, 10558-10562.

## 6. Additional examples of isolation of mycosporines and mycosporine-like amino acids

Chromatography on activated charcoal and IEC Dowex 50W was used for the isolation of shinorine (**S62**) from the red alga *Chondrus yendoi*.<sup>73</sup> Mycosporines **S62**, **S63** and **S64** are the components of Helioguard 365<sup>®</sup> and Helionori<sup>®</sup>.<sup>74</sup> Isolation of mycosporine-aurine (**S65**) and of mycosporine-2 glycine (**S66**) from the sea anemone *Anthopleura elegantissima* was performed by RP C<sub>18</sub> SPE of the 8:2 MeOH/H<sub>2</sub>O extract, followed by RP C<sub>8</sub> HPLC, NP Si-gel HPLC and purification by HPLC with an aminopropyl-bonded Si-gel column.<sup>75</sup> Mycosporine **S67** was isolated by RP C<sub>8</sub> from the corals *Pocillopora damicornis* and *Stylophora pistillata*.<sup>76</sup> Palythine-Thr (**S68**) and palythine-Ser sulfate (**S69**) were also isolated from *S. pistillata* by HPLC using RP C<sub>8</sub>, a size-exclusion HEMA BIO 1000 column, a mixed-mode C<sub>8</sub>/cation column and NP aminopropyl-bonded Si-gel column.<sup>77</sup> A combination of IEC and HILIC was applied for the isolation of prasiolin (**S70**) from the terrestrial green alga *Prasiola calophylla*.<sup>78</sup> Bostrychines (e.g., **S71**) were isolated from the red alga *Bostrychia scorpioides* by Si-gel cc, RP C<sub>18</sub> CC and final purification

by HPLC using a polar RP column of an ether-linked phenyl phase with polar end-capping.<sup>79</sup> A similar polar-RP column was used for the final purification of klebsormidin A (S72) and B from the green microalgae *Interfilum* and *Klebsormidium*, after initial fractionation of the hydroalcoholic extract on Sephadex LH-20.<sup>80</sup>



73. I. Tsujino, K. Yabe, I. Sekikawa, *Bot. Mar.*, 1980, **23**, 65-68.

74. E. G. Brunt, J. G. Burgess, *Int. J. Cosmet. Sci.*, 2018, **40**, 1-15.

75. W. R. Stochaj, W. C. Dunlap, J. M. Shick, *Mar. Biol.*, 1994, **118**, 149-156.

76. J. J. Wu Won, J. A. Rideout, B. E. Chalker, *Tetrahedron Lett.*, 1995, **36**, 5255-5256.

77. J. J. Wu Won, B. E. Chalker, J. A. Rideout, *Tetrahedron Lett.*, 1997, **38**, 2525-2526.

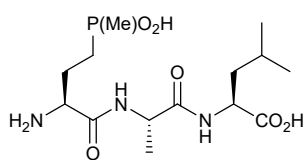
78. A. Hartmann, A. Holzinger, M. Ganzera, U. Karsten, *Planta*, 2016, **243**, 161-169.

79. M. Orfanoudaki, A. Hartmann, H. Miladinovic, H. Nguyen Ngoc, U. Karsten, M. Ganzera, *Mar. Drugs*, 2019, **17**, 356.

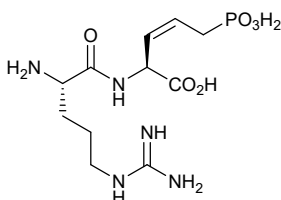
80. A. Hartmann, K. Glaser, A. Holzinger, M. Ganzera, U. Karsten, *Front. Microbiol.*, 2020, **11**, 499.

## 7. Additional examples of isolation of phosphorus-containing water-soluble metabolites

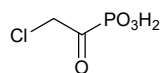
The antibiotic and herbicidal phosalacine (**S73**) was isolated from cultures of *Kitasatosporia phosalacinea* KA-338.<sup>81</sup> Antifungal rhizocticins (e.g., rhizocticin A, **S74**) have been isolated from cultures of *Bacillus subtilis* ATCC 6633.<sup>82</sup> The antibiotic fosfonochlorin, (2-chloroacetyl)phosphonic acid (**S75**), has been isolated from cultures of *Fusarium* spp. and *Talaromyces flavus*.<sup>83</sup> Phosmidosine (**S76**) was isolated from cultures of *Streptomyces* RK-16 and displayed antifungal activity.<sup>84</sup>

**S73**

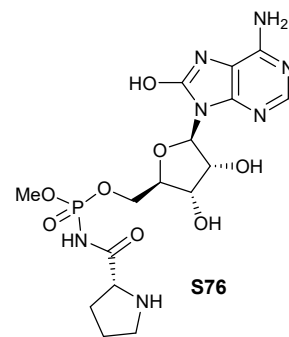
1. Filtered broth (70 L)
2. IEC Diaion WA-30
3. Activated carbon
4. IEC Amberlite IR-120
5. RP C<sub>18</sub> HPLC

**S74**

1. Culture media (5 L)
2. pH 2.5, centrifugation
3. Lyophilization
4. 70% EtOH extraction
5. XAD-16
6. BioGel P-2
7. IEC CM-Sephadex C-25
8. Sephadex -10
9. C<sub>18</sub> RP HPLC

**S75**

1. Filtered broth
2. IEC Dowex 21K
3. IEC Dowex 50WX4
4. IEC Amberlite CG-50
5. Preparative Si-gel TLC
6. IEC Dowex 50W-X4

**S76**

1. Filtered broth (60 L)
2. IEC IRC-50
3. HP-20
4. Activated charcoal
5. Cellulose CC
6. C<sub>18</sub> RP HPLC
7. IEC Dowex 50WX8

81. a) S. Omura, M. H. Murata, K. Hinotozawa, R. Oiwa, H. Tanaka, *J. Antibiot.*, 1984, **37**, 829-835; b) S.

Omura, K. Hinotozawa, N. Imamura, M. Murata, *J. Antibiot.*, 1984, **37**, 939-940.

82. a) C. Rapp, G. Jung, M. Kugler, M. Loef, *Liebigs Ann. Chem.*, 1988, 655-661; b) M. Kugler, W.

Loeffler, C. Rapp, A. Kern, G. Jung, *Arch. Microbiol.*, 1990, **153**, 276-281.

83. M. Takeuchi, M. Nakajima, T. Ogita, M. Inukai, K. Kodama, K. Furuya, H. Nagali, T. Haneishi, *J. Antibiot.*, 1989, **42**, 198-205.

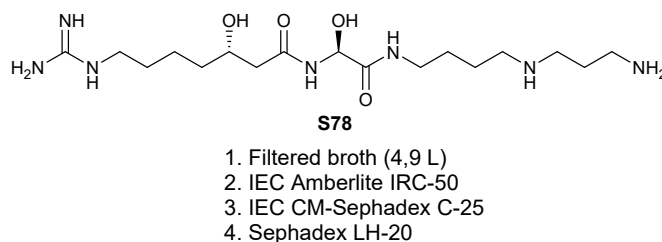
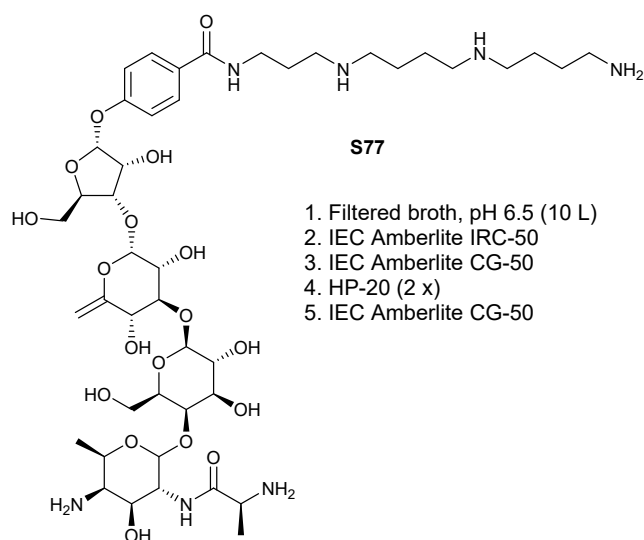
84. a) M. Uramoto, C.-J. Kim, K. Shin-ya, H. Kusakabe, K. Isono, D. R. Phillips, J. A. McCloskey, *J.*

*Antibiot.*, 1991, **44**, 375-381; b) D. R. Phillips, M. Uramoto, K. Isono, J. A. McCloskey, *J. Org. Chem.*,

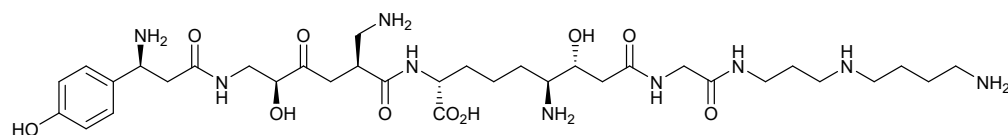
1993, **58**, 854-859.

## 8. Additional examples of isolation of polyamine alkaloids and polyamine conjugates

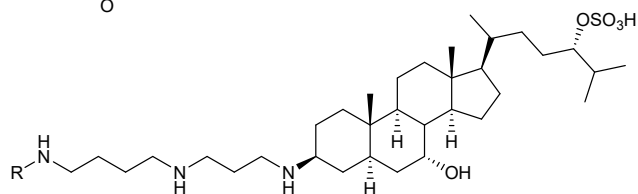
The antibiotic complex constituted by glyasperin A (**S77**), B and C was isolated from cultures of *Bacillus cereus*.<sup>85</sup> *Bacillus laterosporus* BMG162-aF2 was the source of the antitumor antibiotic spergualin (**S78**).<sup>86</sup> Edeines (e.g., edeine A, **S79**) have been isolated from cultures of *Bacillus brevis* Vm4 and exhibit broad antibiotic spectrum against Gram-positive and -negative bacteria, yeasts, mould and mycoplasmas. Edeines eliminate plasmids that promote antibiotic resistance, have immunosuppressive activity, inhibit DNA biosynthesis and protein synthesis.<sup>87</sup> Squalamines (e.g., squalamine, **S80**) isolated from the dogfish shark *Squalus acanthias* display antimicrobial and antifungal activity, among which **S81** proved to be the most active natural squalamine.<sup>88</sup> Hispidospermidin (**S82**) is produced in culture by *Chaetosphaeronema hispidulum* (Cda) Moesz NR 7127 as a new inhibitor of phospholipase C.<sup>89</sup> Circinamide (**S83**) produced in culture by the cyanobacterium *Anabaena circinalis* NIES-41 was isolated by C<sub>18</sub> RP cc, followed by C<sub>18</sub> RP HPLC.<sup>90</sup> Motuporamines A-C (e.g., motuporamine A, **S84**) were isolated as an inseparable mixture of macrocyclic homologues that displayed significant cytotoxic activity.<sup>91</sup> Didemnimides A (**S85**) and B were isolated from the ascidian *Didemnum* sp. as anti-malarial agents.<sup>92</sup> A particular group of water-soluble peptide-polyamine neurotoxins are derived from spiders and wasps, several members of which have been isolated using C<sub>18</sub> RP HPLC.<sup>93</sup>





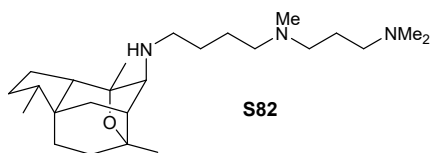
**S79**

1. Broth centrifugation
2. Phenol, 5% AcOH
3. Partitioning
4. Et<sub>2</sub>O, partitioning
5. Sephadex G-25
6. CCC

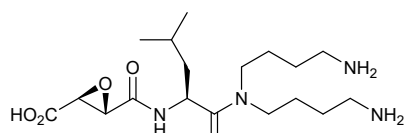
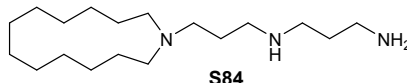
**S80 R = H****S81 R = (CH<sub>2</sub>)<sub>3</sub>NH<sub>2</sub>**

1. Dogfish stomach (400 g) (Ref. 1012a)
2. Lyophilization, 4:6 1% AcOH/MeCN
3. Centrifugation, evaporation, 1% AcOH
4. BioGel P-30
5. C<sub>18</sub> RP HPLC
6. IEC polysulfoethyl aspartamide HPLC
7. C<sub>4</sub> RP HPLC

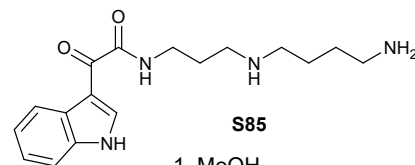
1. Dogfish liver (20 kg) (Ref. 1012c)
2. 12% AcOH sol., 75 °C, 1 h
3. (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>, 95% EtOH, 6 days
4. Organic phase discarded
5. H<sub>2</sub>O soln., filtration
6. XAD-16, 20 h, H<sub>2</sub>O, EtOH
7. EtOH evapn., filtration
8. IEC propylsulfonic acid resin
9. C<sub>18</sub> RP CC
10. IEC propylsulfonic acid resin
11. ultrafiltration

**S82**

1. Broth filtrate, pH 7.0 (17 L)
2. IEC Amberlite IRC-50
3. HP-21
4. pH 9.0, EtOAc

**S83****S84**

1. MeOH
2. EtOAc/H<sub>2</sub>O partitioning
3. H<sub>2</sub>O, 2:1 H<sub>2</sub>O/MeOH, filtration
4. Sephadex LH-20

**S85**

1. MeOH
2. C<sub>8</sub> RP CC
2. C<sub>18</sub> RP CC
3. Sephadex LH-20

85. a) H. Kawaguchi, M. Konishi, T. Tsuno, T. Miyaki, K. Tomita, K. Matsumoto, K. Fujisawa, H.

Tsukiura, *J. Antibiot.*, 1981, **34**, 381-389; b) T. Tsuno, M. Konishi, T. Naito, H. Kawaguchi, *J. Antibiot.*, 1981, **34**, 390-402.

86. a) T. Takeuchi, H. Iinuma, S. Kunimoto, T. Masuda, M. Ishizuka, M. Takeuchi, M. Hamada, H.

Naganawa, S. Kondo, H. Umezawa, *J. Antibiot.*, 1981, **34**, 1619-1621; b) H. Umezawa, S. Kondo, H.

Iinuma, S. Kunimoto, Y. Ikeda, H. Iwasawa, D. Ikeda, T. Takeuchi, *J. Antibiot.*, 1981, **34**, 1622-1624.

87. a) G. Roncar, Z. Kurylo-Borowska, L. C. Craig, *Biochem.*, 1966, **5**, 2153-2159; b) T. P. Hettinger, L.

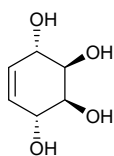
C. Craig, *Biochem.*, 1970, **9**, 1224-1232; c) Z. Kurylo-Borowska, J. Heaney-Kieras, *Methods Enzymol.*,

1983, **94**, 441-451; d) Z. Czajgucki, R. Andruszkiewicz, W. Kamysz, *J. Pept. Sci.*, 2006, **12**, 653-662.

88. a) K. S. Moore, S. Wehrli, H. Order, M. Rogers, J. N. Forrest, Jr., D. McCrimmon, M. Zasloff, *Proc. Natl. Acad. Sci. USA*, 1993, **90**, 1354-1358; S. L. Wehrli, K. S. Moore, H. Roder, S. Durell, M. Zasloff, *Steroids*, 1993, **58**, 370-378; c) M. N. Rao, A. E. Shinnar, A. E.; L. A. Noecker, T. L. Chao, B. Feibush, B. Snyder, I. Sharkansky, A. Sarkahian, X. Zhang, S. R. Jones, W. A. Kinney, M. Zasloff, *J. Nat. Prod.*, 2000, **63**, 631-635.
89. T. Ohtsuka, Y. Itezono, N. Nakayama, A. Sakai, N. Shimma, K. Yokose, H. Seto, *J. Antibiot.*, 1994, **47**, 6-15.
90. H. J. Shin, H. Matsuda, M. Murakami, K. Yamaguchi, *Tetrahedron*, 1997, **53**, 5747-5754.
91. D. E. Williams, P. Lassota, R. J. Andersen, *J. Org. Chem.*, 1998, **63**, 4838-4841.
92. R. Finlayson, A. N. Pearce, M. J. Page, M. Kaiser, M.-L. Bourguet-Kondracki, J.-L. Harper, V. L. Webb, B. R. Copp, *J. Nat. Prod.*, 2011, **74**, 888-892.
93. A. Schäfer, H. Benz, W. Fiedler, A. Guggisberg, S. Bienz, M. Hesse, *The Alkaloids*, 1994, **45**, 1-125.

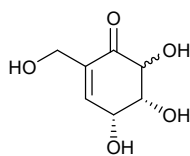
## 9. Additional examples of isolation of polyhydroxylated metabolites other than glycosides

Water-soluble cyclohexene derivatives with OH/C ratios between 0.66 and 0.5 have been isolated from plants and microbial strains. The first of such polyhydroxylated carbocycles is conduritol A (**S86**), isolated from the bark of *Marsdenia condurango* in 1908,<sup>94</sup> and re-isolated from the leaves of *Gyrnnerna sylvestre*.<sup>95</sup> All six conduritol A stereoisomers have been synthesized for the assignment of the absolute stereochemistry.<sup>94</sup> The water-soluble carbocycle KD16-U1 (**S87**) was isolated from cultures of *Streptomyces filipinensis*.<sup>96</sup> The related water-soluble gabosines A (**S88**), B-K have been isolated from cultures of different *Streptomyces* strains.<sup>97</sup> Polyhydroxylated sterols devoid of sugar units or sulfate groups have been recurrently isolated from marine sponges, soft corals and Echinodermata, but apparently none is water-soluble.<sup>98-101</sup>



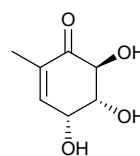
S86

1. Dried powdered leaves (7.9 kg)
2. Petroleum ether
3. MeOH, evaporation
4. H<sub>2</sub>O
5. pH 2.0, acids precipitation
6. Basic pH, bases extraction (CHCl<sub>3</sub>)
7. pH 7.0, acetone/H<sub>2</sub>O 5:1
8. Oil decanted, solvent removal
9. Boiling EtOH, crystallization



S87

1. Filtered broth (5 L)
2. Charcoal
3. Avicel cellulose CC
4. Si-gel
5. Recrystallization



S88

1. Filtered broth
2. Evaporation and lyophilization
3. MeOH extraction
4. Si-gel CC (2 x)
5. Sephadex LH-20

94. M. Balci, Y. Sütbeyaz, H. Seçen, *Tetrahedron*, 1990, **46**, 3715-3742.

95. P. E. Manni, J. E. Sinsheimer, *J. Pharm. Sci.*, 1965, **54**, 1541-1544.

96. K. Tatsuta, T. Tsuchiya, N. Mikami, S. Umezawa, H. Umezawa, H. Naganawa, *J. Antibiot.*, 1974, **27**, 579-586.

97. a) G. Bach, S. Breiding-Mack, S. Grabley, P. Hammann, K. Huetter, R. Thiericke, H. Uhr, J. Wink, A. Zeeck, *Liebigs Ann. Chem.*, 1993, 241-250; b) Y.-Q. Tang, C. Maul, R. Höfs, I. Sattler, S. Grabley, X.-Z. Feng, A. Zeeck, R. Thiericke, *Eur. J. Org. Chem.*, 2000, 149-153.

98. M. V. D'Auria, L. Minale, R. Riccio, *Chem. Rev.*, 1993, **93**, 1839-1895.

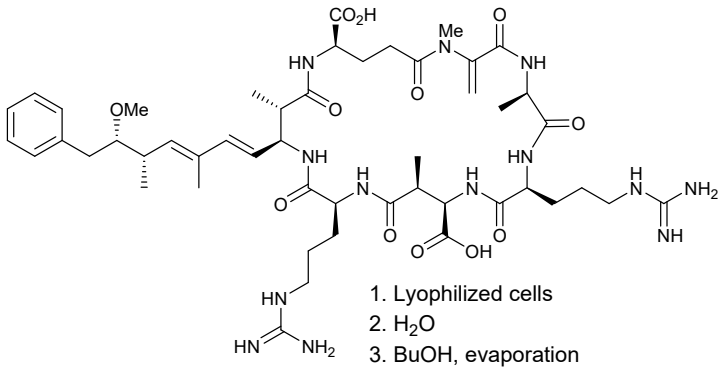
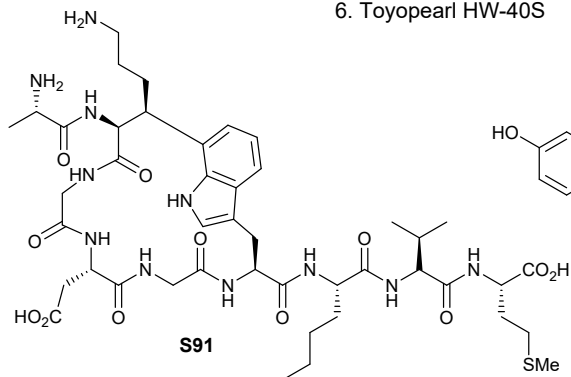
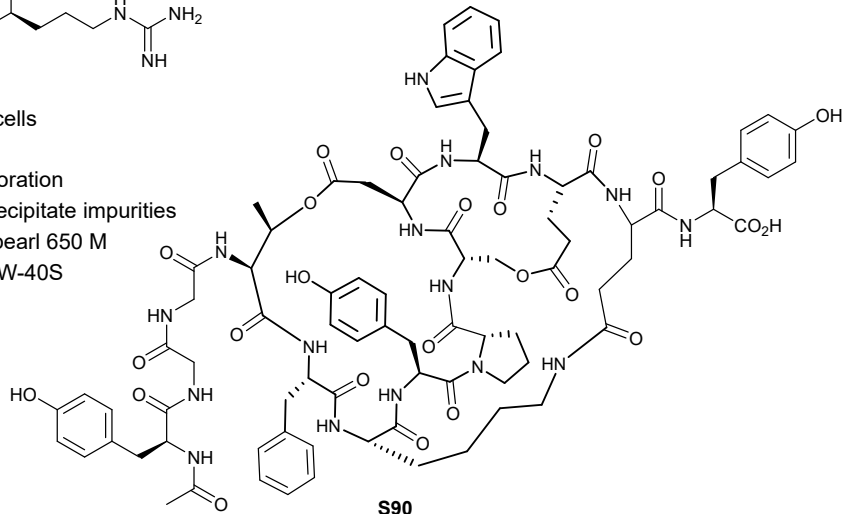
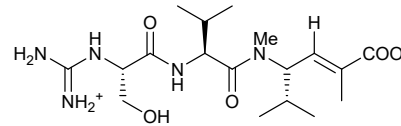
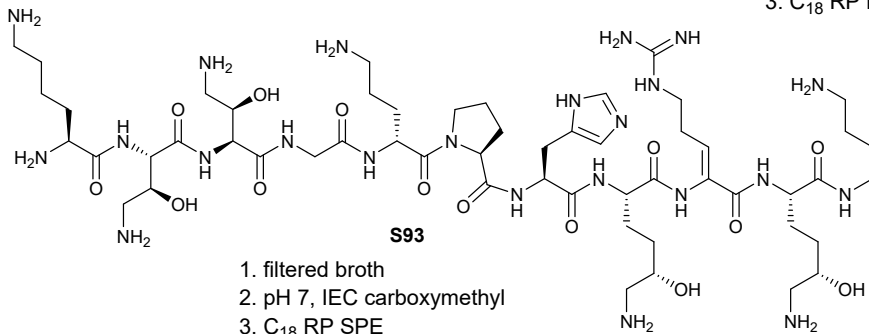
99. A. Aiello, E. Fattorusso, M. Menna, *Steroids*, 1999, **64**, 687-714.

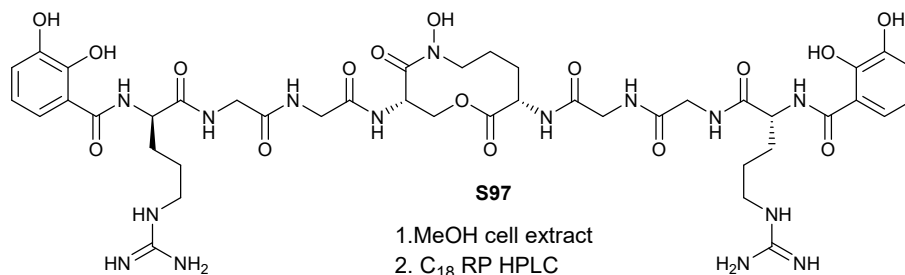
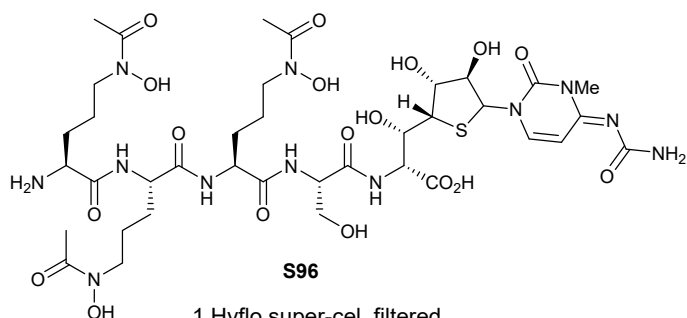
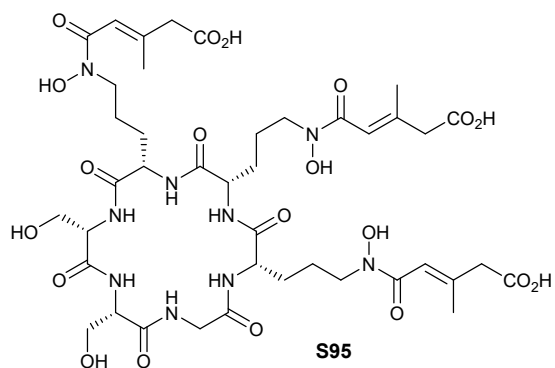
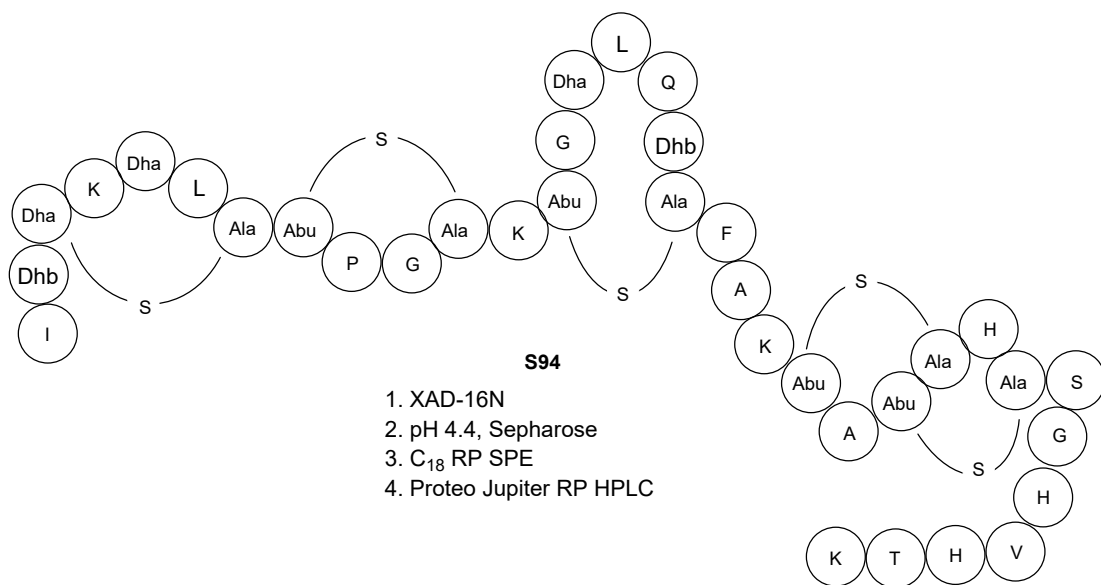
100. V. A. Stonik, *Russ. Chem. Rev.*, 2001, **70**, 673-715.

101. E. V. Ermolenko, A. B. Imbs, T. A. Glorizova, V. V. Poroikov, T. V. Sikorskaya, V. M. Dembitsky, *Mar. Drugs*, 2020, **18**, 613; doi:10.3390/md18120613.

## 10. Additional examples of isolation of water-soluble peptides

Microcystin-RR (**S89**, previously named cyanoviridin-RR) is a widely distributed cyanobacterial toxin known to cause liver damage to humans and animals. It was first purified from *Microcystis viridis* NIES-102 by a combination of anion exchange and size exclusion chromatography.<sup>102,103</sup> From the same strain, the tricyclic depsipeptide microviridin (**S90**) was isolated by RP-HPLC followed by IEC.<sup>104</sup> Streptide (**S91**), produced by *Streptococcus thermophilus*, features an unusual crosslink between two unactivated carbons of a lysine and a tryptophan residues and was isolated and purified using exclusively C<sub>18</sub> RP CC and HPLC.<sup>105</sup> Cryptomaldamide (**S92**) was discovered from the cyanobacterium *Moorea producens* strain by using MALDI mass spectrometry to investigate the metabolome of cyanobacterial cultures fed with <sup>15</sup>N-enriched NaNO<sub>3</sub>.<sup>106</sup> Cryptomaldamide (**S92**) was also isolated using exclusively C<sub>18</sub> RP CC and HPLC. Odilorhabdins (e.g., **S93**) are ribosome-targeting antibiotics produced by *Xenorhabdus nematophila* symbiotically associated with nematodes.<sup>107</sup> Odilorhabdins were isolated by IEC followed by RP chromatography. Antimicrobial nisin J (**S94**) is produced by *Staphylococcus capitis* associated with the human skin microbiota.<sup>108</sup> Isolation of **S94** was performed by chromatography on XAD-16N and Sepharose beads, followed by C<sub>18</sub> RP SPE and purification by C<sub>18</sub> RP HPLC. A particular category of peptides are siderophores, peptides and peptide-derived metabolites that sequester iron from the environment to the benefit of the producing organism, which very often are water-soluble.<sup>109</sup> Ferrichrome (**S95**) was obtained from the rust fungus *Ustilago sphaerogena* by repeated liquid-liquid extractions followed by recrystallization.<sup>110</sup> Initially discovered from an *Actinomyces subtropicus*, albomycin (**S96**) was later isolated from *Streptomyces griseus* using adsorption on XAD-2 and XAD-4, SEC on Bio-Gel P-2 and final purification by C<sub>18</sub> RP HPLC.<sup>111</sup> Fuscachelins (e.g., **S97**) were isolated from the moderate thermophile *Thermobifida fusca* by C<sub>18</sub> RP HPLC with a 300 Å pore size column, suitable for the separation of peptides and proteins.<sup>112</sup>

**S89****S91****S90****S92****S93**



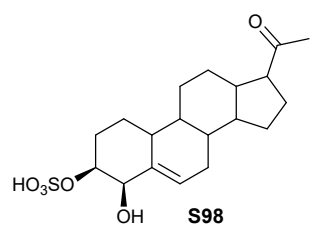
102. T. Kusumi, T. Ooi, M. M. Watanabe, H. Takahashi, H. Kakisawa, *Tetrahedron Lett.*, 1987, **28**, 4695–4698.

103. T. Ooi, T. Kusumi, H. Kakisawa, M. M. Watanabe, *J. Appl. Phycol.*, 1989, **1**, 31–38.
104. M. O. Ishitsuka, T. Kusumi, H. Kakisawa, K. Kaya, M. M. Watanabe, *J. Am. Chem. Soc.*, 1990, **112**, 8180–8182.
105. K. R. Schramma, L. B. Bushin, M. R. Seyedsayamdost, *Nat. Chem.*, 2015, **7**, 431–437.
106. R. B. Kinnel, E. Esquenazi, T. Leao, N. Moss, E. Mevers, A. R. Pereira, E. A. Monroe, A. Korobeynikov, T. F. Murray, D. Sherman, L. Gerwick, P. C. Dorrestein, W. H. Gerwick, *J. Nat. Prod.*, 2017, **80**, 1514–1521.
107. L. Pantel, T. Florin, M. Dobosz-Bartoszek, E. Racine, M. Sarciaux, M. Serri, J. Houard, J.-M. Campagne, R. M. de Figueiredo, C. Midrier, S. Gaudriault, A. Givaudan, A. Lanois, S. Forst, A. Aumelas, C. Cotteaux-Lautard, J.-M. Bolla, C. V. Lundberg, D. L. Huseby, D. Hughes, P. Villain-Guillot, A. S. Mankin, Y. S. Polikanov, M. Gualtieri, *Mol. Cell*, 2018, **70**, 83–94.
108. J. N. O’Sullivan, P. M. O’Connor, M. C. Rea, O. O’Sullivan, C. J. Walsh, B. Healy, H. Mathur, D. Field, C. Hill, R. P. Ross, *J. Bacteriol.*, 2019, **202**, 1–15.
109. D. Al Shaer, O. Al Musaimi, B. G. de la Torre, F. Albericio, *Eur. J. Med. Chem.*, 2020, **208**, 112791. <https://doi.org/10.1016/j.ejmech.2020.112791>
110. J. B. Neilands, *J. Am. Chem. Soc.*, 1952, **74**, 4846–4847.
111. H.-P. Fiedler, F. Walz, A. Döhle, H. Zähler, *Appl. Microbiol. Biotechnol.*, 1985, **21**, 341–347.
112. E. J. Dimise, P. F. Widboom, S. D. Bruner, *Proc. Natl. Acad. Sci.*, 2008, **105**, 15311–15316.

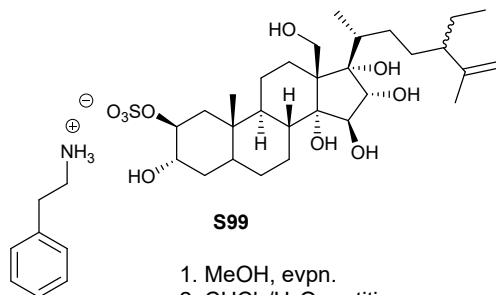
## 11. Additional examples of isolation of sulfated metabolites

Some fungi produce monosulfated sterols. However, it is unclear if a single sulfate group is sufficient to make sterols water-soluble. For example, the isolation of sponge-derived 3 $\beta$ ,4 $\beta$ -dihydroxy-pregn-5-en-20-one-3-sulfate (**S98**) was reported from the aqueous fraction of the marine sponge *Stylopus australis*,<sup>113</sup> as well as echinocasterol sulfate phenethylammonium salt (**S99**).<sup>114</sup> While the fungal sterol sulfate **S100**

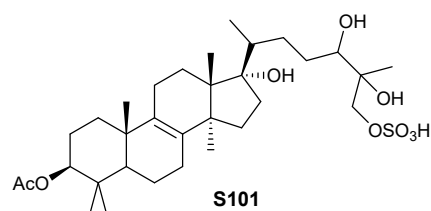
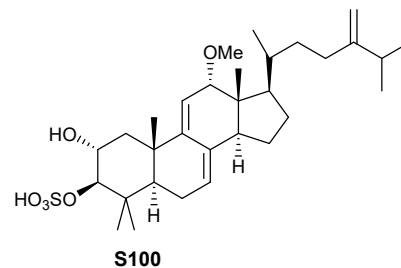
isolated from cultures of *Fusarium compactum* does not appear to be water-soluble,<sup>115</sup> the sterol sulfate Sch 601324 (**S101**) produced by *Chrysosporium* sp. is likely water-soluble.<sup>116</sup>



1. 4:1 MeOH/toluene
2. Evpn., EtOAc/H<sub>2</sub>O
3. H<sub>2</sub>O evpn.
4. MeOH, filtration
5. C<sub>18</sub> RP CC
6. Si-gel
7. Recrystallization EtOAc/MeOH



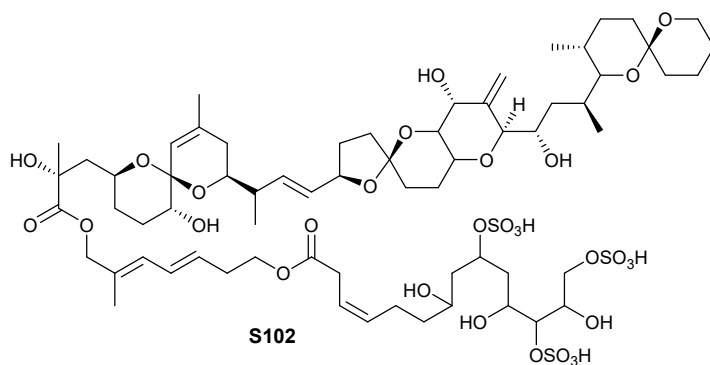
1. MeOH, evpn.
2. CHCl<sub>3</sub>/H<sub>2</sub>O partition
3. H<sub>2</sub>O/n-BuOH partition
4. n-BuOH
5. C<sub>18</sub> RP CC
6. C<sub>18</sub> RP HPLC



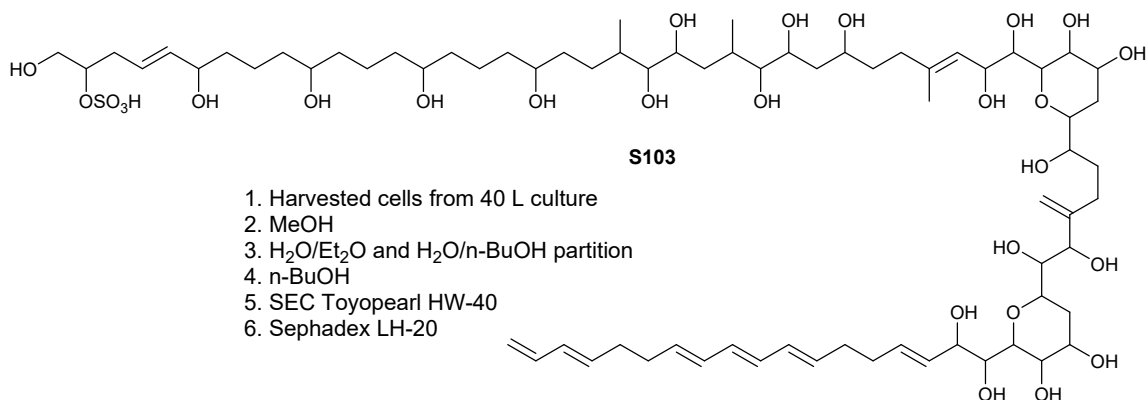
1. Fermentation broth (8 L)
2. NaCl (400 g) + MeCN (16 L)
3. MeCN, evapn.
4. SPE CG<sub>161</sub> polymer
5. C<sub>18</sub> RP semi-prep HPLC

Several marine toxins display sulfate groups. DTX-4 (**S102**) was reported as the water-soluble first diarrhetic shellfish poisoning toxin, isolated from the cell pellet of the cultured dinoflagellate *Prorocentrum lima*.<sup>117</sup> Some of the polyoxygenated linear and cyclized polyketides isolated from *Amphidinium* spp. dinoflagellates present sulfate groups. Amphidinol (**S103**, with no stereochemical assignment to any stereogenic center) was the first compound isolated in this series. Although not explicitly defined as water-soluble, its isolation procedure suggests water-solubility.<sup>118</sup> The closest relative of **S103** is amphidinol 3 (**S104**), obtained from 440 L of *Amphidinium klebsii* cultures,<sup>118a</sup> which lacks a sulfate group but was isolated along with amphidinol 2, by a procedure that implicitly indicates water solubility.<sup>118b</sup> While the stereochemistry of **S103** has not been yet assigned, the stereochemistry of **S104** has been recently revised.<sup>119</sup>

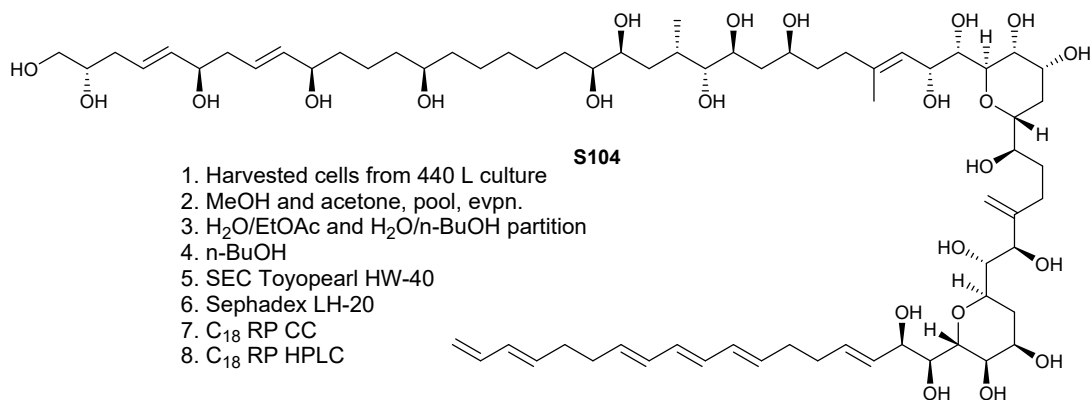




1. Harvested cells (200 g, wet)
2. MeOH
3. Partition with n-hexane, Et<sub>2</sub>O and n-BuOH
4. n-BuOH
5. normal-phase chromatography
6. size exclusion chromatography



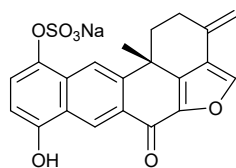
1. Harvested cells from 40 L culture
2. MeOH
3. H<sub>2</sub>O/Et<sub>2</sub>O and H<sub>2</sub>O/n-BuOH partition
4. n-BuOH
5. SEC Toyopearl HW-40
6. Sephadex LH-20



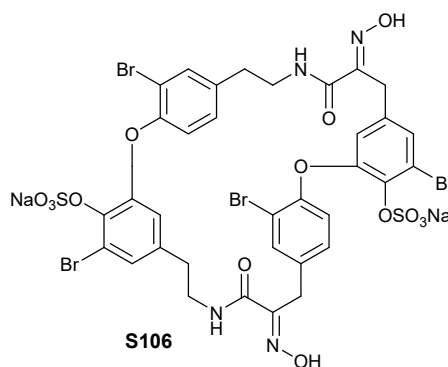
1. Harvested cells from 440 L culture
2. MeOH and acetone, pool, evpn.
3. H<sub>2</sub>O/EtOAc and H<sub>2</sub>O/n-BuOH partition
4. n-BuOH
5. SEC Toyopearl HW-40
6. Sephadex LH-20
7. C<sub>18</sub> RP CC
8. C<sub>18</sub> RP HPLC

Xestoquinol sulfate (**S105**) was isolated from the sponge *Xestospongia sapra*, and proved to be a less effective inhibitor of DNA topoisomerase I and cytotoxic agent than the related desulfated derivatives.<sup>120</sup>

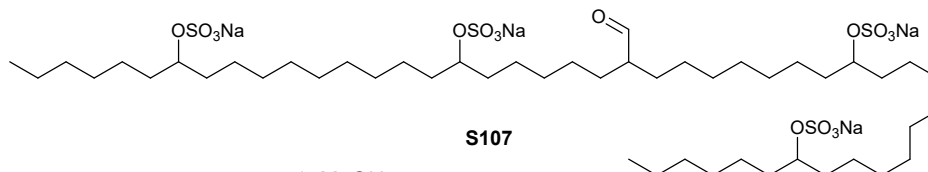
Among several bastadins, 15,34-*O*-disulfatobastadin 7 (**S106**) was the only with two sulfate groups isolated from the sponge *Ianthella basta*. Compound **S106** was moderately active as inducer of Ca<sup>2+</sup> ions release from Ca<sup>2+</sup> stores within the sarcoplasmic reticulum of fast-twitch skeletal muscle through the Ca<sup>2+</sup> channel.<sup>121</sup> Toxadocial B (**S107**) was isolated along with additional antithrombotic toxadocials from the sponge *Toxadocia cylindrica*.<sup>122</sup> Water-soluble callyspongins A (**S108**) and B have been isolated from the sponge *Callyspongia truncata* as cytotoxic agents.<sup>123</sup> The bis-sulfated coumarin dasycladin A (**S109**) was isolated from the 1:1 H<sub>2</sub>O/MeOH extract of the marine alga *Dasycladus vermicularis*.<sup>124</sup> Exiguaquinol (**S110**) was isolated from the sponge *Neopetrosia exigua* and inhibited *Helicobacter pylori* MurI, an enzyme that catalyzes the interconversion of L- into D-glutamate which is a building block of bacterial cell wall peptidoglycan chain.<sup>125</sup>

**S105**

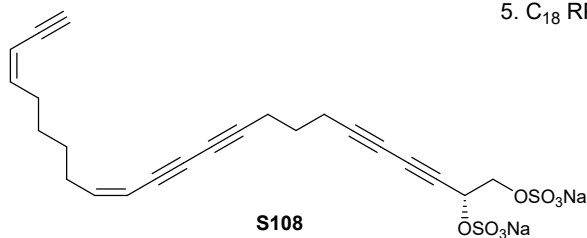
1. MeOH, evpn.
2. EtOAc/H<sub>2</sub>O
3. H<sub>2</sub>O/n-BuOH
4. n-BuOH
5. C<sub>18</sub> RP CC
6. SEC Toyopearl HW-40F

**S106**

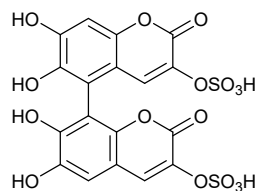
1. MeOH
2. Partition n-hexane, CHCl<sub>3</sub>, n-BuOH
3. n-BuOH
4. Sephadex LH-20
5. Si-gel CC
6. Sephadex LH-20
7. C<sub>18</sub> RP HPLC

**S107**

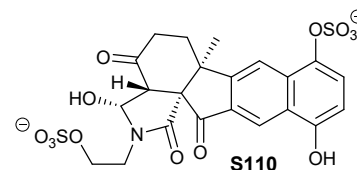
1. MeOH, evpn.
2. H<sub>2</sub>O/Et<sub>2</sub>O and H<sub>2</sub>O/n-BuOH
3. n-BuOH
4. Sephadex LH-20
5. C<sub>18</sub> RP HPLC (3 x)

**S108**

1. MeOH
2. H<sub>2</sub>O/EtOAc, H<sub>2</sub>O/n-BuOH
3. n-BuOH
4. SEC Toyopearl HW-40

**S109**

1. CH<sub>2</sub>Cl<sub>2</sub> then MeOH
2. Then 1:1 H<sub>2</sub>O/MeOH
3. C<sub>18</sub> RP CC

**S110**

1. Extracted inline to C<sub>18</sub> RP MPLC
2. C<sub>18</sub> RP HPLC (2 x)

113. M. R. Prinsep, J. W. Blunt, M. H. G. Munro, *J. Nat. Prod.*, 1989, **52**, 657-659.

114. H.-Y. Li, S. Matsunaga, N. Fusetani, H. Fujiki, P. T. Murphy, R. H. Willis, J. T. Baker, *Tetrahedron Lett.*, 1993, **34**, 5733-5136.

115. G. M. Brill, W. M. Kati, D. Montgomery, J. P. Karwowski, P. E. Humphrey, M. Jackson, J. J.

Clement, S. Kadam, R. H. Chen, J. B. McAlpine, *J. Antibiot.*, 1996, **49**, 541-546.

116. S.-W. Yang, A. Buevich, T.-M. Chan, J. Terraciano, G. Chen, D. Loebenberg, M. Patel, E. Boehm, V. Gullo, B. Paramanik, M. Chu, *J. Antibiot.*, 2003, **56**, 419-422.
117. a) T. Hu, J. M. Curtis, J. A. Walter, J. L. C. Wright, *J. Chem. Soc., Chem. Commun.*, 1995, 597-599;  
b) T. Hu, J. M. Curtis, J. A. Walter, J. L. McLachlan, J. L. C. Wright, *Tetrahedron Lett.*, 1995, **36**, 9273-9276.
118. a) M. Murata, S. Matsuoka, N. Matsumori, G. K. Paul, K. Tachibana, *J. Am. Chem. Soc.*, 1999, **121**, 870-871; b) G. K. Paul, N. Matsumori, M. Murata, K. Tachibana, *Tetrahedron Lett.*, 1995, **36**, 6279-6282.
119. T. Oishi, M. Kanemoto, R. Swasono, N. Matsumori, M. Murata, *Org. Lett.*, 2008, **10**, 5203-5206.
120. J. Kobayashi, T. Hirase, H. Shigemori, M. Ishibashi, T. Sasaki, *J. Nat. Prod.*, 1992, **55**, 994-998.
121. M. A. Franklin, S. G. Penn, C. B. Lebrilla, T. H. Lam, I. N. Pessah, T. F. Molinski, *J. Nat. Prod.*, 1996, **59**, 1121-1127.
122. Y. Nakao, S. Matsunaga, N. Fusetani, *Tetrahedron*, 1993, **49**, 11183-11188.
123. M. Uno, S. Ohta, E. Ohta, S. Ikegami, *J. Nat. Prod.*, 1996, **59**, 1146-1148.
124. A. Hartmann, M. Ganzera, U. Karsten, A. Skhirtladze, H. Stuppner, *Molecules*, 2018, **23**, 2735; doi:10.3390/molecules23112735.
125. P. A. Leone, A. R. Carroll, L. Towerzey, G. King, B. M. McArdle, G. Kern, S. Fisher, J. N. A. Hooper, R. J. Quinn, *Org. Lett.*, 2008, **10**, 2585-2588.

-----  
12. Selected literature examples on the “capture” of hydrophobic natural products using adsorptive resins.

**HP-20**

**Alkaloids**

Nagata, H.; Ochiai, K.; Aotani, Y.; Ando, K.; Yoshida, M.; Takahashi, I.; Tamaoki, T. *J. Antibiot.* **1997**, *50*, 537-542.

Bae, J.; Moon, H.; Oh, K.-K.; Kim, C.-H.; Lee, D. S.; Kim, S.-W.; Hong, S.-I. *Biotechnol. Lett.* **2001**, *23*, 1315-1319.

Juang, R.-S.; Yeh, C.-L. *Biotech. Bioproc. Eng.* **2014**, *19*, 159-168.

Nakashima, T.; Miyano, R.; Iwatsuki, M.; Shirahata, T.; Kimura, T.; Asami, Y.; Kobayashi, Y.; Shiomi, K.; Petersson, G. A.; Takahashi, Y.; Omura, S. *J. Antibiot.* **2016**, *69*, 611-615.

### **Alkaloid-aminoglycoside**

He, H.; Ding, W.-D.; Bernan, V. S.; Richardson, A. D.; Ireland, C. M.; Greenstein, M.; Ellestad, G. A.; Carter, G. T. *J. Am. Chem. Soc.* **2001**, *123*, 5362-5363.

### **Benzene derivative**

Lomascolo, A.; Lesage-Meessen, L.; Labat, M.; Navarro, D.; Delattre, M.; Asther, M. *Can. J. Microbiol.* **1999**, *45*, 653-657.

### **Glycopeptide**

Lee, C.-H.; Kim, S.; Hyun, B.; Suh, J.-W.; Yon, C.; Kim, C.; Lim, Y.; Kim, C. *J. Antibiot.* **1994**, *47*, 1402-1405.

### **Lipopeptide**

Fujie, A.; Iwamoto, T.; Muramatsu, H.; Okudaira, T.; Nitta, K.; Nakanishi, T.; Sakamoto, K.; Hori, Y.; Hino, M.; Hashimoto, S.; Okuhara, M. *J. Antibiot.* **2000**, *53*, 912-919.

Kanasaki, R.; Sakamoto, K.; Hashimoto, M.; Takase, S.; Tsurumi, Y.; Fujie, A.; Hino, M.; Hashimoto, S.; Hori, Y. *J. Antibiot.* **2006**, *59*, 137-144.

Kai, H.; Yamashita, M.; Takase, S.; Hashimoto, M.; Muramatsu, H.; Nakamura, I.; Yoshikawa, K.; Ezaki, M.; Nitta, K.; Watanabe, M.; Inamura, N.; Fujie, A. *J. Antibiot.* **2013**, *66*, 465-471.

### **Meroterpenoid**

Carney, J. R.; Krenisky, J. M.; Williamson, R. T.; Luo, J. *J. Nat. Prod.* **2002**, *65*, 203-205.

### **Peptide**

Morita, H.; Suzuki, H.; Kobayashi, J. *J. Nat. Prod.* **2004**, *67*, 1628-1630.

### **Polyketides**

McDonald, L. A.; Abbanat, D. R.; Barbieri, L. R.; Bernan, V. S.; Discafani, C. M.; Greenstein, M.; Janota, K.; Korshalla, J. D.; Lassota, P.; Tischler, M.; Carter, G. T. *Tetrahedron Lett.* **1990**, *4*, 2489-2492.

Sanson, D. R.; Gracz, H.; Tempesta, M. S.; Fukuda, D. S.; Nakatsukasa, W. M.; Sands, T. H.; Baker, P. J.; Mynderse, J. S. *Tetrahedron* **1991**, *41*, 3633-3644.

Igarashi, M.; Hayashi, C.; Homma, Y.; Hattori, S.; Kinoshita, N.; Hamada, M.; Takeuchi, T. *J. Antibiot.* **2000**, *53*, 1096-1101.

Ohsumi, K.; Masaki, T.; Takase, S.; Watanabe, M.; Fuji, A. *J. Antibiot.* **2014**, *67*, 707-711.

Kobayashi, K.; Tsukasaki, N.; Uchida, R.; Yamaguchi, Y.; Tomoda, H. *J. Antibiot.* **2015**, *68*, 615-619.

Li, C.-Y.; Lee, E.-J.; Wu, T.-S. *J. Nat. Prod.* **2004**, *67*, 437-440.

### **Polyketide-aminoglycoside**

Lam, K. S.; Gustavson, D. R.; Veitch, J. A.; Forenza, S. *J. Ind. Microbiol.* **1993**, *12*, 99-102.

### **Polyketide-peptide (PKS-NRPS)**

Hara, M.; Asano, K.; Kawamoto, I.; Takiguchi, T.; Katsumata, S.; Takahashi, K.-I.; Nakano, H. *J. Antibiot.* **1989**, *42*, 1768-1774.

Liu, B.; Hui, J.; Cheng, Y.-Q.; Zhang, X. *J. Ind. Microbiol. Biotechnol.* **2012**, *39*, 767-776.

#### Polyphenols

Kamimura, A.; Takahashi, T. *Experim. Dermatol.* **2002**, *11*, 532-541.

#### Polyphenol

Okada, Y.; Ishimaru, A.; Suzuki, R.; Okuyama, T. *J. Nat. Prod.* **2004**, *67*, 103-105.

#### Terpenoids

Okada, M.; Kamiya, S.; Shiina, Y.; Suwa, H.; Nagashima, N.; Nakajima, S.; Shimokawa, H.; Sugiyama, E.; Kondo, H.; Kojiri, K.; Suda, H. *J. Antibiot.* **1998**, *51*, 1081-1086.

Igarashi, Y.; Sekine, A.; Fukazawa, H.; Uehara, Y.; Yamagushi, K.; Endo, Y.; Okuda, T.; Furumai, T.; Oki, T. *J. Antibiot.* **2002**, *55*, 371-376.

Hitotsuyanagi, Y.; Ozeki, A.; Itokawa, H.; Alves, S. M.; Takeya, K. *J. Nat. Prod.* **2001**, *64*, 1583-1584.

#### Triterpenoid monoglycoside

Yokosuka, A.; Mimaki, Y.; Sashida, Y. *J. Nat. Prod.* **2003**, *66*, 876-878.

#### HP-20SS

#### Polyketide-peptide (PKS-NRPS)

Arslanian, R. L.; Parker, C. D.; Wang, P. K.; McIntire, J. R.; Lau, J.; Starks, C.; Licari, P. J. *J. Nat. Prod.* **2002**, *65*, 570-572.

#### Polyamide

#### Alkaloid

Charan, R. D.; Schlingmann, G.; Bernan, V. S.; Feng, X.; Carter, G. T. *J. Nat. Prod.* **2005**, *68*, 277-279.

#### Polyketide

Charan, R. D.; Schlingmann, G.; Bernan, V. S.; Feng, X.; Carter, G. T. *J. Antibiot.* **2005**, *58*, 271-274.

#### Toyopearl HW-40

#### Alkaloid, polyphenols, terpenoids and monoglycosides

Nakagawa, H.; Takaishi, Y.; Fujimoto, Y.; Duque, C.; Garzon, C.; Sato, M.; Okamoto, M.; Oshikawa, T.; Ahmed, S. U. Chemical Constituents from the Colombian Medicinal Plant *Maytenus laevis* *J. Nat. Prod.* **2004**, *67*, 1919-1924.

#### XAD-16

#### Alkaloids

Pu, X.; Qu, X.; Chen, F.; Bao, J.; Zhang, G.; Luo, Y. *Appl. Microbiol. Biotechnol.* **2013**, *97*, 9365-9375.

#### Lipopeptide

Hedge, V. R.; Silver, J.; Patel, M.; Gullo, V. P.; Puar, M. P.; Das, P. R.; Loebenberg, D. *J. Antibiot.* **2003**, *56*, 437-447.

#### Polyketides

Wessels, P.; Gohrt, A.; Zeeck, A.; Drautz, H.; Zahner, H. *J. Antibiot.* **1991**, *44*, 1013-1018.

Grabley, S.; Hammann, P.; Hutter, K.; Kirsch, R.; Kluge, H.; Thiericke, R.; Mayer, M.; Zeeck, A. *J. Antibiot.* **1992**, *45*, 1176-1181.

Gerth, K.; Washausen, P.; Höfle, G.; Irschik, H.; Reichenbach, H. *J. Antibiot.* **1996**, *49*, 71-75.

Woo, E. J.; Starks, C. M.; Carney, J. R.; Arslanian, R.; Cadapan, L.; Zavala, S.; Licari, P. *J. Antibiot.* **2002**, *55*, 141-146.

Brachmann, A. O.; Forst, S.; Furgani, G. M.; Fodor, A.; Bode, H. B. *J. Nat. Prod.* **2006**, *69*, 1830-1832.

Carlson, J. C.; Li, S.; Burr, D. A.; Sherman, D. H. *J. Nat. Prod.* **2009**, *72*, 2076-2079.

### **Polyketide-peptide (PKS-NRPS)**

Gerth, K.; Bedorf, N.; Höfle, G.; Irschik, H.; Reichenbach, H. *J. Antibiot.* **1996**, *49*, 560-563.

Le Goff, G.; Martin, M.-T.; Servy, C.; Cortial, S.; Lopes, P.; Bialecki, A.; Smadja, J.; Ouazzani, J. *J. Nat. Prod.* **2012**, *75*, 915-919.

Le Goff, G.; Martin, M.-T.; Iorga, B. I.; Adelin, E.; Servy, C.; Cortial, S.; Ouazzani, J. *J. Nat. Prod.* **2013**, *76*, 142-149.

Brachmann, A. O.; Forst, S.; Furgani, G. M.; Fodor, A.; Bode, H. B. *J. Nat. Prod.* **2006**, *69*, 1830-1832.

### **Polyketides and alkaloids**

Grabley, S.; Hammann, P.; Kluge, H.; Wink, J.; Kricke, P.; Zeeck, A. *J. Antibiot.* **1991**, *44*, 797-800.

### **Polyphenols**

Hegde, V. R.; Patel, M. G.; Horan, A. C.; Schwartz, J. L.; Hart, R.; Puar, M. S.; Gullo, V. P.; Iyengar, S. *J. Ind. Microbiol.* **1991**, *8*, 187-192.

### **Other compounds**

Henkel, T.; Breiding-Mack, S.; Zeeck, A.; Grabley, S.; Hammann, P. E.; Hiitter, P. E.; Till, G.; Thiericke, R.; Wink, J. *Liebigs Ann. Chem.* **1991**, 575-580.

### **XAD-2, XAD-4 and XAD-7**

#### **Alkaloids**

Nicacio, K. J.; Ióca, L. P.; Fróes, A. M.; Leomil, L.; Appolinario, L. R.; Thompson, C. C.; Thompson, F. L.; Ferreira, A. G.; Williams, D. E.; Andersen, R. J.; Eustaquio, A. S.; Berlinck, R. G. S. *J. Nat. Prod.* **2017**, *80*, 235-240.

#### **Lipopeptides**

Homann, V. V.; Sandy, M.; Tincu, J. A.; Templeton, A. S.; Tebo, B. M.; Butler, A. *J. Nat. Prod.* **2009**, *72*, 884-888.

#### **Polyketides**

Needham, J.; Andersen, R. J.; Kelly, M. T. *Tetrahedron Lett.* **1991**, *32*, 315-318.

### **XAD-1180**

#### **Polyketides**

Potterat, O.; Zahner, H.; Volkmann, C.; Zeeck, A. *J. Antibiot.*, **1993**, *46*, 346-349.

-----

13. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using a column with aminopropyl-bonded Si-gel as stationary phase** in at least one of the isolation steps.

### Alkaloids

Becher, P. G.; Beuchat, J.; Gademann, K.; Jüttner, F. *J. Nat. Prod.* **2005**, *68*, 1793-1795.

Nugroho, A. E.; Hirasawa, Y.; Kawahara, N.; Goda, Y.; Awang, K.; Hadi, A. H. A.; Morita, H. *J. Nat. Prod.* **2009**, *72*, 1502–1506.

Yang, S.-P.; Zhang, H.; Zhang, C.-R.; Cheng, H.-D.; Yue, J.-M. *J. Nat. Prod.* **2006**, *69*, 79-82.

Carroll, A. R.; Addepalli, R.; Fechner, G.; Smith, J.; Guymer, G. P.; Forster, P. I.; Quinn, R. J. *J. Nat. Prod.* **2008**, *71*, 1063–1065.

Di, Y.-T.; He, H.-P.; Lu, Y.; Yi, P.; Li, L.; Wu, L.; Hao, X.-J. *J. Nat. Prod.* **2006**, *69*, 1074-1076.

Bringmann, G.; Messer, K.; Brun, R.; Mudogo, V. *J. Nat. Prod.* **2002**, *65*, 1096-1101.

Zaima, K.; Hirata, T.; Hosoya, T.; Hirasawa, Y.; Koyama, K.; Rahman, A.; Kusumawati, I.; Zaini, N. C.; Shiro, M.; Morita, H. *J. Nat. Prod.* **2009**, *72*, 1686–1690.

Yan, Y.-X.; Hu, X.-D.; Chen, J. C.; Sun, Y.; Zhang, X.-M.; Qing, C.; Qiu, M.-H. *J. Nat. Prod.* **2009**, *72*, 308–311.

Oliveira, J. H. H. L.; Grube, A.; Köck, M.; Berlinck, R. G. S.; Macedo, M. L.; Ferreira, A. G.; Hajdu, E. *J. Nat. Prod.* **2004**, *67*, 1685-1689.

Davis, R. A.; Carroll, A. R.; Quinn, R. J. *J. Nat. Prod.* **2002**, *65*, 454-457.

Lee, H.-S.; Seo, Y.; Rho, J.-R.; Shin, J.; Paul, V. J. *J. Nat. Prod.* **2001**, *64*, 1474-1476.

Wang, Y.-H.; Zhang, Z.-K.; Yang, F.-M.; Sun, Q.-Y.; He, H.-P.; Di, Y.-T.; Mu, S.-Z.; Lu, Y.; Chang, Y.; Zheng, Q.-T.; Ding, M.; Dong, J.-H.; Hao, X.-J. *J. Nat. Prod.* **2007**, *70*, 1458–1461.

Zhang, H.; Yue, J.-M. *J. Nat. Prod.* **2005**, *68*, 1201-1207.

Nishimura, K.; Hitotsuyanagi, Y.; Sugeta, N.; Fukaya, H.; Aoyagi, Y.; Hasuda, T.; Kinoshita, T.; Takeya, K. *J. Nat. Prod.* **2007**, *70*, 758-762.

Wu, Y.; Suehiro, M.; Kitajima, M.; Matsuzaki, T.; Hashimoto, S.; Nagaoka, M.; Zhang, R.; Takayama, H. *J. Nat. Prod.* **2009**, *72*, 204–209.

Gunasekera, S. P.; McCarthy, P. J.; Longley, R. E.; Pomponi, S. A.; Wright, A. E. *J. Nat. Prod.* **1999**, *62*, 1208-1211.

Van Wagoner, R. M.; Jompa, J.; Tahir, A.; Ireland, C. M. *J. Nat. Prod.* **1999**, *62*, 794-79.

### Glycosides

Dai, J. R.; Hallock, Y. F.; Cardellina II, J. H.; Boyd, M. R. *J. Nat. Prod.* **1999**, *62*, 1427-1429.

Yahara, S.; Uda, N.; Yoshio, E.; Yae, E. *J. Nat. Prod.* **2004**, *67*, 500-502.

Hernández-Carlos, B.; Bye, R.; Pereda-Miranda, R. *J. Nat. Prod.* **1999**, *62*, 1096-1100.

Wang, W.; Jang, H.; Hong, J.; Lee, C.-O.; Im, K. S.; Bae, S. J.; Jung, J. H. *J. Nat. Prod.* **2004**, *67*, 1654-1660.

Clement, J. A.; Li, M.; Hecht, S. M.; Kingston, D. G. I. *J. Nat. Prod.* **2006**, *69*, 373-376.



Konopleva, M. M.; Matławska, I.; Wojcinska, M.; Ahmed, A. A.; Rybczynska, M.; Paszel, A.; Ohta, S.; Hirata, T.; Bylka, W.; Mabry, T. J.; Cannon, J. F. *J. Nat. Prod.* **2006**, *69*, 394-396.

### Peptides

Morita, H.; Suzuki, H.; Kobayashi, J. *J. Nat. Prod.* **2004**, *67*, 1628-1630.

Nakao, Y.; Yoshida, W. Y.; Takada, Y.; Kimura, J.; Yang, L.; Mooberry, S. L.; Scheuer, P. J. *J. Nat. Prod.* **2004**, *67*, 1332-1340.

Rao, K. V.; Na, M.; Cook, J. C.; Peng, J.; Matsumoto, R.; Hamann, M. T. *J. Nat. Prod.* **2008**, *71*, 772-778.

### Polyphenols

Duncan, C. J. G.; Cuendet, M.; Fronczek, F. R.; Pezzuto, J. M.; Mehta, R. G.; Hamann, M. T.; Ross, S. A. *J. Nat. Prod.* **2003**, *66*, 103-107.

Groweiss, A.; Cardellina, II, J. H.; Boyd, M. R. *J. Nat. Prod.* **2000**, *63*, 1537-1539.

Ibrahim, M. A.; Mansoor, A. A.; Gross, A.; Ashfaq, M. K.; Jacob, M.; Khan, S. I.; Hamann, M. T. *J. Nat. Prod.* **2009**, *72*, 2141-2144.

### Polyols

Tsuda, M.; Oguchi, K.; Iwamoto, R.; Okamoto, Y.; Fukushi, E.; Kawabata, J.; Ozawa, T.; Masuda, A. *J. Nat. Prod.* **2007**, *70*, 1661-1663.

Ozaki, S.; Oe, H.; Kitamura, S. *J. Nat. Prod.* **2008**, *71*, 981-984.

### Other compounds

Tsuda, M.; Sasaki, M.; Mugishima, T.; Komatsu, K.; Sone, T.; Tanaka, M.; Mikami, Y.; Kobayashi, J. *J. Nat. Prod.* **2005**, *68*, 273-276.

García, A.; Vázquez, M. J.; Quiñoá, E.; Riguera, R.; Debitus, C. *J. Nat. Prod.* **1996**, *59*, 782-785.

Bernart, M. W.; Cardellina II, J. H.; Balaschak, M. S.; Alexander, M. R.; Shoemaker, R. H.; Boyd, M. R. *J. Nat. Prod.* **1996**, *59*, 748-753.

-----  
14. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using a column with cyanopropyl-bonded Si-gel as stationary phase** in at least one of the isolation steps.

### Alkaloids

Jayasuriya, H.; Herath, K. B.; Ondeyka, J. G.; Polishook, J. D.; Bills, G. F.; Dombrowski, A. W.; Springer, M. S.; Siciliano, S.; Malkowitz, L.; Sanchez, M.; Guan, Z.; Tiwari, S.; Stevenson, D. W.; Borris, R. P.; Singh, S. B. *J. Nat. Prod.* **2004**, *67*, 1036-1038.

Meragelman, K. M.; McKee, T. C.; Boyd, M. R. *J. Nat. Prod.* **2000**, *63*, 427-428.

Van Wagoner, R. M.; Jompa, J.; Tahir, A.; Ireland, C. M. *J. Nat. Prod.* **1999**, *62*, 794-797.

Klausmeyer, P.; McCloud, T. G.; Tucker, K. D.; Cardellina II, J. H.; Shoemaker, R. H. *J. Nat. Prod.* **2005**, *68*, 1300-1302.

### Amines

Kossuga, M. H.; MacMillan, J. B.; Rogers, E. W.; Molinski, T. F.; Nascimento, G. G. F.; Rocha, R. M.; Berlinck, R. G. S. *J. Nat. Prod.* **2004**, *67*, 1879-1881.

### Diketopiperazines

Capon, R. J.; Stewart, M.; Ratnayake, R.; Lacey, E.; Gill, J. H. *J. Nat. Prod.* **2007**, *70*, 1746-1752.

### Fatty acids and glycerides

Alam, N.; Bae, B. H.; Hong, J.; Lee, C. O.; Shin, B. A.; Im, K. S.; Jung, J. H. *J. Nat. Prod.* **2001**, *64*, 533-535.

Zhao, Q.; Lee, S. Y.; Hong, J.; Lee, C. O.; Im, K. S.; Sim, C. J.; Lee, D. S.; Jung, J. H. *J. Nat. Prod.* **2003**, *66*, 408-411.

Zhao, Q.; Mansoor, T. A.; Hong, J.; Lee, C. O.; Im, K. S.; Lee, D. S.; Jung, J. H. *J. Nat. Prod.* **2003**, *66*, 725-728.

### Peptides

Schmidt, E. W.; Harper, M. K.; Faulkner, D. J. *J. Nat. Prod.* **1997**, *60*, 779-782.

Williams, P. G.; Yoshida, W. Y.; Moore, R. E.; Paul, V. J. *J. Nat. Prod.* **2002**, *65*, 1336-1339.

Ratnayake, A. S.; Bugni, T. S.; Feng, X.; Harper, M. K.; Skalicky, J. J.; Mohammed, K. A.; Andjelic, C. D.; Barrows, L. R.; Ireland, C. M. *J. Nat. Prod.* **2006**, *69*, 1582-1586.

### Phenols and polyphenols

Baggett, S.; Protiva, P.; Mazzola, E. P.; Yang, H.; Ressler, E. T.; Basile, M. J.; Weinstein, I. B.; Kennelly, E. J. *J. Nat. Prod.* **2005**, *68*, 354-360.

Murphy, B. T.; Cao, S.; Norris, A.; Miller, J. S.; Ratovoson, F.; Andriantsiferana, R.; Rasamison, V. E. Kingston, D. G. I. *J. Nat. Prod.* **2005**, *68*, 417-419.

Groweiss, A.; Cardellina, J. H.; Boyd, M. R. *J. Nat. Prod.* **2000**, *63*, 1537-1539.

Gu, J. Q.; Park, E. J.; Vigo, J. S.; Graham, J. G.; Fong, H. H. S.; Pezzuto, J. M.; Kinghorn, A. D. *J. Nat. Prod.* **2002**, *65*, 1616-1620.

Leong, Y. W.; Harrison, L. J. *J. Nat. Prod.* **2004**, *67*, 1601-1603.

### Polyacetylenes

Lim, Y. J.; Park, H. S.; Im, K. S.; Lee, C. O.; Hong, J.; Lee, M. Y.; Kim, D.; Jung, J. H. *J. Nat. Prod.* **2001**, *64*, 46-53.

Kim, J. S.; Lim, Y. J.; Im, K. S.; Jung, J. H.; Shim, C. J.; Lee, C. O.; Hong, J.; Lee, H. *J. Nat. Prod.* **1999**, *62*, 554-559.

Lim, Y. J.; Lee, C. O.; Hong, J.; Kim, D. K.; Im, K. S.; Jung, J. H. *J. Nat. Prod.* **2001**, *64*, 1565-1567.

Lim, Y. J.; Kim, J. S.; Im, K. S.; Jung, J. H.; Lee, C. O.; Hong, J.; Kim, D. K. *J. Nat. Prod.* **1999**, *62*, 1215-1217.

Dai, J. R.; Hallock, Y. F.; Cardellina II, J. H.; Gray, G. N.; Boyd, M. R. *J. Nat. Prod.* **1996**, *59*, 860-865.

### Polyketides

Thines, E.; Anke, H.; Sterner, O. *J. Nat. Prod.* **1998**, *61*, 306-308.

### Purines

Van Wagoner, R. M.; Jompa, J.; Tahir, A.; Ireland, C. M. *J. Nat. Prod.* **2001**, *64*, 1100-1101.

### Terpenoids

- Conrad, J.; Förster-Fromme, B.; Constantin, M. A.; Ondrus, V.; Mika, S.; Mert-Balci, F.; Klaiber, I.; Pfannstiel, J.; Möller, W.; Rösner, H.; Förster-Fromme, K.; Beifuss, U. *J. Nat. Prod.* **2009**, *72*, 835-840.
- Tóth, N.; Simon, A.; Tóth, G.; Kele, Z.; Hunyadi, A.; Báthori, M. *J. Nat. Prod.* **2008**, *71*, 1461-1463.
- Ma, W. S.; Mutka, T.; Vesley, B.; Amsler, M. O.; McClintock, J. B.; Amsler, C. D.; Perman, J. A.; Singh, M. P.; Maiese, W. M.; Zaworotko, M. J.; Kyle, D. E.; Baker, B. J. *J. Nat. Prod.* **2009**, *72*, 1842-1846.
- Mitre, G. B.; Kamiya, N.; Bardón, A.; Asakawa, Y. *J. Nat. Prod.* **2004**, *67*, 31-36.
- Clement, J. A.; Li, M.; Hecht, S. M.; Kingston, D. G. I. *J. Nat. Prod.* **2006**, *69*, 373-376.
- Ankisetty, S.; Amsler, C. D.; McClintock, J. B.; Baker, B. J. *J. Nat. Prod.* **2004**, *67*, 1172-1174.
- Liu, Y.; Bae, B. H.; Alam, N.; Hong, J.; Sim, C. J.; Lee, C. O.; Im, K. S.; Jung, J. H. *J. Nat. Prod.* **2001**, *64*, 1301-1304.
- Singh, S. B.; Ondeyka, J. G.; Jayasuriya, H.; Zink, D. L.; Ha, S. N.; Dahl-Roshak, A.; Greene, J.; Kim, J. A.; Smith, M. M.; Shoop, W.; Tkacz, J. S. *J. Nat. Prod.* **2004**, *67*, 1496-1506.
- Beutler, J. A.; McCall, K. L.; Herbert, K.; Herald, D. L.; Pettit, G. R.; Johnson, T.; Shoemaker, R. H.; Boyd, M. R. *J. Nat. Prod.* **2000**, *63*, 657-661.
- Nagashima, F.; Suzuki, M.; Takaoka, S.; Asakawa, Y. *J. Nat. Prod.* **2001**, *64*, 1309-1317.

-----

15. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using a column with DIOL-bonded Si-gel as stationary phase** in at least one of the isolation steps.

### Alkaloids

- Carroll, A. R.; Addepalli, R.; Fechner, G.; Smith, J.; Guymer, G. P.; Forster, P. I.; Quinn, R. *J. Nat. Prod.* **2008**, *71*, 1063-1065.
- Davis, R. A.; Carroll, A. R.; Pierens, G. K.; Quinn, R. J. *J. Nat. Prod.* **1999**, *62*, 419-424.
- Gross, H.; Kehraus, S.; König, G. M.; Woerheide, G.; Wright, A. D. *J. Nat. Prod.* **2002**, *65*, 1190-1193.
- McKay, M. J.; Carroll, A. R.; Quinn, R. J.; Hooper, J. N. A. *J. Nat. Prod.* **2002**, *65*, 595-597.
- Peters, L.; König, G. M.; Terlau, H.; Wright, A. D. *J. Nat. Prod.* **2002**, *65*, 1633-1637.
- Liu, S.; Fu, X.; Schmitz, F. J.; Kelly-Borges, M. *J. Nat. Prod.* **1997**, *60*, 614-615.

### Flavonoids

- Flagg, M. L.; Wächter, G. A.; Davis, A. L.; Montenegro, G.; Timmermann, B. N. *J. Nat. Prod.* **2000**, *63*, 1689-1691.
- Kikuchi, H.; Ohtsuki, T.; Koyano, T.; Kowithayakorn, T.; Sakai, T.; Ishibashi, M. *J. Nat. Prod.* **2007**, *65*, 1910-1914.

### Phenylpropanoid

- Biondi, D. M.; Rocco, C.; Ruberto, G. *J. Nat. Prod.* **2005**, *68*, 1099-1102.
- Biondi, D. M.; Rocco, C.; Ruberto, G. *J. Nat. Prod.* **2007**, *66*, 477-480.

Davis, R. A.; Carroll, A. R.; Duffy, S.; Avery, V. M.; Guymer, G. P.; Forster, P. I.; Quinn, R. J. *J. Nat. Prod.* **2007**, *70*, 1118-1121.

Feng, Y.; Carroll, A. R.; Addepalli, R.; Fechner, G. A.; Avery, V. M.; Quinn, R. J. *J. Nat. Prod.* **2007**, *70*, 1790-1792.

Li, S. S.; Gao, Z.; Feng, X.; Hecht, S. M. *J. Nat. Prod.* **2004**, *67*, 1608-1610.

### Terpenes

Carroll, A. R.; Lamb, J.; Moni, R.; Hooper, J. N.; Quinn, R. J. *J. Nat. Prod.* **2008**, *71*, 884-886.

Chludil, H. D.; Muniain, C. C.; Seldes, A. M.; Maier, M. S. (2002). *J. Nat. Prod.* **2002**, *65*, 860-865.

Feng, X.; Gao, Z.; Li, S.; Jones, S. H.; Hecht, S. M. *J. Nat. Prod.* **2004**, *67*, 1744-1747.

Funel-Le Bon, C.; Berru , F.; Thomas, O. P.; Reyes, F.; Amade, P. *J. Nat. Prod.* **2005**, *68*, 1284-1287.

Jayasuriya, H.; Herath, K. B.; Ondeyka, J. G.; Guan, Z.; Borris, R. P.; Tiwari, S.; Jong, W.; Chavez, F.; Moss, J.; Stevenson, D. W.; Beck, H. T.; Slattery, M.; Zamora, N.; Schulman, M.; Ali, A.; Shar, a. N.; MacNaul, K.; Hayes, N.; Menke, J. G.; Singh, S. B. *J. Nat. Prod.* **2005**, *68*, 1247-1252.

Li, C.; Lee, D.; Graf, T. N.; Phifer, S. S.; Nakanishi, Y.; Riswan, S.; Setyowati, F. M.; Saribi, A. M.; Soejarto, D. D.; Farnsworth, N. R.; Falkinham, III, J. O.; Kroll, D. J.; Kinghorn, A. D.; Wani, M. C.; Oberlies, N. H. *J. Nat. Prod.* **2009**, *72*, 1949-1953.

Nagashima, F.; Suzuki, M.; Takaoka, S.; Asakawa, Y. *J. Nat. Prod.* **2001**, *64*, 1309-1317.

Pham, N. B.; Butler, M. S.; Quinn, R. J. *J. Nat. Prod.* **2002**, *65*, 1147-1150.

Politi, M.; De Tommasi, N.; Pescitelli, G.; Di Bari, L.; Morelli, I.; Braca, A. *J. Nat. Prod.* **2002**, *65*, 1742-1745.

Quang, D. N.; Hashimoto, T.; Tanaka, M.; Takaoka, S.; Asakawa, Y. (2004). *J. Nat. Prod.* **2004**, *67*, 148-151.

Shen, X.; Krasnoff, S. B.; Lu, S. W.; Dunbar, C. D.; O'Neal, J.; Turgeon, B. G.; Yoder, O. C.; Gibson, D. M.; Hamann, M. T. *J. Nat. Prod.* **1999**, *62*, 895-897.

van Wyk, A. W.; Gray, C. A.; Whibley, C. E.; Osoniyi, O.; Hendricks, D. T.; Caira, M. R.; Davies-Coleman, M. T. *J. Nat. Prod.* **2008**, *71*, 420-425.

Xu, J.; Harrison, L. J.; Vittal, J. J.; Xu, Y. J.; Goh, S. H. *J. Nat. Prod.* **2000**, *63*, 1062-1065.

### Steroid

Funel, C.; Berru , F.; Roussakis, C.; Fernandez Rodriguez, R.; Amade, P. *J. Nat. Prod.* **2004**, *67*, 491-494.

Pham, N. B.; Butler, M. S.; Hooper, J. N.; Moni, R. W.; Quinn, R. J. (1999). *J. Nat. Prod.* **1999**, *62*, 1439-1442.

### Polyketide

Davis, R. A.; Carroll, A. R.; Quinn, R. J. *J. Nat. Prod.* **1999**, *62*, 158-160.

Davis, R. A.; Carroll, A. R.; Quinn, R. J. *J. Nat. Prod.* **1999**, *62*, 1405-1409.

Feng, Y.; Blunt, J. W.; Cole, A. L.; Munro, M. H. *J. Nat. Prod.* **2002**, *65*, 1681-1682.

Geraci, C.; Neri, P.; Patern , C.; Rocco, C.; Tringali, C. *J. Nat. Prod.* **2000**, *63*, 347-351.

Gu, J. Q.; Graf, T. N.; Lee, D.; Chai, H. B.; Mi, Q.; Kardono, L. B.; Setyowati, F. M.; Ismail, R.; Riswan, A.; Farnsworth, N. R.; Cordell, G. A.; Pezzuto, J. M.; Swanson, S. M.; Kroll, D. J.; Falkinham, J. O.; Wall, M. E.; Wani, M. C.; Kinghorn, A. D.; Oberlies, N. H. *J. Nat. Prod.* **2004**, *67*, 1156-1161.

Höller, U.; Gloer, J. B.; Wicklow, D. T. *J. Nat. Prod.* **2002**, *65*, 876-882.

Jadulco, R.; Proksch, P.; Wray, V.; Sudarsono, V. W.; Berg, A.; Gräfe, U. *J. Nat. Prod.* **2001**, *64*, 527-530.

Kossuga, M. H.; MacMillan, J. B.; Rogers, E. W.; Molinski, T. F.; Nascimento, G. G.; Rocha, R. M.; Berlinck, R. G. *J. Nat. Prod.* **2004**, *67*, 1879-1881.

Leong, Y. W.; Harrison, L. J. *J. Nat. Prod.* **2004**, *67*, 1601-1603.

Paranagama, P. A.; Wijeratne, E. K.; Burns, A. M.; Marron, M. T.; Gunatilaka, M. K.; Arnold, A. E.; Gunatilaka, A. L. *J. Nat. Prod.* **2007**, *70*, 1700-1705.

Tanaka, I.; Matsuoka, S.; Murata, M.; Tachibana, K. *J. Nat. Prod.* **1998**, *61*, 685-688.

Watanabe, K.; Tsuda, Y.; Iwashima, M.; Iguchi, K. *J. Nat. Prod.* **2000**, *63*, 258-260.

Xu, Y. M.; McLaughlin, S. P.; Gunatilaka, A. L. *J. Nat. Prod.* **2007**, *70*, 2045-2048.

### Other compounds

Figueiredo, J. N.; Raz, B.; Séquin, U. *J. Nat. Prod.* **1998**, *61*, 718-723.

Jiao, W.; Blunt, J. W.; Cole, A. L.; Munro, M. H. *J. Nat. Prod.* **2004**, *67*, 1434-1437.

Jiao, W.; Feng, Y.; Blunt, J. W.; Cole, A. L.; Munro, M. H. (2004). *J. Nat. Prod.* **2004**, *67*, 1722-1725.

-----  
 16. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using a column with phenyl-, phenyl-hexyl, and fluorophenyl bonded Si-gel as stationary phase** in at least one of the isolation steps.

### Alkaloids

Rochfort, S. J.; Towerzey, L.; Carroll, A.; King, G.; Michael, A.; Pierens, G.; Rali, T.; Redburn, J.; Whitmore, J.; Quinn, R. J. *J. Nat. Prod.* **2005**, *68*, 1080-1082.

### Glycosides

Ibrahim, M. A.; Mansoor, A. A.; Gross, A.; Ashfaq, M. K.; Jacob, M.; Khan, S. I.; Hamann, M. T. *J. Nat. Prod.* **2009**, *72*, 2141-2144.

Luecha, P.; Umehara, K.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **2009**, *72*, 1954-1959.

Conrad, J.; Förster-Fromme, B.; Constantin, M. A.; Ondrus, V.; Mika, S.; Mert-Balci, F.; Klaiber, I.; Pfannstiel, J.; Möller, W.; Rösner, H.; Förster-Fromme, K.; Beifuss, U. *J. Nat. Prod.* **2009**, *72*, 835-840.

Kobayashi, S.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **2002**, *65*, 319-328.

Lin, H. C.; Ding, H. Y.; Wu, Y. C. *J. Nat. Prod.* **1998**, *61*, 343-346.

Takekawa, Y.; Matsunaga, S.; van Soest, R. W. M.; Fusetani, N. *J. Nat. Prod.* **2006**, *69*, 1503-1505.

Cao, S.; Guza, R. C.; Wisse, J. H.; Miller, J. S.; Evans, R.; Kingston, D. G. I. *J. Nat. Prod.* **2005**, *68*, 487-492.

## Peptides

Laird, D. W.; LaBarbera, D. V.; Feng, X.; Bugni, T. S.; Harper, M. K.; Ireland, C. M. *J. Nat. Prod.* **2007**, *70*, 741–746.

Davis, R. A. *J. Nat. Prod.* **2005**, *68*, 769–772.

Luesch, H.; Yoshida, W. Y.; Moore, R. E.; Paul, V. J. *J. Nat. Prod.* **2000**, *63*, 1437–1439.

Luesch, H.; Moore, R. E.; Paul, V. J.; Mooberry, S. L.; Corbett, T. H. *J. Nat. Prod.* **2001**, *64*, 907–910.

Jiménez, J. I.; Vansach, T.; Yoshida, W. Y.; Sakamoto, B.; Pörzgen, P.; Horgen, F. D. *J. Nat. Prod.* **2009**, *72*, 1573–1578.

Zhang, C.; Herath, K.; Jayasuriya, H.; Ondeyka, J. G.; Zink, D. L.; Occi, J.; Birdsall, G.; Venugopal, J.; Ushio, M.; Burgess, B.; Masurekar, P.; Barrett, J. F.; Singh, S. B. *J. Nat. Prod.* **2009**, *72*, 841–847.

Ovenden, S. P. B.; Sberna, G.; Tait, R. M.; Wildman, H. G.; Patel, R.; Li, B.; Steffy, K.; Nguyen, N.; Meurer-Grimes, B. M. *J. Nat. Prod.* **2004**, *67*, 2093–2095.

Tan, L. T.; Sitachitta, N.; Gerwick, W. H. *J. Nat. Prod.* **2003**, *66*, 764–771

## Polyphenols

Oh, H.; Kwon, T. O.; Gloer, J. B.; Marvanová, L.; Shearer, C. A. *J. Nat. Prod.* **1999**, *62*, 580–583.

Baggett, S.; Protiva, P.; Mazzola, E. P.; Yang, H.; Ressler, E. T.; Basile, M. J.; Weinstein, I. B.; Kennelly, E. J. *J. Nat. Prod.* **2005**, *68*, 354–360.

## Terpenoids

Pandey, R. C.; Yankov, L. K.; Poulev, A.; Nair, R.; Caccamese, S. *J. Nat. Prod.* **1998**, *61*, 57–63.

Yoganathan, K.; Rossant, C.; Glover, R. P.; Cao, S.; Vittal, J. J.; Ng, S.; Huang, Y.; Buss, A. D.; Butler, M. S. *J. Nat. Prod.* **2004**, *67*, 1681–1684.

Hou, Y.; Cao, S.; Brodie, P.; Miller, J. S.; Birkinshaw, C.; Ratovoson, F.; Rakotondrajaona, R.; Andriantsiferana, R.; Rasamison, V. E.; Kingston, D. G. I. *J. Nat. Prod.* **2008**, *71*, 150–152.

Jarvis, B. B.; Wang, S. *J. Nat. Prod.* **1999**, *62*, 1284–1289.

Suenaga, K.; Shibata, T.; Takada, N.; Kigoshi, H.; Yamada, K. *J. Nat. Prod.* **1998**, *61*, 515–518.

Tsuda, M.; Endo, T.; Mikami, Y.; Fromont, J.; Kobayashi, J. *J. Nat. Prod.* **2002**, *65*, 1507–1508.

## Saponins

Jayatilake, G. S.; Freeberg, D. R.; Liu, Z.; Richeimer, S. L.; Blake, M. E.; Bailey, D. T.; Haridas, V.; Gutterman, J. U. *J. Nat. Prod.* **2003**, *66*, 779–783.

Mills, C.; Carroll, A. R.; Quinn, R. J. *J. Nat. Prod.* **2005**, *68*, 311–318.

Yoshikawa, M.; Morikawa, T.; Nakano, K.; Pongpiriyadacha, Y.; Murakami, T.; Matsuda, H. *J. Nat. Prod.* **2002**, *65*, 1638–1642.

Cao, S.; Norris, A.; Miller, J. S.; Ratovoson, F.; Razafitsalama, J.; Andriantsiferana, R.; Rasamison, V. E.; TenDyke, K.; Suh, T.; Kingston, D. G. I. *J. Nat. Prod.* **2007**, *70*, 361–366.

## Other compounds

- Itoh, T.; Kinoshita, M.; Aoki, S.; Kobayashi, M. *J. Nat. Prod.* **2003**, *66*, 1373–1377.
- Kossuga, M. H.; Nascimento, A. M.; Reimão, J. Q.; Tempone, A. G.; Taniwaki, N. N.; Veloso, K.; Ferreira, A. G.; Cavalcanti, B. C.; Pessoa, C.; Moraes, M. O.; Mayer, A. M. S.; Hajdu, E.; Berlinck, R. G. S. *J. Nat. Prod.* **2008**, *71*, 334–339.
- Mao, S. C.; Liu, Y.; Morgan, J. B.; Jekabsons, M. B.; Zhou, Y. D.; Nagle, D. G. *J. Nat. Prod.* **2009**, *72*, 1927–1936.
- Dalisay, D. S.; Rogers, E. W.; Edison, A. S.; Molinski, T. F. *J. Nat. Prod.* **2009**, *72*, 732–738.
- Mori-Hongo, M.; Takimoto, H.; Katagiri, T.; Kimura, M.; Ikeda, Y.; Miyase, T. *J. Nat. Prod.* **2009**, *72*, 194–203.
- Capon, R. J.; Stewart, M.; Ratnayake, R.; Lacey, E.; Gill, J. H. *J. Nat. Prod.* **2007**, *70*, 1746–1752.
- Williams, D. E.; Marques, S. O.; Hajdu, E.; Peixinho, S.; Andersen, R. J.; Berlinck, R. G. S. *J. Nat. Prod.* **2009**, *72*, 1691–1694.
- Kossuga, M. H.; MacMillan, J. B.; Rogers, E. W.; Molinski, T. F.; Nascimento, G. G. F.; Rocha, R. M.; Berlinck, R. G. S. *J. Nat. Prod.* **2004**, *67*, 1879–1881.
- Fujita, M.; Nakao, Y.; Matsunaga, S.; Van Soest, R. W. M.; Itoh, Y.; Seiki, M.; Fusetani, N. *J. Nat. Prod.* **2003**, *66*, 569–571.

-----

17. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with HP-20 as stationary phase** in at least one of the isolation steps.

#### **Alkaloids**

- Adbel-Halim, O. B.; Morikawa, T.; Ando, S.; Matsuda, H.; Yoshikawa, M. *J. Nat. Prod.* **2004**, *67*, 1119–1124.
- Zhang, Z.; ElSohly, H. N.; Jacob, M. R.; Pasco, D. S.; Walker, L. A.; Clark, A. M. *J. Nat. Prod.* **2001**, *64*, 1001–1005.
- Lee, H.-S.; Seo, Y.; Rho, J.-R.; Shin, J.; Paul, V. J. *J. Nat. Prod.* **2001**, *64*, 1474–1476.

#### **Glycosides**

- Kikuchi, M.; Kakuda, R.; Kikuchi, M.; Yaoita, Y. *J. Nat. Prod.* **2005**, *68*, 751–753.
- Otsuka, H.; Kuwabara, H.; Hoshiyama, H. *J. Nat. Prod.* **2008**, *71*, 1178–1181.
- Mimaki, Y.; Yokosuka, A.; Sakuma, C.; Sakagami, H.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1424–1428.
- Mimaki, Y.; Kuroda, M.; Fukasawa, T.; Sashida, Y. *J. Nat. Prod.* **1999**, *62*, 194–197.
- Yin, J.; Kouda, K.; Tezuka, Y.; Tran, Q. L.; Miyahara, T.; Chen, Y.; Kadota, S. *J. Nat. Prod.* **2003**, *66*, 646–650.
- Hosny, M.; Rosazza, J. P. N. *J. Nat. Prod.* **2002**, *65*, 805–813.
- Honbu, T.; Ikeda, T.; Zhu, X.-H.; Yoshihara, O.; Okawa, M.; Nafady, A. M.; Nohara, T. *J. Nat. Prod.* **2002**, *65*, 1918–1920.
- Luecha, P.; Umehara, K.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **2009**, *72*, 1954–1959.

- Wang, Y.; Edrada-Ebel, R.; Tsevegsuren, N.; Sendker, J.; Braun, M.; Wray, V.; Lin, W.; Proksch, P. *J. Nat. Prod.* **2009**, *72*, 671-675.
- Zi, J.; Li, S.; Liu, M.; Gan, M.; Lin, S.; Song, W.; Zhang, Y.; Fan, X.; Yang, Y.; Zhang, J.; Shi, J.; Di, D. *J. Nat. Prod.* **2008**, *71*, 799-805.
- Cuong, N. X.; Minh, C. V.; Kiem, P. V.; Huong, H. T.; Ban, N. K.; Nhiem, N. X.; Tung, N. H.; Jung, J.-W.; Kim, H.-J.; Kim, S.-Y.; Kim, J. A.; Kim, Y. H. *J. Nat. Prod.* **2009**, *72*, 1673-1677.
- Murata, T.; Endo, Y.; Miyase, T.; Yoshizaki, F. *J. Nat. Prod.* **2008**, *71*, 1768-1770.
- Tian, L.-W.; Zhang, Y.-J.; Wang, Y.-F.; Lai, C.-C.; Yang, C.-R. *J. Nat. Prod.* **2009**, *72*, 1608-1611.
- Sena Filho, J. G.; Nimmo, S. L.; Xavier, H. S.; Barbosa-Filho, J. M.; Cichewicz, R. H. *J. Nat. Prod.* **2009**, *72*, 1344-1347.
- Jiang, Z.-H.; Wang, J.-R.; Li, M.; Liu, Z.-Q.; Chau, K.-Y.; Zhao, C.; Liu, L. *J. Nat. Prod.* **2005**, *68*, 397-399.
- Lin, Y.-L.; Shen, C.-C.; Huang, Y.-J.; Chang, Y.-Y. *J. Nat. Prod.* **2005**, *68*, 381-384.
- Sang, S.; Cheng, X.; Zhu, N.; Wang, M.; Jhoo, J.-W.; Stark, R. E.; Badmaev, V.; Ghai, G.; Rosen, R. T.; Ho, C.-T. *J. Nat. Prod.* **2001**, *64*, 799-800.
- Asami, Y.; Ogura, T.; Otake, N.; Nishimura, T.; Xinsheng, Y.; Sakurai, T.; Nagasawa, H.; Sakuda, S.; Tatsuta, K. *J. Nat. Prod.* **2003**, *66*, 729-731.
- Chen, C.-C.; Huang, Y.-L.; Huang, F.-I.; Wang, C.-W.; Ou, J.-C. *J. Nat. Prod.* **2001**, *64*, 990-992.
- He, D.-H.; Otsuka, H.; Hirata, E.; Shinzato, T.; Bando, M.; Takeda, Y. *J. Nat. Prod.* **2002**, *65*, 685-688.

### Peptides

- Morita, H.; Kayashita, T.; Shimomura, M.; Takeya, K.; Itokawa, H. *J. Nat. Prod.* **1996**, *59*, 280-282.
- Yoshikawa, K.; Tao, S.; Arihara, S. *J. Nat. Prod.* **2000**, *63*, 540-542.
- Morita, H.; Kayashita, T.; Uchida, A.; Takeya, K.; Itokawa, H. *J. Nat. Prod.* **1997**, *60*, 212-215.
- Morita, H.; Shishido, A.; Kayashita, T.; Takeya, K.; Itokawa, H. *J. Nat. Prod.* **1997**, *60*, 404-407.

### Polyphenols

- Kobayashi, S.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **2002**, *65*, 319-328.
- Terahara, N.; Oda, M. *J. Nat. Prod.* **1996**, *59*, 139-144.
- Jiang, Z.-H.; Wen, X.-Y.; Tanaka, T.; Wu, S.-Y.; Liu, Z.; Iwata, H.; Hirose, Y.; Wu, S.; Kouno, I. *J. Nat. Prod.* **2008**, *71*, 719-723.
- Otsuka, H.; Kuwabara, H.; Hoshiyama, H. *J. Nat. Prod.* **2008**, *71*, 1178-1181.

### Saponins

- Guo, H.; Koike, K.; Li, W.; Satou, T.; Guo, D.; Nikaido, T. *J. Nat. Prod.* **2004**, *67*, 10-13.
- Fu, H.; Koike, K.; Li, W.; Nikaido, T.; Lin, W.; Guo, D. *J. Nat. Prod.* **2005**, *68*, 754-758.
- Schöpke, T.; Hiller, K.; Wray, V.; Nimtz, M.; Yamasaki, K.; Kasai, R. *J. Nat. Prod.* **1996**, *59*, 355-359.
- Kuroda, M.; Mimaki, Y.; Yokosuka, A.; Hasegawa, F.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1417-1423.



Matsushita, A.; Sasaki, Y.; Warashina, T.; Miyase, T.; Noguchi, H.; Velde, D. V. *J. Nat. Prod.* **2004**, *67*, 384-388.

Kobayashi, W.; Miyase, T.; Suzuki, S.; Noguchi, H.; Chen, X.-M. *J. Nat. Prod.* **2000**, *63*, 1121-1126.

Ikeda, T.; Fujiwara, S.; Araki, K.; Kinjo, J.; Nohara, T.; Miyoshi, T. *J. Nat. Prod.* **1997**, *60*, 102-107.

Park, S.-Y.; Chang, S.-Y.; Yook, C.-S.; Nohara, T. *J. Nat. Prod.* **2000**, *63*, 1630-1633.

Zheng, Q.; Koike, K.; Han, L.-K.; Okuda, H.; Nikaido, T. *J. Nat. Prod.* **2004**, *67*, 604-613.

Tran, Q. L.; Tezuka, Y.; Banskota, A. H.; Tran, Q. K.; Saiki, I.; Kadota, S. *J. Nat. Prod.* **2001**, *64*, 1127-1132.

Koike, K.; Kudo, M.; Jia, Z.; Nikaido, T.; Ide, Y.; Sakura, T. *J. Nat. Prod.* **1999**, *62*, 228-232.

Dai, H.-F.; Edrada, R. A.; Ebel, R.; Nimtz, M.; Wray, V.; Proksch, P. *J. Nat. Prod.* **2005**, *68*, 1231-1237.

Matsushita, A.; Miyase, T.; Noguchi, H.; Velde, D. V. *J. Nat. Prod.* **2004**, *67*, 377-383.

Li, W.; Fu, H.; Bai, H.; Sasaki, T.; Kato, H.; Koike, K. *J. Nat. Prod.* **2009**, *72*, 1755-1760.

### Terpenoids

Gui, M.-Y.; Aoyagi, Y.; Jin, Y.-R.; Li, X.-W.; Hasuda, T.; Takeya, K. *J. Nat. Prod.* **2004**, *67*, 373-376.

Liu, S.; Zhu, H.; Zhang, S.; Zhang, X.; Yu, Q.; Xuan, L. *J. Nat. Prod.* **2008**, *71*, 755-759.

Morikawa, T.; Li, X.; Nishida, E.; Ito, Y.; Matsuda, H.; Nakamura, S.; Muraoka, O.; Yoshikawa, M. *J. Nat. Prod.* **2008**, *71*, 828-835.

Liu, Q.; Wang, Y.-F.; Chen, R.-J.; Zhang, M.-Y.; Wang, Y.-F.; Yang, C.-R.; Zhang, Y.-J. *J. Nat. Prod.* **2009**, *72*, 969-972.

Li, W.; Wei, K.; Fu, H.; Koike, K. *J. Nat. Prod.* **2007**, *70*, 1971-1976.

Liu, R.; Ma, S.; Yu, S.; Pei, Y.; Zhang, S.; Chen, X.; Zhang, J. *J. Nat. Prod.* **2009**, *72*, 632-639.

Kim, K. H.; Choi, S. U.; Lee, R. K. *J. Nat. Prod.* **2009**, *72*, 1121-1127.

Whitson, E. L.; Bugni, T. S.; Chockalingam, P. S.; Concepcion, G. P.; Harper, M. K.; He, M.; Hooper, J. N. A.; Mangalindan, G. C.; Ritacco, F.; Ireland, C. M. *J. Nat. Prod.* **2008**, *71*, 1213-1217.

Matsuo, Y.; Watanabe, K.; Mimaki, Y. *J. Nat. Prod.* **2009**, *72*, 1155-1160.

-----  
 18. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products by column chromatography with Amberlite XAD-2, -7 and -16 as stationary phase** in at least one of the isolation steps, or for capturing the compounds from aqueous extracts.

### Column Chromatography Separation

#### XAD-2

#### Diketopiperazine

Jayatilake, G. S.; Thornton, M. P.; Leonard, A. C.; Grimwade, J. E.; Baker, B. J. *J. Nat. Prod.* **1996**, *59*, 293-296.

#### Glycosides

Chang, W.; Su, M.; Lee, S. *J. Nat. Prod.* **1997**, *60*, 76-80.

Yoshikawa, K.; Eiko, K.; Mimura, N.; Kondo, Y.; Arihara, S. *J. Nat. Prod.* **1998**, *61*, 786-790.

Yoshikawa, K.; Minura, N.; Arihara, S. *J. Nat. Prod.* **1998**, *61*, 1137-1139.

Palagiano, E.; Zollo, F.; Minale, L.; Iorizzi, M.; Bryan, P.; McClintock, J.; Hopkins, T. *J. Nat. Prod.* **1996**, *59*, 348-354.

Kicha, A. A.; Kalinovsky, A. I.; Ivanchina, N. V.; Stonik, V. A. *J. Nat. Prod.* **1999**, *62*, 279-282.

Yoshikawa, K.; Nishino, H.; Arihara, S.; Chang, H.; Wang, J. *J. Nat. Prod.* **2000**, *63*, 146-148.

### **Polyketides**

Zeng, L.; Wu, F.; Oberlies, N. H.; McLaughlin, J. L. *J. Nat. Prod.* **1996**, *59*, 1035-1042.

Kim, G.; Zeng, L.; Alali, F.; Rogers, L. L.; Wu, F.; McLaughlin, J. L.; Sastrodihardko, S. *J. Nat. Prod.* **1998**, *61*, 432-436.

### **Purines**

Chegade, C. C.; Dias, R. L.; Berlinck, R. G.; Ferreira, A.; Costa, L. V.; Rangel, M.; Malpezzi, E.; Freitas, J. C.; Hajdu, E. *J. Nat. Prod.* **1997**, *60*, 729-731.

### **Saponins**

Marino, S.; Iorizzi, M.; Palagiano, E.; Zollo, F.; Roussakis, C. *J. Nat. Prod.* **1998**, *61*, 1319-1327.

Yoshikawa, K.; Suzaki, Y.; Tanaka, M.; Arihara, S.; Nigam, S. K. *J. Nat. Prod.* **1997**, *60*, 1269-1274.

Marino, S.; Iorizzi, M.; Zollo, F.; Minale, L.; Amsler, C. D.; Baker, B. J.; McClintock, J. B. *J. Nat. Prod.* **1997**, *60*, 959-965.

Yoshikawa, K.; Satou, Y.; Tokunaga, Y.; Tanaka, M.; Arihara, S.; Nigam, S. K. *J. Nat. Prod.* **1998**, *61*, 440-445.

Marino, S.; Iorizzi, M.; Palagiano, E.; Zollo, F.; Roussakis, C. *J. Nat. Prod.* **1998**, *61*, 1319-1327.

Kicha, A. A.; Ivanchina, N. V.; Kalinovsky, A. I.; Dmitrenok, P. S.; Agafonova, I. G.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 793-798.

Maier, M. S.; Pocatagliata, A. J.; Kuriss, A.; Chludil, H.; Seldes, A. M.; Pujol, C. A.; Damonte, E. B. *J. Nat. Prod.* **2001**, *64*, 732-736.

### **Terpenes**

Roccatagliata, A. J.; Maier, M. S.; Seldes, A. M. *J. Nat. Prod.* **1998**, *61*, 370-374.

Qureshi, A.; Faulkner, D. J. *J. Nat. Prod.* **2000**, *63*, 841-842.

Ivanchina, N. V.; Kicha, A. A.; Kalinovsky, A. I.; Dmitrenok, P. S.; Dmitrenok, A. S.; Chaikina, E. L.; Stonik, V. A.; Gavagnin, M.; Cimino, G. *J. Nat. Prod.* **2006**, *69*, 224-228.

Ivanchina, N. V.; Kicha, A. A.; Kalinovsky, A. I.; Dmitrenok, P. S.; Stonik, V. A.; Riguera, R.; Jiménez, C. *J. Nat. Prod.* **2000**, *63*, 1178-1181.

### **Other compounds**

Beuerle, T.; Engelhard, S.; Bicchi, C.; Schwab, W. *J. Nat. Prod.* **1999**, *62*, 35-40.

**XAD-16**

**Terpenes**

O'Neill, M. J.; Lewis, J. A.; Noble, H. M.; Holland, S.; Mansat, C.; Farthing, J. E.; Foster, G.; Noble, D.; Lane, S. J.; Sidebottom, P. J.; Lynn, S. M.; Hayes, M. V.; Dix, C. J. *J. Nat. Prod.* **1998**, *61*, 1328-1331.

**Polyketides**

Pfefferle, C.; Breinholt, J.; Olsem, C. E.; Kroppenstedt, R. M.; Wellington, E. M. H.; Gurtler, H.; Fiedler, H. *J. Nat. Prod.* **2000**, *63*, 295-298.

**Terpenes**

Wu, S. J.; Fotso, S.; Li, F.; Qin, S.; Laatsch, H. *J. Nat. Prod.* **2007**, *70*, 304-306.

**Capture from aqueous extracts****XAD-7****Alkaloids**

Reed, K. A.; Manam, R. R.; Mitchell, S. S.; Xu, J.; Teisan, S.; Chao, T.; Deyanat-Yazdi, G.; Neuteboom, S. T. C.; Lam, K. S.; Potts, B. C. M. *J. Nat. Prod.* **2007**, *70*, 269-276.

**Peptides**

Cho, J. Y.; Williams, P. G.; Kwon, H. C.; Jensen, P. R.; Fenical, W. *J. Nat. Prod.* **2007**, *70*, 1321-1328.

**XAD-16****Alkaloids**

Fotso, S.; Zabriskie, T. M.; Proteau, P. J.; Flatt, P. M.; Santosa, D. A.; Sulastri; Mahmud, T. *J. Nat. Prod.* **2009**, *72*, 690-695.

**Diketopiperazine**

Park, Y. C.; Gunasekera, S. P.; Lopex, J. V.; McCarthy, P. J.; Wright, A. E. *J. Nat. Prod.* **2006**, *69*, 580-584.

**Glycosides**

Ohlendorf, B.; Lorenzen, W.; Kehraus, S.; Krick, A.; Bode, H. B.; Konig, G. M. *J. Nat. Prod.* **2009**, *72*, 82-86.

**Peptides**

Boot, C. M.; Tenney, K.; Valeriote, F. A.; Crews, P. *J. Nat. Prod.* **2006**, *69*, 83-92.

Dwivedi, D.; Jansen, R.; Molinari, G.; Nimtz, M.; Johri, B. N.; Wray, V. *J. Nat. Prod.* **2008**, *71*, 637-641.

Ohlendorf, B.; Kehraus, S.; Konig, G. M. *J. Nat. Prod.* **2008**, *71*, 1708-1713.

**Polyene**

Irschik, H.; Schummer, D.; Hofle, G.; Reichenbach, H.; Steinmetz, H.; Jansen, R. *J. Nat. Prod.* **2007**, *70*, 1060-1063.

**Polyketides**

Williams, P. G.; Asolkar, R. N.; Kondratyuk, T.; Pezzuto, J. M.; Jensen, P. R.; Fenical, W. *J. Nat. Prod.* **2007**, *70*, 83-88.

**Polyphenols**

Chu, M.; Truumees, I.; Mierzwa, R.; Terracciano, J.; Patel, M.; Loebenberg, D.; Kaminski, J. J.; Das, P.; Puar, M. S. *J. Nat. Prod.* **1997**, *60*, 525-528.

### Terpenes

Rao, M. N.; Shinnar, A. E.; Noecker, L. A.; Chao, T. L.; Feibush, B.; Snyder, B.; Sharkansky, I.; Sarkahian, A.; Zhang, Z.; Jones, S. R.; Kinney, W. A.; Zasloff, M. *J. Nat. Prod.* **2000**, *63*, 631-635.

### Other compounds

Niu, X.; Dahse, H.; Menzel, K.; Lozach, O.; Walther, G.; Meijer, L.; Grabley, S.; Sattler, I. *J. Nat. Prod.* **2008**, *71*, 689-692.

Carlson, J. C.; Li, S.; Burr, D. A.; Sherman, D. H. *J. Nat. Prod.* **2009**, *72*, 2076-2079.

-----  
 19. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with the macroporous resin D101 as stationary phase** in at least one of the isolation steps.

### Glycosides

Li, Y.; Zhang, D.-M.; Li, J.-B.; Yu, S.-S.; Li, Y.; Luo, Y.-M. *J. Nat. Prod.* **2006**, *69*, 616-620.

Liu, H.; Chou, G.-X.; Wu, T.; Guo, Y.-L.; Wang, S.-C.; Wang, C.-H.; Wang, Z.-T. *J. Nat. Prod.* **2009**, *72*, 1964-1968.

Meng, D.; Chen, W.; Zhao, W. *J. Nat. Prod.* **2007**, *70*, 824-829.

Su, D.; Tang, W.; Hu, Y.; Liu, Y.; Yu, S.; Ma, S.; Qu, J.; Yu, D. *J. Nat. Prod.* **2008**, *71*, 784-788.

Wang, J.; Yang, X.; Di, Y.; Wang, Y.; Shen, Y.; Hao, X. *J. Nat. Prod.* **2006**, *69*, 778-782.

Yu, Y.; Xie, Z.-L.; Gao, H.; Ma, W.-W.; Dai, Y.; Wang, Y.; Zhong, Y.; Yao, X.-S. *J. Nat. Prod.* **2009**, *72*, 1459-1464.

### Polyphenols

Qi, Y.; Sun, A.; Liu, R.; Meng, Z.; Xie, H. *J. Chromatogr. A* **2007**, *1140*, 219-224.

Wu, Z.; Wang, W.; He, F.; Li, D.; Wang, D. *J. Food Sci.* **2018**, *83*, 2109-2118.

### Saponins

Ma, S. G.; Hu, Y. C.; Yu, S. S.; Zhang, Y.; Chen, X. G.; Liu, J.; Liu, Y. X. *J. Nat. Prod.* **2008**, *71*, 41-46.

Zhou, X.; He, X.; Wang, G.; Gao, H.; Zhou, G.; Ye, W.; Yao, X. *J. Nat. Prod.* **2006**, *69*, 1158-1163.

### Other compounds

Chen, Y.; Wei, X.; Xie, H.; Deng, H. *J. Nat. Prod.* **2008**, *71*, 929-932.

Lin, P.; Li, S.; Wang, S.; Yang, Y.; Shi, J. *J. Nat. Prod.* **2006**, *69*, 1629-1632.

Luo, X.; Ma, Y.; Wu, S.; Wu, D. *J. Nat. Prod.* **1999**, *62*, 1022-1024.

Ma, M.; Zhao, J.; Wang, S.; Li, S.; Yang, Y.; Shi, J.; Fan, X.; He, L. *J. Nat. Prod.* **2007**, *70*, 337-341.

Ma, C.-H.; Chen, B.; Qi, H.-Y.; Li, B.-G.; Zhang, G.-L. *J. Nat. Prod.* **2004**, *67*, 1598-1600.

Wang, W.; Zhao, Y.-Y.; Liang, H.; Jia, Q.; Chen, H.-B. *J. Nat. Prod.* **2006**, *69*, 876-880.

-----

20. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with polyamide resin as stationary phase** in at least one of the isolation steps.

### Alkaloids

Buchanan, M. S.; Davis, R. A.; Duffy, S.; Avery, V. M.; Quinn, R. J. *J. Nat. Prod.* **2009**, *72*, 1541-1543.

Csupor, D.; Forgo, P.; Wenzig, E. M.; Bauer, R.; Hohmann, J. *J. Nat. Prod.* **2008**, *71*, 1779-1782.

Xu, Q.; Lin, M. *J. Nat. Prod.* **1999**, *62*, 1025-1027.

### Glycosides

Abdel-Shafeek, K. A.; El-Messiry, M. M.; Shahat, A. A.; Apers, S.; Pieters, L.; Seif-El Nasr, M. M. *J. Nat. Prod.* **2000**, *63*, 845-847.

Calis, I.; Kuruüzüm, A.; Demirezer, O.; Sticher, O.; Ganci, W.; Rüedi, P. *J. Nat. Prod.* **1999**, *62*, 1101-1105.

Ishiguro, K.; Yamamoto, R.; Oku, H. *J. Nat. Prod.* **1999**, *62*, 906-908.

Kuruüzüm, A.; Demirezer, L. O.; Bergere, I.; Zeeck, A. *J. Nat. Prod.* **2001**, *64*, 688-690.

### Phenols and polyphenols

Collins, R. A.; Ng, T. B.; Fong, W. P.; Wan, C. C.; Yeung, H. W. *Biochem. Mol. Biol. Int.* **1998**, *45*, 791-796

Conrad, J.; Förster-Fromme, B.; Constantin, M.-A.; Ondrus, V.; Mika, S.; Mert-Balci, F.; Klaiber, I.; Pfannstiel, J.; Möller, W.; Rösner, H.; Förster-Fromme, K.; Beifuss, U. *J. Nat. Prod.* **2009**, *72*, 835-840.

Veit, M.; Pauli, G. F. *J. Nat. Prod.* **1999**, *62*, 1301-1303.

### Phenylpropanoid

Biondi, D. M.; Rocco, C.; Ruberto, G. *J. Nat. Prod.* **2005**, *68*, 1099-1102.

### Saponins

Liu, R.; Ma, S.; Yu, S.; Pei, Y.; Zhang, S.; Chen, X.; Zhang, J. *J. Nat. Prod.* **2009**, *72*, 632-639.

Ma, S. G.; Hu, Y. C.; Yu, S. S.; Zhang, Y.; Chen, X. G.; Liu, J.; Liu, Y. X. *J. Nat. Prod.* **2008**, *71*, 41-46.

### Steroid

Tóth, N.; Simin, A.; Tóth, G.; Kele, Z.; Hunyadi, A.; Báthori, M. *J. Nat. Prod.* **2008**, *71*, 1461-1463.

Ványolós, A.; Simon, A.; Tóth, G.; Polgár, L.; Kele, Z.; Ilku, A.; Mátyrus, P.; Báthori, M. *J. Nat. Prod.* **2009**, *72*, 929-932.

### Terpenoids

Çalis, I.; Bedir, E. *J. Nat. Prod.* **1996**, *59*, 457-460.

Deng, J.-Z.; Starck, S. R.; Hecht, S. M.; Ijames, C. F.; Hemling, M. E. *J. Nat. Prod.* **1999**, *62*, 1000-1002.

Liao, Y.-H.; Houghton, P. J.; Hoult, J. R. S. *J. Nat. Prod.* **1999**, *62*, 1241-1245.

Litaudon, M.; Jolly, C.; Callonec, C. L.; Cuong, D. D.; Retailleau, P.; Nosjean, O.; Nguyen, V. H.; Pfeiffer, B.; Boutin, J. A.; Guéritte, F. *J. Nat. Prod.* **2009**, *72*, 1314-1320.

Sun, D.-A.; Starck, S. R.; Locke, E. P.; Hecht, S. M. *J. Nat. Prod.* **1999**, *62*, 1110-1113.

Zhou, K.; Zhao, F.; Liu, Z.; Zhuang, Y.; Chen, L.; Qiu, F. *J. Nat. Prod.* **2009**, *72*, 1563-1567.

### Other compounds

Chen, Y.; Wei, X.; Xie, H.; Deng, H. *J. Nat. Prod.* **2008**, *71*, 929-932.

-----

21. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products using a column with the macroporous resin polychrome (Teflon powder) as stationary phase** in at least one of the isolation steps.

### Glycosides

Antonov, A. S.; Avilov, S. A.; Kalinovsky, A. I.; Anastyuk, S. D.; Dmitrenok, P. S.; Kalinin, V. I.; Taboada, S.; Bosh, A.; Avila, C.; Stonik, V. A. *J. Nat. Prod.* **2009**, *72*, 33-38.

Antonov, A. S.; Avilov, S. A.; Kalinovsky, A. I.; Anastyuk, S. D.; Dmitrenok, P. S.; Evtushenko, E. V.; Kalinin, V. I.; Smirnov, A. V.; Taboada, S.; Ballesteros, M.; Avila, C.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 1677-1685.

Antonov, A. S.; Kalinovsky, A. I.; Stonik, V. A.; Afiyatullof, S. S.; Aminin, D. L.; Dmitrenok, P. S.; Mollo, E.; Cimino, G. *J. Nat. Prod.* **2007**, *70*, 169-178.

Antonov, A. S.; Afiyatullof, S. S.; Kalinovsky, A. I.; Ponomarenko, L. P.; Dmitrenok, P. S.; Aminin, D. L.; Agafonova, I. G.; Stonik, V. A. *J. Nat. Prod.* **2003**, *66*, 1082-1088.

Avilov, S. A.; Silchenko, A. S.; Antonov, A. S.; Kalinin, V. I.; Kalinovsky, A. I.; Smirnov, A. V.; Dmitrenok, P. S.; Evtushenko, E. V.; Fedorov, S. N.; Savina, A. S.; Shubina, L. K.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 525-531.

Avilov, S. A.; Antonov, A. S.; Drozdova, O. A.; Kalinin, V. I.; Kalinovsky, A. I.; Stonik, V. A.; Riguera, R.; Lenis, L. A.; Jiménez, C. *J. Nat. Prod.* **2000**, *63*, 62-71.

Silchenko, A. S.; Avilov, S. A.; Kalinin, V. I.; Kalinovsky, A. I.; Dmitrenok, P. S.; Fedorov, S. N.; Stepanov, V. G.; Dong, Z.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 351-356.

### Other compounds

Brazhnikov, V. V.; Moseva, L. I.; Sakodynskii, K. I. *Chromatographia* **1970**, *3*, 306-315.

-----

22. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of saponins using normal-phase chromatography and aqueous mixtures as eluents**.

Abdel-Kader, M. S.; Bahler, B. D.; Malone, S.; Werkhoven, M. C. M.; Wisse, J. H.; Neddermann, K. M.; Bursucker, I.; Kingston, D. G. I. *J. Nat. Prod.* **2000**, *63*, 1461-1464.

Acebes, B.; Bernabe, M.; Diaz-Lanza, A. M.; Bartolome, C. *J. Nat. Prod.* **1998**, *61*, 1557-1559.

Arda, N.; Gören, N.; Kuru, A.; Pengsuparp, T.; Pezzuto, J. M.; Qiu, S.-X.; Cordell, G. A. *J. Nat. Prod.* **1997**, *60*, 1170-1173.

Bang, S. C.; Kim, Y.; Lee, J. H.; Ahn, B. Z. *J. Nat. Prod.* **2005**, *68*, 268-272.

Bedir, E.; Çalis, I.; Aquino, R.; Piacente, S.; Pizza, C. *J. Nat. Prod.* **1999**, *62*, 563-568.

Çalis, I.; Santana, M. E.; Yürüker, A.; Kelican, P.; Demirdamar, R.; Alaçam, R.; Tanker, N.; Rügger, H.; Sticher, O. *J. Nat. Prod.* **1997**, *60*, 315-318.

- Chen, M.; Wu, W. W.; Sticher, O.; Nanz, D. *J. Nat. Prod.* **1996**, *59*, 722–728.
- Crublet, M. L.; Pouny, I.; Delaude, C.; Lavaud, C. *J. Nat. Prod.* **2002**, *65*, 1560–1567.
- Dai, H. F.; Edrada, R. A.; Ebel, R.; Nimtz, M.; Wray, V.; Proksch, P. *J. Nat. Prod.* **2005**, *68*, 1231–1237.
- Desbène, S.; Hanquet, B.; Shoyama, Y.; Wagner, H.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **1999**, *62*, 923–926.
- Elsohly, H. N.; Danner, S.; Li, X. C.; Nimrod, A. C.; Clark, A. M. *J. Nat. Prod.* **1999**, *62*, 1341–1342.
- Endale, A.; Wray, V.; Murillo, R.; Schmidt, P. C.; Merfort, I. *J. Nat. Prod.* **2005**, *68*, 443–446.
- Fu, H.; Koike, K.; Li, W.; Nikaido, T.; Lin, W.; Guo, D. *J. Nat. Prod.* **2005**, *68*, 754–758.
- Gaidi, G.; Miyamoto, T.; Ramezani, M.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2004**, *67*, 1114–1118.
- Gaidi, G.; Miyamoto, T.; Laurens, V.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2002**, *65*, 1568–1572.
- Gaidi, G.; Miyamoto, T.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2001**, *64*, 1533–1537.
- Gaidi, G.; Marouf, A.; Hanquet, B.; Bauer, R.; Correia, M.; Chauffert, B.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2000**, *63*, 122–124.
- Gaidi, G.; Miyamoto, T.; Rustaiyan, A.; Laurens, V.; Lacaille-Dubois, M.-A. *J. Nat. Prod.* **2000**, *63*, 1497–1502.
- Glensk, M.; Wray, V.; Nimtz, M.; Schöpke, T. *J. Nat. Prod.* **1999**, *62*, 717–721.
- Haddad, M.; Miyamoto, T.; Laurens, V.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2003**, *66*, 372–377.
- Jiang, Z.; Gallard, J. F.; Adeline, M. T.; Dumontet, V.; Van Tri, M.; Sévenet, T.; Païs, M. *J. Nat. Prod.* **1999**, *62*, 873–876.
- Jin, J. M.; Zhang, Y. J.; Li, H. Z.; Yang, C. R. *J. Nat. Prod.* **2004**, *67*, 1992–1995.
- Kang, S. S.; Kim, J. S.; Kim, Y. H.; Choi, J. S. *J. Nat. Prod.* **1997**, *60*, 1060–1062.
- Kang, S. S.; Ahn, B. T.; Kim, J. S.; Bae, K. *J. Nat. Prod.* **1998**, *61*, 299–300.
- Kim, G. S.; Kim, H. T.; Seong, J. D.; Oh, S. R.; Lee, C. O.; Bang, J. K.; Seong, N. S.; Song, K. S. *J. Nat. Prod.* **2005**, *68*, 766–768.
- Kinoshita, K.; Koyama, K.; Takahashi, K.; Kondo, N.; Yuasa, H. *J. Nat. Prod.* **2000**, *63*, 701–703.
- Kirmizigül, S.; Anil, H.; Rose, M. E. *J. Nat. Prod.* **1996**, *59*, 415–418.
- Koike, K.; Kudo, M.; Jia, Z.; Nikaido, T.; Ide, Y.; Sakura, T. *J. Nat. Prod.* **1999**, *62*, 228–232.
- Li, W.; Fu, H.; Bai, H.; Sasaki, T.; Kato, H.; Koike, K. *J. Nat. Prod.* **2009**, *72*, 1755–1760.
- Li, X. C.; ElSohly, H. N.; Nimrod, A. C.; Clark, A. M. *J. Nat. Prod.* **1999**, *62*, 674–677.
- Mimaki, Y.; Kuroda, M.; Nakamura, O.; Sashida, Y. *J. Nat. Prod.* **1997**, *60*, 592–597.
- Mimaki, Y.; Kuroda, M.; Kameyama, A.; Yokosuka, A.; Sashida, Y. *J. Nat. Prod.* **1998**, *61*, 1279–1282.
- Mimaki, Y.; Yokosuka, A.; Kuroda, M.; Hamanaka, M.; Sakuma, C.; Sashida, Y. *J. Nat. Prod.* **2001**, *64*, 1226–1229.
- Mimaki, Y.; Watanabe, K.; Ando, Y.; Sakuma, C.; Sashida, Y.; Furuya, S.; Sakagami, H. *J. Nat. Prod.* **2001**, *64*, 17–22.
- Mimaki, Y.; Kuroda, M.; Asano, T.; Sashida, Y. *J. Nat. Prod.* **1999**, *62*, 1279–1283.

- Mitaine-Offer, A. C.; Miyamoto, T.; Khan, I. A.; Delaude, C.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2002**, *65*, 553–557.
- Mitaine-Offer, A. C.; Marouf, A.; Pizza, C.; Khanh, T. C.; Chauffert, B.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2001**, *64*, 243–245.
- Miyakoshi, M.; Shirasuna, K.; Hirai, Y.; Shingu, K.; Isoda, S.; Shoji, J.; Ida, Y.; Shimizu, T. *J. Nat. Prod.* **1999**, *62*, 445–448.
- Miyakoshi, M.; Tamura, Y.; Masuda, H.; Mizutani, K.; Tanaka, O.; Ikeda, T.; Ohtani, K.; Kasai, R.; Yamasaki, K. *J. Nat. Prod.* **2000**, *63*, 332–338.
- Morikawa, T.; Li, X.; Nishida, E.; Ito, Y.; Matsuda, H.; Nakamura, S.; Muraoka, O.; Yoshikawa, M. *J. Nat. Prod.* **2008**, *71*, 828–835.
- Nishimura, K.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **1999**, *62*, 1128–1133.
- Olugbade, T. A.; Ogundaini, A.; Birlirakis, N.; Païs, M.; Martin, M. T. *J. Nat. Prod.* **2000**, *63*, 716–719.
- Osorio, J. N.; Martinez, O. M. M.; Navarro, Y. M. C.; Watanabe, K.; Sakagami, H.; Mimaki, Y. *J. Nat. Prod.* **2005**, *68*, 1116–1120.
- Park, S. Y.; Chang, S. Y.; Yook, C. S.; Nohara, T. *J. Nat. Prod.* **2000**, *63*, 1630–1633.
- Sánchez-Contreras, S.; Díaz-Lanza, A. M.; Matellano, L. F.; Bernabé, M.; Ollivier, E.; Balansard, G.; Faure, R. *J. Nat. Prod.* **1998**, *61*, 1383–1385.
- Sánchez-Contreras, S.; Díaz-Lanza, A. M.; Bernabe, M. *J. Nat. Prod.* **2000**, *63*, 1479–1482.
- Sang, S.; Lao, A.; Wang, H.; Chen, Z. *J. Nat. Prod.* **1999**, *62*, 1028–1029.
- Schöpke, T.; Hiller, K.; Wray, V.; Nimitz, M.; Yamasaki, K.; Kasai, R. *J. Nat. Prod.* **1996**, *59*, 355–359.
- Schöpke, T.; Thiele, H.; Hiller, K.; Wray, V.; Nimitz, M. *J. Nat. Prod.* **1996**, *59*, 939–943.
- Seo, Y.; Berger, J. M.; Hoch, J.; Neddermann, K. M.; Bursucker, I.; Mamber, S. W.; Kingston, D. G. I. *J. Nat. Prod.* **2002**, *65*, 65–68.
- Seo, Y.; Hoch, J.; Abdel-Kader, M.; Malone, S.; Derveld, M. I.; Adams, H.; Werkhoven, M. C. M.; Wisse, J. H.; Mamber, S. W.; Dalton, J. M.; Kingston, D. G. I. *J. Nat. Prod.* **2002**, *65*, 170–174.
- Shin, M. H.; Wang, W.; Nam, K. I.; Jo, Y.; Jung, J. H.; Im, K. S. *J. Nat. Prod.* **2003**, *66*, 1351–1355.
- Ma, S. G.; Hu, Y. C.; Yu, S. S.; Zhang, Y.; Chen, X. G.; Liu, J.; Liu, Y. X. *J. Nat. Prod.* **2008**, *71*, 41–46.
- Soliman, H. S. M.; Elgamal, M. H. A.; Simon, A.; Tóth, G.; Horváth, G.; Duddeck, H. *J. Nat. Prod.* **1999**, *62*, 885–888.
- Su, Y.; Guo, D.; Guo, H.; Liu, J.; Zheng, J.; Koike, K.; Nikaido, T. *J. Nat. Prod.* **2001**, *64*, 32–36.
- Tang, M.; Shen, D.; Hu, Y.; Gao, S.; Yu, S. *J. Nat. Prod.* **2004**, *67*, 1969–1974.
- Tang, H. F.; Yi, Y. H.; Li, L.; Sun, P.; Zhang, S. Q.; Zhao, Y. P. *J. Nat. Prod.* **2005**, *68*, 337–341.
- Xiao, K.; Yi, Y. H.; Wang, Z. Z.; Tang, H. F.; Li, Y. Q.; Lin, H. W. *J. Nat. Prod.* **1999**, *62*, 1030–1032.
- Wang, B. G.; Zhu, W. M.; Li, X. M.; Jia, Z. J.; Hao, X. J. *J. Nat. Prod.* **2000**, *63*, 851–854.
- Ye, W.; He, A.; Zhao, S.; Che, C.-T. *J. Nat. Prod.* **1998**, *61*, 658–659.
- Yokosuka, A.; Mimaki, Y.; Sashida, Y. *J. Nat. Prod.* **2000**, *63*, 1239–1243.
- Yoshikawa, K.; Suzaki, Y.; Tanaka, M.; Arihara, S.; Nigam, S. K. *J. Nat. Prod.* **1997**, *60*, 1269–1274.



Yoshikawa, M.; Morikawa, T.; Nakano, K.; Pongpiriyadacha, Y.; Murakami, T.; Matsuda, H. *J. Nat. Prod.* **2002**, *65*, 1638–1642.

Yoshikawa, M.; Morikawa, T.; Kashima, Y.; Ninomiya, K.; Matsuda, H. *J. Nat. Prod.* **2003**, *66*, 922–927.

Zhang, Z.; Koike, K.; Jia, Z.; Nikaido, T.; Guo, D.; Zheng, J. *J. Nat. Prod.* **1999**, *62*, 877–881.

Zou, K.; Zhu, S.; Meselhy, M. R.; Tohda, C.; Cai, S.; Komatsu, K. *J. Nat. Prod.* **2002**, *65*, 1288–1292.

Zou, K.; Zhu, S.; Tohda, C.; Cai, S.; Komatsu, K. *J. Nat. Prod.* **2002**, *65*, 346–351.

-----  
23. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of glycosides other than saponins using normal-phase chromatography** and aqueous mixtures as eluents.

Adnyana, K. I.; Tezuka, Y.; Banskota, A. H.; Xiong, Q.; Tran, K. Q.; Kadota, S. *J. Nat. Prod.* **2000**, *63*, 496–500.

Antonov, A. S.; Avilov, S. A.; Kalinovsky, A. I.; Anastyuk, S. D.; Dmitrenok, P. S.; Evtushenko, E. V.; Kalinin, V. I.; Smirnov, A. V.; Taboada, S.; Ballesteros, M.; Avila, C.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 1677–1685.

Antonov, A. S.; Avilov, S. A.; Kalinovsky, A. I.; Anastyuk, S. D.; Dmitrenok, P. S.; Kalinin, V. I.; Taboada, S.; Bosh, A.; Avila, C.; Stonik, V. A. *J. Nat. Prod.* **2009**, *72*, 33–38.

Avilov, S. A.; Silchenko, A. S.; Antonov, A. S.; Kalinin, V. I.; Kalinovsky, A. I.; Smirnov, A. V.; Dmitrenok, P. S.; Evtushenko, E. V.; Fedorov, S. N.; Savina, A. S.; Shubina, L. K.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 525–531.

Avilov, S. A.; Antonov, A. S.; Drozdova, O. A.; Kalinin, V. I.; Kalinovsky, A. I.; Stonik, V. A.; Riguera, R.; Lenis, L. A.; Jiménez, C. *J. Nat. Prod.* **2000**, *63*, 65–71.

Bedir, E.; Khan, I. A. *J. Nat. Prod.* **2000**, *63*, 1699–1701.

Bedir, E.; Calis, I.; Aquino, R.; Piacente, S.; Pizza, C. *J. Nat. Prod.* **1998**, *61*, 1469–1472.

Bedir, E.; Calis, I.; Zerbe, O.; Sticher, O. *J. Nat. Prod.* **1998**, *61*, 503–505.

Bianco, A.; Guiso, M.; Martino, M.; Nicoletti, M.; Serafini, M.; Tomassini, L. *J. Nat. Prod.* **1997**, *60*, 366–367.

Bravo, J. A. B.; Sauvain, M.; Gimenez, A. T.; Balanza, E.; Serani, L.; Laprévotte, O.; Massiot, G.; Lavaud, C. *J. Nat. Prod.* **2001**, *64*, 720–725.

Calzada, F.; Cedillo-Rivera, R.; Mata, R. *J. Nat. Prod.* **2001**, *64*, 671–673.

Cardoso, C. L.; Siqueira Silva, D. H.; Tomazela, D. M.; Verli, H.; Young, M. C. M.; Furlan, M.; Eberlin, M. N.; Da Silva Bolzani, V. *J. Nat. Prod.* **2003**, *66*, 1017–1021.

Çalış, I.; Kirmizibekmez, H.; Sticher, O. *J. Nat. Prod.* **2001**, *64*, 60–64.

Çalış, I.; Heilmann, J.; Tasdemir, D.; Linden, A.; Ireland, C. M.; Sticher, O. *J. Nat. Prod.* **2001**, *64*, 961–964.

Çalış, I.; Kirmizibekmez, H.; Rügger, H.; Sticher, O. *J. Nat. Prod.* **1999**, *62*, 1165–1168.

Çalış, I.; Zor, M.; Saracoğlu, I.; İşimer, A.; Rügger, H. *J. Nat. Prod.* **1996**, *59*, 1019–1023.

Chen, C. C.; Huang, Y. L.; Huang, F. I.; Wang, C. W.; Ou, J. C. *J. Nat. Prod.* **2001**, *64*, 990–992.

- Cuong, N. X.; Minh, C. V.; Kiem, P. V.; Huong, H. T.; Ban, N. K.; Nhiem, N. X.; Tung, N. H.; Jung, J.-W.; Kim, H.-J.; Kim, S.-Y.; Kim, J. A.; Kim, Y. H. *J. Nat. Prod.* **2009**, *72*, 1673–1677.
- Elbandy, M.; Miyamoto, T.; Chauffert, B.; Delaude, C.; Lacaille-Dubois, M. A. *J. Nat. Prod.* **2002**, *65*, 193–197.
- Gromova, A. S.; Lutsky, V. I.; Li, D.; Wood, S. G.; Owen, N. L.; Semenov, A. A.; Grant, D. M. *J. Nat. Prod.* **2000**, *63*, 911–914.
- He, Z. D.; Lau, K. M.; But, P. P. H.; Jiang, R. W.; Dong, H.; Ma, S. C.; Fung, K. P.; Ye, W. C.; Sun, H. D. *J. Nat. Prod.* **2003**, *66*, 851–854.
- Honbu, T.; Ikeda, T.; Zhu, X. H.; Yoshihara, O.; Okawa, M.; Nafady, A. M.; Nohara, T. *J. Nat. Prod.* **2002**, *65*, 1918–1920.
- Hosny, M.; Rosazza, J. P. N. *J. Nat. Prod.* **1999**, *62*, 853–858.
- Hua, Y.; Liu, H.-Y.; Ni, W.; Chen, C.-X.; Lu, Y.; Wang, C.; Zheng, Q.-T. *J. Nat. Prod.* **2003**, *66*, 898–900.
- Huang, Y.; De Bruyne, T.; Apers, S.; Ma, Y.; Claeys, M.; Vanden Berghe, D.; Pieters, L.; Vlietinck, A. *J. Nat. Prod.* **1998**, *61*, 757–761.
- Hsu, F. L.; Liu, I. M.; Kuo, D. H.; Chen, W. C.; Su, H. C.; Cheng, J. T. *J. Nat. Prod.* **2003**, *66*, 788–792.
- Ikeda, T.; Fujiwara, S.; Araki, K.; Kinjo, J.; Nohara, T.; Miyoshi, T. *J. Nat. Prod.* **1997**, *60*, 102–107.
- Itoh, A.; Kumashiro, T.; Tanahashi, T.; Nagakura, N.; Nishi, T. *J. Nat. Prod.* **2002**, *65*, 352–357.
- Jiang, Y.; Zhang, W.; Tu, P.; Xu, X. *J. Nat. Prod.* **2005**, *68*, 875–879.
- Jiang, Z. H.; Wang, J. R.; Li, M.; Liu, Z. Q.; Chau, K. Y.; Zhao, C.; Liu, L. *J. Nat. Prod.* **2005**, *68*, 397–399.
- Jin, J. M.; Zhang, Y. J.; Yang, C. R. *J. Nat. Prod.* **2004**, *67*, 5–9.
- Ju, J.-H.; Liu, D.; Lin, G.; Zhang, Y.-M.; Yang, J.-S.; Lu, Y.; Gong, N.-B.; Zheng, Q.-T. *J. Nat. Prod.* **2002**, *65*, 147–152.
- Kalinin, V. I.; Avilov, S. A.; Kalinina, E. Y.; Korolkova, O. G.; Kalinovskiy, A. I.; Stonik, V. A.; Riguera, R.; Jimenez, C. *J. Nat. Prod.* **1997**, *60*, 817–819.
- Kim, K. H.; Choi, S. U.; Lee, K. R. *J. Nat. Prod.* **2009**, *72*, 1121–1127.
- Kim, N. C.; Desjardins, A. E.; Wu, C. D.; Kinghorn, A. D. *J. Nat. Prod.* **1999**, *62*, 1379–1384.
- Kikuchi, M.; Matsuda, N. *J. Nat. Prod.* **1996**, *59*, 314–315.
- Kikuchi, M.; Kakuda, R.; Kikuchi, M.; Yaoita, Y. *J. Nat. Prod.* **2005**, *68*, 751–753.
- Kirmizigül, S.; Gören, N.; Yang, S. W.; Cordell, G. A.; Bozok-Johansson, C. *J. Nat. Prod.* **1997**, *60*, 378–381.
- Kobayashi, W.; Miyase, T.; Suzuki, S.; Noguchi, H.; Chen, X. M. *J. Nat. Prod.* **2000**, *63*, 1121–1126.
- Krenn, L.; Kopp, B.; Steurer, S.; Schubert-Zsilavec, M. *J. Nat. Prod.* **1996**, *59*, 612–613.
- Kuroda, M.; Mimaki, Y.; Yokosuka, A.; Hasegawa, F.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1417–1423.
- Kuroda, M.; Mimaki, Y.; Ori, K.; Sakagami, H.; Sashida, Y. *J. Nat. Prod.* **2004**, *67*, 2099–2103.
- Kuruüzüm, A.; Demirezer, L. Ö.; Bergere, I.; Zeeck, A. *J. Nat. Prod.* **2001**, *64*, 688–690.

- Lee, T. H.; Qiu, F.; Waller, G. R.; Chou, C. H. *J. Nat. Prod.* **2000**, *63*, 710–712.
- Li, J.; Jiang, Y.; Tu, P. F. *J. Nat. Prod.* **2005**, *68*, 739–744.
- Li, S. Y.; Fuchino, H.; Kawahara, N.; Sekita, S.; Satake, M. *J. Nat. Prod.* **2002**, *65*, 262–266.
- Luecha, P.; Umehara, K.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **2009**, *72*, 1954–1959.
- Matsunaga, S.; Nishimura, S.; Fusetani, N. *J. Nat. Prod.* **2001**, *64*, 816–818.
- Matsuo, Y.; Watanabe, K.; Mimaki, Y. *J. Nat. Prod.* **2009**, *72*, 1155–1160.
- Mimaki, Y.; Watanabe, K.; Sakagami, H.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1863–1868.
- Mimaki, Y.; Yokosuka, A.; Sakuma, C.; Sakagami, H.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1424–1428.
- Mimaki, Y.; Yokosuka, A.; Sashida, Y. *J. Nat. Prod.* **2000**, *63*, 1519–1523.
- Mimaki, Y.; Kuroda, M.; Fukasawa, T.; Sashida, Y. *J. Nat. Prod.* **1999**, *62*, 194–197.
- Pawar, R. S.; Bhutani, K. K. *J. Nat. Prod.* **2004**, *67*, 668–671.
- Sang, S.; Cheng, X.; Zhu, N.; Wang, M.; Jhoo, J. W.; Stark, R. E.; Badmaev, V.; Ghai, G.; Rosen, R. T.; Ho, C. T. *J. Nat. Prod.* **2001**, *64*, 799–800.
- Semmar, N.; Fenet, B.; Lacaille-Dubois, M. A.; Gluchoff-Fiasson, K.; Chemli, R.; Jay, M. *J. Nat. Prod.* **2001**, *64*, 656–658.
- Shen, Y. C.; Hsieh, P. W. *J. Nat. Prod.* **1997**, *60*, 453–457.
- Silchenko, A. S.; Avilov, S. A.; Kalinin, V. I.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Fedorov, S. N.; Stepanov, V. G.; Dong, Z.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 351–356.
- Skrzypek, Z.; Wysokińska, H.; Świątek, L.; Wróblewski, A. E. *J. Nat. Prod.* **1999**, *62*, 127–129.
- Su, B. N.; Pawlus, A. D.; Jung, H. A.; Keller, W. J.; McLaughlin, J. L.; Kinghorn, A. D. *J. Nat. Prod.* **2005**, *68*, 592–595.
- Takasaki, M.; Yamauchi, I.; Haruna, M.; Konoshima, T. *J. Nat. Prod.* **1998**, *61*, 1105–1109.
- Tian, L. W.; Zhang, Y. J.; Wang, Y. F.; Lai, C. C.; Yang, C. R. *J. Nat. Prod.* **2009**, *72*, 1608–1611.
- Tian, L. W.; Pei, Y.; Zhang, Y. J.; Wang, Y. F.; Yang, C. R. *J. Nat. Prod.* **2009**, *72*, 1057–1060.
- Xiang, Y.; Zhang, H.; Fan, C. Q.; Yue, J. M. *J. Nat. Prod.* **2004**, *67*, 1517–1521.
- Wang, M.; Kikuzaki, H.; Jin, Y.; Nakatani, N.; Zhu, N.; Csiszar, K.; Boyd, C.; Rosen, R. T.; Ghai, G.; Ho, C. T. *J. Nat. Prod.* **2000**, *63*, 1182–1183.
- Yin, J.; Kouda, K.; Tezuka, Y.; Tran, Q. Le; Miyahara, T.; Chen, Y.; Kadota, S. *J. Nat. Prod.* **2003**, *66*, 646–650.
- Yokosuka, A.; Mimaki, Y.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1293–1298.
- Yoshikawa, K.; Nishino, H.; Arihara, S.; Chang, H. C.; Wang, J. Der. *J. Nat. Prod.* **2000**, *63*, 146–148.
- Zhang, Y. J.; Tanaka, T.; Iwamoto, Y.; Yang, C. R.; Kouno, I. *J. Nat. Prod.* **2000**, *63*, 1507–1510.
- Zhou, B. N.; Bahler, B. D.; Hofmann, G. A.; Mattern, M. R.; Johnson, R. K.; Kingston, D. G. I. *J. Nat. Prod.* **1998**, *61*, 1410–1412.
- Zi, J.; Li, S.; Liu, M.; Gan, M.; Lin, S.; Song, W.; Zhang, Y.; Fan, X.; Yang, Y.; Zhang, J.; Shi, J.; Di, D. *J. Nat. Prod.* **2008**, *71*, 799–805.

-----  
24. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of water-soluble natural products other than glycosides and saponins using normal-phase chromatography** and aqueous mixtures as eluents.

#### **Alkaloids**

Cheng, Y.; Schneider, B.; Riese, U.; Schubert, B.; Li, Z.; Hamburger, M. *J. Nat. Prod.* **2004**, *67*, 1854–1858.

Endo, T.; Tsuda, M.; Okada, T.; Mitsushashi, S.; Shima, H.; Kikuchi, K.; Mikami, Y.; Fromont, J.; Kobayashi, J. *J. Nat. Prod.* **2004**, *67*, 1262–1267.

Fu, X.; Schmitz, F. J. *J. Nat. Prod.* **1999**, *62*, 1072–1073.

Hosny, M.; Rosazza, J. N. *J. Nat. Prod.* **1998**, *61*, 734–742.

Li, C. J.; Schmitz, F. J.; Kelly-Borges, M. *J. Nat. Prod.* **1998**, *61*, 387–389.

Shen, X.; Perry, T. L.; Dunbar, C. D.; Kelly-Borges, M.; Hamann, M. T. *J. Nat. Prod.* **1998**, *61*, 1302–1303.

Sun, B.; Morikawa, T.; Matsuda, H.; Tewtrakul, S.; Wu, L. J.; Harima, S.; Yoshikawa, M. *J. Nat. Prod.* **2004**, *67*, 1464–1469.

Tsuda, M.; Takahashi, Y.; Fromont, J.; Mikami, Y.; Kobayashi, J. *J. Nat. Prod.* **2005**, *68*, 1277–1278.

Tsuda, M.; Endo, T.; Watanabe, K.; Fromont, J.; Kobayashi, J. I. *J. Nat. Prod.* **2002**, *65*, 1670–1671.

Tsuda, M.; Sakuma, Y.; Kobayashi, J. *J. Nat. Prod.* **2001**, *64*, 980–982.

Tsukamoto, S.; Tane, K.; Ohta, T.; Matsunaga, S.; Fusetani, N.; Van Soest, R. W. M. *J. Nat. Prod.* **2001**, *64*, 1576–1578.

Xu, Q.; Lin, M. *J. Nat. Prod.* **1999**, *62*, 1025–1027.

Zhang, Z.; ElSohly, H. N.; Jacob, M. R.; Pasco, D. S.; Walker, L. A.; Clark, A. M. *J. Nat. Prod.* **2001**, *64*, 1001–1005.

#### **Peptides**

Li, H. Y.; Matsunaga, S.; Fusetani, N. *J. Nat. Prod.* **1996**, *59*, 163–166.

Morita, H.; Suzuki, H.; Kobayashi, J. *J. Nat. Prod.* **2004**, *67*, 1628–1630.

Sano, T.; Usui, T.; Ueda, K.; Osada, H.; Kaya, K. *J. Nat. Prod.* **2001**, *64*, 1052–1055.

#### **Phenols and polyphenols**

Kobayashi, S.; Miyase, T.; Noguchi, H. *J. Nat. Prod.* **2002**, *65*, 319–328.

Martín-Cordero, C.; López-Lázaro, M.; Espartero, J. L.; Ayuso, M. J. *J. Nat. Prod.* **2000**, *63*, 248–250.

Takasaki, M.; Kuroki, S.; Kozuka, M.; Konoshima, T. *J. Nat. Prod.* **2001**, *64*, 1305–1308.

Yoshikawa, K.; Kinoshita, H.; Arihara, S. *J. Nat. Prod.* **1997**, *60*, 511–513.

#### **Polyketides**

Wu, P. L.; Su, G. C.; Wu, T. S. *J. Nat. Prod.* **2003**, *66*, 996–998.

#### **Purines**

Mourabit, A. Al; Pusset, M.; Chtourou, M.; Gaigne, C.; Ahond, A.; Poupat, C.; Potier, P. *J. Nat. Prod.* **1997**, *60*, 290–291.

### Steroids

Mimaki, Y.; Kuroda, M.; Yokosuka, A.; Sashida, Y. *J. Nat. Prod.* **2001**, *64*, 1069–1072.

### Terpenoids

Avilov, S. A.; Kalinovskiy, A. I.; Kalinin, V. I.; Stonik, V. A.; Riguera, R.; Jimenez, C. *J. Nat. Prod.* **1997**, *60*, 808–810.

Li, C. Y.; Lee, E. J.; Wu, T. S. *J. Nat. Prod.* **2004**, *67*, 437–440.

Liu, S.; Zhu, H.; Zhang, S.; Zhang, X.; Yu, Q.; Xuan, L. *J. Nat. Prod.* **2008**, *71*, 755–759.

Liu, Q.; Wang, Y. F.; Chen, R. J.; Zhang, M. Y.; Wang, Y. F.; Yang, C. R.; Zhang, Y. J. *J. Nat. Prod.* **2009**, *72*, 969–972.

Sperry, S.; Crews, P. *J. Nat. Prod.* **1997**, *60*, 29–32.

-----  
**25. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the isolation of natural products using only C<sub>18</sub> reversed-phase chromatography.**

Akihisa, T.; Mafune, S.; Ukiya, M.; Kimura, Y.; Yasukawa, K.; Suzuki, T.; Tokuda, H.; Tanabe, N.; Fukuoka, T. *J. Nat. Prod.* **2004**, *67*, 479–480.

Andriantsiferana, R.; Rasamison, V. E.; Kingston, D. G. I. *J. Nat. Prod.* **2009**, *72*, 1766–1770.

Antunes, E. M.; Beukes, D. R.; Kelly, M.; Samaai, T.; Barrows, L. R.; Marshall, K. M.; Sincich, C.; Davies-Coleman, M. T. *J. Nat. Prod.* **2004**, *67*, 1268–1276.

Barile, E.; Zolfaghari, B.; Sajjadi, S. E.; Lanzotti, V. *J. Nat. Prod.* **2004**, *67*, 2037–2042.

Blom, J. F.; Bister, B.; Bischoff, D.; Nicholson, G.; Jung, G.; Süßmuth, R. D.; Jüttner, F. *J. Nat. Prod.* **2003**, *66*, 431–434.

Cabrera, G. M.; Seldes, A. M. *J. Nat. Prod.* **1999**, *62*, 759–760.

Cafieri, F.; Fattorusso, E.; Tagliatalata-Scafati, O. *J. Nat. Prod.* **1998**, *61*, 1171–1173.

Capon, R. J.; Ford, J.; Lacey, E.; Gill, J. H.; Heiland, K.; Friedel, T. *J. Nat. Prod.* **2002**, *65*, 358–363.

Carroll, A. R.; Avery, V. M. *J. Nat. Prod.* **2009**, *72*, 696–699.

Carroll, A. R.; Duffy, S.; Avery, V. M. *J. Nat. Prod.* **2009**, *72*, 764–768.

Chang, L.; Whittaker, N. F.; Bewley, C. A. *J. Nat. Prod.* **2003**, *66*, 1490–1494.

Corea, G.; Fattorusso, E.; Lanzotti, V. *J. Nat. Prod.* **2003**, *66*, 1405–1411.

Dagne, E.; Bisrat, D.; Van Wyk, B. E.; Viljoen, A. *J. Nat. Prod.* **1998**, *61*, 256–257.

Es-Safi, N. E.; Khlifi, S.; Kerhoas, L.; Kollmann, A.; El Abbouyi, A.; Ducrot, P. H. *J. Nat. Prod.* **2005**, *68*, 1293–1296.

- Feng, Y.; Carroll, A. R.; Pass, D. M.; Archbold, J. K.; Avery, V. M.; Quinn, R. J. *J. Nat. Prod.* **2009**, *71*, 8-11.
- Franzyk, H.; Olsen, C. E.; Jensen, S. R. *J. Nat. Prod.* **2004**, *67*, 1052-1054.
- Goetz, G.; Nakao, Y.; Scheuer, P. J. *J. Nat. Prod.* **1997**, *60*, 562-567.
- Hedner, E.; Sjögren, M.; Hodzic, S.; Andersson, R.; Göransson, U.; Jonsson, P. R.; Bohlin, L. *J. Nat. Prod.* **2008**, *71*, 330-333.
- Hedner, E.; Sjögren, M.; Hodzic, S.; Andersson, R.; Göransson, U.; Jonsson, P. R.; Bohlin, L. *J. Nat. Prod.* **2008**, *71*, 330-333.
- Ishida, K.; Matsuda, H.; Murakami, M.; Yamaguchi, K. *J. Nat. Prod.* **1997**, *60*, 184-187.
- Itoh, A.; Kumashiro, T.; Tanahashi, T.; Nagakura, N.; Nishi, T. *J. Nat. Prod.* **2002**, *65*, 352-357.
- Kako, M.; Miura, T.; Nishiyama, Y.; Ichimaru, M.; Moriyasu, M.; Kato, A. *J. Nat. Prod.* **1997**, *60*, 604-605.
- Karkare, S.; Adou, E.; Cao, S.; Brodie, P.; Miller, J. S.; Andrianjafy, A. N.; Razafitsalama, J.;
- Killday, K. B.; Yarwood, D.; Sills, M. A.; Murphy, P. T.; Hooper, J. N. A.; Wright, A. E. *J. Nat. Prod.* **2001**, *64*, 525-526.
- Mimaki, Y.; Watanabe, K.; Sakagami, H.; Sashida, Y. *J. Nat. Prod.* **2002**, *65*, 1863-1868.
- Mitova, M.; Popov, S.; De Rosa, S. *J. Nat. Prod.* **2004**, *67*, 1178-1181.
- Morinaka, B. I.; Pawlik, J. R.; Molinski, T. F. *J. Nat. Prod.* **2009**, *72*, 259-264.
- Murakami, M.; Suzuki, S.; Itou, Y.; Kodani, S.; Ishida, K. *J. Nat. Prod.* **2000**, *63*, 1280-1282.
- Nicholas, G. M.; Blunt, J. W.; Munro, M. H. *J. Nat. Prod.* **2001**, *64*, 341-344.
- Park, Y.; Liu, Y.; Hong, J.; Lee, C. O.; Cho, H.; Kim, D. K.; Im, K. S.; Jung, J. H. *J. Nat. Prod.* **2003**, *66*, 1495-1498.
- Roccatagliata, A. J.; Maier, M. S.; Seldes, A. M.; Zea, S.; Duque, C. *J. Nat. Prod.* **1997**, *60*, 285-286.
- Seo, Y.; Hoch, J.; Abdel-Kader, M.; Malone, S.; Derveld, I.; Adams, H.; Werkhoven, M. C. M.; Wisse, J. H.; Manber, S. W.; Dalton, J. D.; Kingston, D. G. *J. Nat. Prod.* **2002**, *65*, 170-174.
- Shin, H. J.; Matsuda, H.; Murakami, M.; Yamaguchi, K. *J. Nat. Prod.* **1997**, *60*, 139-141.
- Svangård, E.; Göransson, U.; Hocaoglu, Z.; Gullbo, J.; Larsson, R.; Claeson, P.; Bohlin, L. *J. Nat. Prod.* **2004**, *67*, 144-147.
- Tapiolas, D. M.; Bowden, B. F.; Abou-Mansour, E.; Willis, R. H.; Doyle, J. R.; Muirhead, A. N.; Liptrot, C.; Llewellyn, L. E.; Wolff, C. W. W.; Wright, A. D.; Motti, C. A. *J. Nat. Prod.* **2009**, *72*, 1115-1120.
- Tincu, J. A.; Taylor, S. W. *J. Nat. Prod.* **2002**, *65*, 377-378.
- Um, B. H.; Weniger, B.; Lobstein, A.; Pouplin, T.; Polat, M.; Aragón, R.; Anton, R. *J. Nat. Prod.* **2001**, *64*, 1588-1589.

Zhokhov, S. S.; Jastrebova, J. A.; Kenne, L.; Broberg, A. *J. Nat. Prod.* **2009**, *72*, 656-661.

-----  
 26. Articles published in the *Journal of Natural Products* between 1996 and 2009 reporting the **isolation of natural products using countercurrent separation in at least one of the separations steps.**

#### **Alkaloids**

Lee, S.-S.; Chen, C.-K.; Huang, F.-M.; Chen, C.-H. *J. Nat. Prod.* **1996**, *59*, 80-82.

Mitova, M. I.; Lang, G.; Wiese, J.; Imhoff, J. F. *J. Nat. Prod.* **2008**, *71*, 824-827.

Lee, S.-S.; Doskotch, R. W. *J. Nat. Prod.* **1996**, *59*, 738-743.

#### **Glycosides other than saponins**

Lee, S.-S.; Lin, Y.-S.; Chen, C.-K. *J. Nat. Prod.* **2009**, *72*, 1249-1252.

Urbain, A.; Marston, A.; Grilo, L. S.; Bravo, J.; Purev, O.; Purevsuren, B.; Batsuren, D.; Reist, M.; Carrupt, P.; Hostettmann, K. *J. Nat. Prod.* **2008**, *71*, 895-897.

Krenn, L.; Kopp, B.; Steurer, S.; Schubert-Zsilavecz, M. *J. Nat. Prod.* **1996**, *59*, 612-613.

Otsuka, H.; Kuwabara, H.; Hoshiyama, H. *J. Nat. Prod.* **2008**, *71*, 1178-1181.

Kotsos, M. P.; Aligiannis, N.; Myrianthopoulos, V.; Mitaku, S.; Skaltsounis, L. *J. Nat. Prod.* **2008**, *71*, 847-851.

Pieri, V.; Schwaiger, S.; Ellmerer, E. P.; Stuppner, H. *J. Nat. Prod.* **2009**, *72*, 1798-1803.

#### **Mixed NRPS-PKS**

Nakao, Y.; Kawatsu, S.; Okamoto, C.; Okamoto, M.; Matsumoto, Y.; Matsunaga, S.; van Soest, R. V.; Fusetani, N. *J. Nat. Prod.* **2008**, *71*, 469-472.

#### **Phenylpropanoids**

Lee, S.-S.; Lin, M.-T.; Liu, C.-L.; Lin, Y.-Y.; Liu, K. C. S. C. *J. Nat. Prod.* **1996**, *59*, 1061-1065.

#### **Polyketides**

Hopp, D. C.; Milanowski, D. J.; Rhea, J.; Jacobsen, D.; Rabenstein, J.; Smith, C.; Romari, K.; Clarke, M.; Francis, L.; Irigoyen, M.; Luche, M.; Carr, G. J.; Mocek, U. *J. Nat. Prod.* **2008**, *71*, 2032-2035.

Lang, M.; Jägers, E.; Polborn, K.; Steglich, W. *J. Nat. Prod.* **2009**, *72*, 214-217.

Jarvis, B. B.; Wang, S.; Ammon, H. L. *J. Nat. Prod.* **1996**, *59*, 254-261.

#### **Peptides**

Pettit, G. R.; Knight, J. C.; Herald, D. L.; Pettit, R. K.; Hogan, F.; Mukku, V. J. R. V.; Hamblin, J. S.; Dodson II, M. J.; Chapuis, J.-C. *J. Nat. Prod.* **2009**, *i*, 366-371.

Lang, G.; Kalvelage, T.; Peters, A.; Wiese, J.; Imhoff, J. F. *J. Nat. Prod.* **2008**, *71*, 1074-1077.

#### **Saponins**

Piacente, S.; Pizza, C.; De Tommasi, N.; Mahmood, N. *J. Nat. Prod.* **1996**, *59*, 565-569.

Palagiano, E.; Zollo, F.; Minale, L.; Iorizzi, M.; Bryan, P.; McClintock, J.; Hopkins, T. *J. Nat. Prod.* **1996**, *59*, 348-354.

Aquino, R.; Peluso, G.; de Tommasi, N.; De Simone, F.; Pizza, C. *J. Nat. Prod.* **1996**, *59*, 555-564.

## Terpenoids

Carroll, A. R.; Lamb, J.; Moni, R.; Hooper, J. N. A.; Quinn, R. J. *J. Nat. Prod.* **2008**, *71*, 884-886.

Girault, J.-P.; Báthori, M.; Kalász, H.; Mathé, I.; Lafont, R. *J. Nat. Prod.* **1996**, *59*, 522-524.

De Riccardis, F.; Izzo, I.; Iorizzi, M.; Palagiano, E.; Minale, L.; Riccio, R. *J. Nat. Prod.* **1996**, *59*, 386-390.

-----

### 27. Articles reporting additional examples of **isolation of water-soluble alkaloids other than guanidines**.

Henning, A. J.; Higuchi, T.; Parks, L. M. *J. Am. Pharm. Assoc.* **1951**, *40*, 168-172.

Itoh, A.; Tanahashi, A.; Nagakura, N. *J. Nat. Prod.* **1995**, *58*, 1228-1239.

Yasuda, K.; Kizu, H.; Yamashita, T.; Kameda, Y.; Kato, A.; Nash, R. J.; Fleet, G. W. J.; Molyneux, R. J.; Asano, N. *J. Nat. Prod.* **2002**, *65*, 198-202.

Wu, X.-D.; Wang, L.; He, J.; Li, X.-Y.; Dong, L.-B.; Gong, X.; Gao, X.; Song, L.-D.; Li, Y.; Peng, L.-Y.; Zhao, Q.-S. *Helv. Chim. Acta* **2013**, *96*, 2207-2213.

Zhang, J.-G.; Huang, X.-Y.; Ma, Y.-B.; Zhang, X.-M.; Chen, J.-J.; Geng, C.-A. *J. Sep. Sci.* **2018**, *41*, 1532-1538.

Kato, A.; Yasui, M.; Yano, N.; Kawata, Y.; Moriki, K.; Adachi, I.; Hollinshead, J.; Nash, R. J. *Phytochem. Lett.* **2009**, *2*, 77-80.

Bush, K.; Henry, P. R.; Souser-Woehleke, M.; Trejo, W. H.; Slusarchyk, D. S. *J. Antibiot.* **1984**, *37*, 1308-1312; Liu, W. C.; Parker, W. L.; Brandt, S. S.; Atwal, K. S.; Ruby, E. P. *J. Antibiot.* **1984**, *37*, 1313-1319.

Miguel-Gordo, M.; Gegunde, S.; Calabro, K.; Jennings, L. K.; Alfonso, A.; Genta-Jouve, G.; Vacelet, J.; Botana, L. M.; Thomas, O. P. *Mar. Drugs* **2019**, *17*, 319; doi:10.3390/md17060319.

Uemura, D.; Toya, Y.; Watanabe, I.; Hirata, Y. *Chem. Lett.* **1979**, 1481-1482.

-----

### 28. Articles reporting additional examples of **isolation of water-soluble bleomycin-related glycopeptides**.

Ito, Y.; Oashi, Y.; Egawa, Y.; Yamaguchi, T.; Furmai, T. *J. Antibiot.* **1971**, *24*, 727-731.

Argoudelis, A. D.; Bergy, M. E.; Pyke, T. R. *J. Antibiot.* **1971**, *24*, 543-57.

Takasawa, S.; Kawamoto, I.; Okachi, R.; Koakura, M.; Yahashi, R. *J. Antibiot.* **1975**, *28*, 366-71.

Takasawa, S.; Kawamoto, I.; Sato, S.; Yahashi, R.; Okachi, R. *J. Antibiot.* **1975**, *28*, 662-667.

Kawaguchi, H.; Tsukiura, H.; Tomita, K.; Konishi, M.; Saito, K.; Kobaru, S.; Numata, K.-I.; Fujisawa, K.-I.; Miyaki, T.; Hatori, M.; Koshiyama, H. *J. Antibiot.* **1977**, *30*, 779-88.

Ohba, K.; Shomura, T.; Tsuruoka, T.; Omoto, S.; Kojima, M.; Hisamatsu, T.; Inouye, S.; Niida, T. *J. Antibiot.* **1980**, *33*, 1236-1242.

Shomura, T.; Omoto, S.; Ohba, K.; Ogino, H.; Kojima, M.; Inouye, S. *J. Antibiot.* **1980**, *33*, 1243-1248.

Chen, C.; Si, S.; He, Q.; Xu, H.; Lu, M.; Xie, Y.; Wang, Y.; Chen, R. *J. Antibiot.* **2008**, *61*, 747-751.



-----  
29. Articles reporting additional examples of **isolation of water-soluble saponins from brittle-stars, holothurians (sea-cucumbers), sea-stars and marine sponges.**

Mackie, A. M.; Turner, A. B. *Biochem. J.* **1970**, *117*, 543-550.

Ikegami, S.; Kamiya, Y.; Tamura, S. *Tetrahedron* **1973**, *29*, 1807-1810.

Kitagawa, I.; Kobayashi, M. *Tetrahedron Lett.* **1977**, 859-862.

Ikegami, S.; Okano, K.; Muragaki, H. *Tetrahedron Lett.* **1979**, 1769-1772.

Maltsev, I. I.; Stonik, V. A.; Kalinovsky, A. I.; Elyakov, G. B. *Comp. Biochem. Physiol.* **1984**, *78B*, 421-426.

Zurita, M. B.; Ahond, A.; Poupat, C.; Potier, P.; Menou, J. L. *J. Nat. Prod.* **1986**, *49*, 809-813. (in French)

Andersson, L.; Bohlin, L.; Iorizzi, M.; Riccio, R.; Minale, L.; Moreno-López, W. *Toxicon* **1989**, *27*, 179-188.

Hirota, H.; Takayama, S.; Miyashiro, S.; Ozaki, Y.; Ikegami, S. *Tetrahedron Lett.* **1990**, *31*, 3321-3324.

Rodriguez, J.; Castro, R.; Riguera, R. *Tetrahedron* **1991**, *41*, 4753-4762.

Kobayashi, M.; Okamoto, Y.; Kitagawa, I. *Chem. Pharm. Bull.* **1991**, *39*, 2867-2877.

Espada, A.; Jiménez, C.; Rodriguez, J.; Crews, P.; Riguera, R. *Tetrahedron* **1992**, *48*, 8685-8696.

D'Auria, M. V.; Paloma, L. G.; Minale, L.; Riccio, R. *Tetrahedron* **1992**, *48*, 491-498.

Findlay, J. A.; Yayli, N.; Radics, L. *J. Nat. Prod.* **1992**, *55*, 93-101.

Maier, M. S.; Roccatagliata, A.; Seldes, A. M. *J. Nat. Prod.* **1993**, *56*, 939-942.

Vazquez, M. J.; Quiñoá, E.; Riguera, R. *Can. J. Chem.* **1993**, *71*, 1147-1151.

Vazquez, M. J.; Quiñoá, E.; Riguera, R.; San Martin, A.; Darias, J. *Liebigs Ann. Chem.* **1993**, 1257-1262.

Kalinin, V. I.; Avilov, S. A.; Kalinina, E. Y.; Korolkova, O. G.; Kalinovsky, A. I.; Stonik, V. A.; Riguera, R.; Jiménez, C. *J. Nat. Prod.* **1997**, *60*, 817-819.

Díaz de Vivar, M. E.; Maier, M. S.; Seldes, A. M. *Molecules* **2000**, *5*, 350-351.

Sandvoss, M.; Pham, L. H.; Levsen, K.; Preiss, A.; Mügge, C.; Wünsch, G. *Eur. J. Org. Chem.* **2000**, 1253-1262.

Shin, J.; Lee, H.-S.; Woo, L.; Rho, J.-R.; Seo, Y.; Cho, K. W.; Sim, C. J. *J. Nat. Prod.* **2001**, *64*, 767-771.

Chludil, H. D.; Seldes, A. M.; Maier, M. S. *J. Nat. Prod.* **2002**, *65*, 153-157.

Wang, W.; Li, F.; Alam, N.; Liu, Y.; Hong, J.; Lee, C.-K.; Im, K. S.; Jung, J. H. *J. Nat. Prod.* **2002**, *65*, 1649-1656.

Takada, K.; Nakao, Y.; Matsunaga, S.; van Soest, R. W. M.; Fusetani, N. *J. Nat. Prod.* **2002**, *65*, 411-413.

Qi, J.; Ojika, M.; Sakagami, Y. *Bioorg. Med. Chem.* **2002**, *10*, 1961-1966.

Kalinovsky, A. I.; Antonov, A. S.; Afiyatullof, S. S.; Dmitrenok, P. S.; Evtuschenko, E. V.; Stonik, V. A. *Tetrahedron Lett.* **2002**, *43*, 523-525.

Antonov, A. S.; Afiyatullof, S. S.; Kalinovsky, A. I.; Ponomarenko, L. P.; Dmitrenok, P. S.; Aminin, D. L.; Agafonova, I. G.; Stonik, V. A. *J. Nat. Prod.* **2003**, *66*, 1082-1088.

- Wang, W.; Li, F.; Hong, J.; Lee, C.-O.; Cho, H. Y.; Im, K. S.; Jung, J. H. *Chem. Pharm. Bull.* **2003**, *51*, 435-439.
- Wang, W.; Li, F.; Park, Y.; Hong, J.; Lee, C.-O.; Kong, J. Y.; Shin, S.; Im, K. S.; Jung, J. H. *J. Nat. Prod.* **2003**, *66*, 384-391.
- Bonnard, I.; Rinehart, K. L. *Tetrahedron* **2004**, *60*, 2987-2992.
- Qi, J.; Ojika, M.; Sakagami, Y. *Bioorg. Med. Chem.* **2004**, *12*, 4259-4265.
- Wang, W.; Hong, J.; Lee, C.-O.; Im, K. S.; Choi, J. S.; Jung, J. H. *J. Nat. Prod.* **2004**, *67*, 584-591.
- Dai, H.-F.; Edrada, R. A.; Ebel, R.; Nimtz, M.; Wray, V.; Proksch, P. *J. Nat. Prod.* **2005**, *68*, 1231-1237.
- Chludil, H. D.; Maier, M. S. *J. Nat. Prod.* **2005**, *68*, 1279-1283.
- Tang, H.; Yi, Y.-H.; Li, L.; Sun, P.; Zhang, S.-Q.; Zhao, Y. *Planta Med.* **2005**, *71*, 458-463.
- Tang, H.-F.; Yi, Y.-H.; Li, L.; Sun, P.; Zhang, S.-Q.; Zhao, Y.-P. *J. Nat. Prod.* **2005**, *68*, 337-341.
- Yi, Y.-H.; Xu, Q.-Z.; Li, L.; Zhang, S.-L.; Wu, H.-M.; Ding, J.; Tong, Y.-G.; Tan, W.-F.; Li, M.-H.; Tian, F.; Wu, J.-H.; Liaw, C.-C.; Bastow, K. F.; Lee, K.-H. *Helv. Chim. Acta* **2006**, *89*, 54-63.
- Santalova, E. A.; Denisenko, V. A.; Dmitrenok, P. S.; Berdyshev, D. V.; Stonik, V. A. *Nat. Prod. Commun.* **2006**, *1*, 265-271.
- Han, C.; Qi, J.; Ojika, M. *Bioorg. Med. Chem.* **2006**, *14*, 4458-4465.
- Yang, S.-W.; Chan, T.-M.; Buevich, A.; Priestley, T.; Crona, J.; Reed, J.; Wright, A. E.; Patel, M.; Gullo, V.; Chen, G.; Pramanika, B.; Chu, M. *Bioorg. Med. Chem. Lett.* **2007**, *17*, 5543-5547.
- Han, C.; Qi, J.; Ojika, M. *J. Nat. Med.* **2007**, *61*, 138-145.
- Silchenko, A. S.; Avilov, S. A.; Kalinin, V. I.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Fedorov, S. N.; Stepanov, V. G.; Dong, Z.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 351-356.
- Tang, H.-F.; Cheng, G.; Wu, J.; Chen, X.-L.; Zhang, S.-Y.; Wen, A.-D.; Lin, H.-W. *J. Nat. Prod.* **2009**, *72*, 284-289.
- Yuan, W.-H.; Yi, Y.-H.; Tan, R.-X.; Wang, Z.-L.; Sun, G.-Q.; Xue, M.; Zhang, H.-W.; Tang, H.-F. *Planta Med.* **2009**, *75*, 647-653.
- Cachet, N.; Regalado, E. L.; Genta-Jouve, G.; Mehiri, M.; Amade, P.; Thomas, O. P. *Steroids* **2009**, *74*, 746-750.
- Regalado, E. L.; Tasdemir, D.; Kaiser, M.; Cachet, N.; Amade, P.; Thomas, O. P. *J. Nat. Prod.* **2010**, *73*, 1404-1410.
- Antonov, A. S.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Kalinin, V. I.; Stonik, V. A.; Mollo, E.; Cimino, G. *Carbohydr. Res.* **2011**, *346*, 2182-2192.
- Regalado, E. L.; Jiménez-Romero, C.; Genta-Jouve, G.; Tasdemir, D.; Amade, P.; Nogueiras, C.; Thomas, O. P. *Tetrahedron* **2011**, *67*, 1011-1018.
- Regalado, E. L.; Turk, T.; Tasdemir, D.; Gorjanc, M.; Kaiser, M.; Thomas, O. P.; Fernández, R.; Amade, P. *Steroids* **2011**, *76*, 1389-1396.
- Hwang, I. H.; Kim, D. W.; Kim, S. J.; Min, B. S.; Lee, S. H.; Son, J. K.; Kim, C.-H.; Chang, H. W.; Na, M. *Chem. Pharm. Bull.* **2011**, *59*, 78-83.

- Regalado, E. L.; Jiménez-Romero, C.; Genta-Jouve, G.; Tasdemir, D.; Amade, P.; Nogueiras, C.; Thomas, O. P. *Tetrahedron* **2011**, *67*, 1011-1018.
- Lee, J. H.; Jeon, J.-e.; Lee, Y.-J.; Lee, H.-S.; Sim, C. J.; Oh, K. B.; Shin, J. *J. Nat. Prod.* **2012**, *75*, 1365-1372.
- Berru e, F.; McCulloch, M. W. B.; Boland, P.; Hart, S.; Harper, M. K.; Johnston, J.; Kerr, R. *J. Nat. Prod.* **2012**, *75*, 2094-2100.
- Colorado, J.; Mu oz, D.; Marquez, D.; Marquez, M. E.; Lopez, J.; Thomas, O. P.; Martinez, A. *Molecules* **2013**, *18*, 2598-2610; doi:10.3390/molecules18032598.
- Yu, S.; Ye, X.; Huang, H.; Peng, R.; Su, Z.; Lian, X.-Y.; Zhang, Z. *Planta Med.* **2015**, *81*, 152–159.
- Bahrami, Y.; Franco, C. M. M. *Mar. Drugs* **2015**, *13*, 597-617.
- Genta-Jouve, G.; Boughanem, C.; Oca a, O.; P erez, T.; Thomas, O. P. *Phytochemistry Lett.* **2015**, *13*, 252–255.
- Ngoan, B. T.; Hanh, T. T. H.; Vien, L. T.; Diep, C. N.; Thao, N. P.; Thao, D. T.; Thanh, N. V.; Cuong, N. X.; Nam, N. H.; Thung, D. C.; Kiem, P. V.; Kim, Y. H.; Minh, C. V. *J. Asian Nat. Prod. Res.* **2015**, *17*, 1010-1017.
- Kang, J.-X.; Kang, Y. F.; Han, H. *Mar. Drugs* **2016**, *14*, 189; doi:10.3390/md14100189
- Calabro, K.; Kalahroodi, E. L.; Rodrigues, D.; D az, C.; de la Cruz, M.; Cautain, B.; Laville, R.; Reyes, F.; P erez, T.; Soussi, B.; Thomas, O. P. *Mar. Drugs* **2017**, *15*, 199; doi:10.3390/md15070199.
- Vien, L. T.; Ngoan, B. T.; Hanh, T. T. H.; Vinh, L. B.; Thung, D. C.; Thao, D. T.; Thanh, N. V.; Cuong, N. X.; Nam, N. H.; Kiem, P. V.; Minh, C. V. *J. Asian Nat. Prod. Res.* **2017**, *19*, 474-480.
- Vien, L. T.; Hanh, T. T. H.; Hong, P. T.; Thanh, N. V.; Huong, T. T.; Cuong, N. X.; Nam, N. H.; Thung, D. C.; Kiem, P. V.; Minh, C. V. *Nat. Prod. Res.* **2018**, *32*, 54-59.
- Jomori, T.; Shiroyama, S.; Ise, Y.; Kohtsuka, H.; Matsuda, K.; Kuranaga, T.; Wakimoto, T. *J. Nat. Med.* **2019**, *73*, 814–819.

-----

30. Articles reporting additional examples of **isolation of water-soluble saponins from brittle-stars, holothurians (sea-cucumbers), sea-stars and marine sponges using polychrome (Teflon powder)** in the first separation step.

- Kicha, A. A.; Kalinovskii, A. I.; Ivanchina, N. V.; Stonik, V. A. *Russ. Chem. Bull.* **1993**, *42*, 943–946.
- Kicha, A. A.; Kalinovskii, A. I.; Stonik, V. A. *Russ. Chem. Bull.* **1995**, *44*, 1125–1126.
- Kicha, A. A.; Kalinovskii, A. I.; Stonik, V. A. *Russ. Chem. Bull.* **1997**, *46*, 190–195.
- Kicha, A. A.; Kalinovskii, A. I.; Ivanchina, N. V.; Stonik, V. A. *J. Nat. Prod.* **1999**, *62*, 279–282.
- Kicha, A. A.; Ivanchina, N. V.; Kalinovskii, A. I.; Dmitrenok, P. S.; Stonik, V. A. *Russ. Chem. Bull.* **2000**, *49*, 1794–1795.
- Kicha, A. A.; Ivanchina, N. V.; Gorshkova, I. A.; Ponomarenko, L. P.; Likhatskaya, G. N.; Stonik, V. A. *Comp. Biochem. Physiol. - B Biochem. Mol. Biol.* **2001**, *128*, 43–52.
- Kicha, A. A.; Ivanchina, N. V.; Kalinovskii, A. I.; Dmitrenok, P. S.; Stonik, V. A. *Russ. Chem. Bull.* **2001**, *50*, 724–727.

- Levina, E. V.; Andriyashchenko, P. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Stonik, V. A.; Prokof'eva, N. *G. Russ. Chem. Bull.* **2002**, *51*, 535–539.
- Kalinovskii, A. I.; Levina, E. V.; Stonik, V. A.; Dmitrenok, P. S.; Andriyashchenko, P. V. *Russ. J. Bioorganic Chem.* **2004**, *30*, 191–195.
- Levina, E. V.; Kalinovskii, A. I.; Andriyashchenko, P. V.; Dmitrenok, P. S.; Evtushenko, E. V.; Stonik, V. A. *Russ. Chem. Bull.* **2004**, *53*, 2634–2638.
- Levina, E. V.; Kalinovskiy, A. I.; Stonik, V. A.; Dmitrenok, P. S.; Andriyashchenko, P. V. *Russ. J. Bioorganic Chem.* **2005**, *31*, 467–474.
- Ivanchina, N. V.; Malyarenko, T. V.; Kicha, A. A.; Kalinovskii, A. I.; Dmitrenok, P. S.; Mollo, E. *Chem. Nat. Compd.* **2006**, *42*, 621–622.
- Levina, E. V.; Kalinovskiy, A. I.; Levin, V. S. *Russ. J. Bioorganic Chem.* **2006**, *32*, 84–88.
- Levina, E. V.; Kalinovskiy, A. I.; Andriyashchenko, P. V.; Menzorova, N. I.; Dmitrenok, P. S. *Russ. J. Bioorganic Chem.* **2007**, *33*, 334–340.
- Kicha, A. A.; Ivanchina, N. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Sokolova, E. V.; Agafonova, I. G.; Morre, J.; Stonik, V. A. *Russ. Chem. Bull.* **2007**, *56*, 823–830.
- Kicha, A. A.; Ivanchina, N. V.; Kalinovskii, A. I.; Dmitrenok, P. S.; Sokolova, E. V.; Agafonova, I. G. *Chem. Nat. Compd.* **2007**, *43*, 76–80.
- Kicha, A. A.; Kapustina, I. I.; Ivanchina, N. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Stonik, V. A.; Pal'yanova, N. V.; Pankova, T. M.; Starostina, M. V. *Russ. J. Bioorganic Chem.* **2008**, *34*, 118–124.
- Levina, E. V.; Kalinovskii, A. I.; Andriyashchenko, P. V.; Dmitrenok, P. S. *Russ. Chem. Bull.* **2008**, *57*, 2431–2436.
- Kicha, A. A.; Ivanchina, N. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Agafonova, I. G.; Stonik, V. A. *J. Nat. Prod.* **2008**, *71*, 793–798.
- Ivanchina, N. V.; Malyarenko, T. V.; Kicha, A. A.; Kalinovskii, A. I.; Dmitrenok, P. S. *Russ. Chem. Bull.* **2008**, *57*, 204–208.
- Levina, E. V.; Kalinovskiy, A. I.; Dmitrenok, P. V. *Russ. J. Bioorganic Chem.* **2009**, *35*, 123–130.
- Kicha, A. A.; Ivanchina, N. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Smirnov, A. V. *Russ. J. Bioorganic Chem.* **2009**, *35*, 504–509.
- Levina, E. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Aminin, D. L. *Nat. Prod. Commun.* **2009**, *4*, 1041–1046.
- Kicha, A. A.; Ivanchina, N. V.; Huong, T. T. T.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Fedorov, S. N.; Dyshlovoy, S. A.; Long, P. Q.; Stonik, V. A. *Bioorganic Med. Chem. Lett.* **2010**, *20*, 3826–3830.
- Levina, E. V.; Aminin, D. L.; Kovalchuk, S. N.; Kozhemyako, V. B.; Dyshlovoi, S. A.; Kalinovskii, A. I.; Dmitrenok, P. S. *Russ. J. Bioorganic Chem.* **2010**, *36*, 233–239.
- Malyarenko, T. V.; Kicha, A. A.; Ivanchina, N. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Smirnov, A. V. *Russ. J. Bioorganic Chem.* **2010**, *36*, 755–761.
- Levina, E. V.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Martyyas, E. A.; Stonik, V. A. *Nat. Prod. Commun.* **2010**, *5*, 1737–1742.
- Kicha, A. A.; Ivanchina, N. V.; Huong, T. T. T.; Kalinovskiy, A. I.; Dmitrenok, P. S.; Long, P. Q. *Russ. Chem. Bull.* **2010**, *59*, 2133–2136.

- Malyarenko, T. V.; Kicha, A. A.; Ivanchina, N. V.; Kalinovsky, A. I.; Dmitrenok, P. S.; Ermakova, S. P.; Stonik, V. A. *Steroids* **2011**, *76*, 1280–1287.
- Kicha, A. A.; Kalinovsky, A. I.; Ivanchina, N. V.; Malyarenko, T. V.; Dmitrenok, P. S.; Ermakova, S. P.; Stonik, V. A. *Chem. Biodivers.* **2011**, *8*, 166–175.
- Malyarenko, T. V.; Kicha, A. A.; Ivanchina, N. V.; Kalinovskii, A. I.; Dmitrenok, P. S.; Ermakova, S. P.; Minkh, C. V. *Russ. Chem. Bull.* **2012**, *61*, 1986–1991.
- Levina, E. V.; Kalinovskii, A. I.; Ermakova, S. P.; Dmitrenok, P. S. *Russ. J. Bioorganic Chem.* **2012**, *38*, 520–525.
- Malyarenko, T. V.; Kicha, A. A.; Ivanchina, N. V.; Kalinovsky, A. I.; Popov, R. S.; Vishchuk, O. S.; Stonik, V. A. *Steroids* **2014**, *87*, 119–127.
- Kicha, A. A.; Dinh, T. H.; Ivanchina, N. V.; Malyarenko, T. V.; Kalinovsky, A. I.; Popov, R. S.; Ermakova, S. P.; Tran, T. T. T.; Doan, L. P. *Nat. Prod. Commun.* **2014**, *9*, 1269–1274.
- Kicha, A. A.; Kalinovsky, A. I.; Malyarenko, T. V.; Ivanchina, N. V.; Dmitrenok, P. S.; Menchinskaya, E. S.; Yurchenko, E. A.; Pislyagin, E. A.; Aminin, D. L.; Huong, T. T. T.; Long, P. Q.; Stonik, V. A. *J. Nat. Prod.* **2015**, *78*, 1397–1405.
- Vien, L. T.; Hanh, T. T. H.; Huong, P. T. T.; Tu, V. A.; Thanh, N. V.; Lyakhova, E. G.; Cuong, N. X.; Nam, N. H.; Kiem, P. V.; Minh, C. V.; Kicha, A. A.; Stonik, V. A. *Chem. Nat. Compd.* **2016**, *52*, 1056–1060.
- Malyarenko, T. V.; Kicha, A. A.; Kalinovsky, A. I.; Ivanchina, N. V.; Popov, R. S.; Pislyagin, E. A.; Menchinskaya, E. S.; Padmakumar, K. P.; Stonik, V. A. *Chem. Biodivers.* **2016**, 998–1007.
- Kicha, A. A.; Ivanchina, N. V.; Malyarenko, T. V.; Kalinovsky, A. I.; Dmitrenok, P. S.; Pislyagin, E. A.; Yurchenko, E. A. *Nat. Prod. Commun.* **2016**, *11*, 1243–1246.
- Kicha, A. A.; Ivanchina, N. V.; Malyarenko, T. V.; Kalinovsky, A. I.; Dmitrenok, P. S. *Chem. Nat. Compd.* **2017**, *53*, 88–92.
- Kicha, A. A.; Kalinovsky, A. I.; Ivanchina, N. V.; Malyarenko, T. V.; Dmitrenok, P. S.; Kuzmich, A. S.; Sokolova, E. V.; Stonik, V. A. *J. Nat. Prod.* **2017**, *80*, 2761–2770.
- Ivanchina, N. V.; Kalinovsky, A. I.; Malyarenko, T. V.; Kicha, A. A.; Dmitrenok, P. S. *Nat. Prod. Commun.* **2019**, *14*, 1–3.
- Ha, D. T.; Kicha, A. A.; Kalinovsky, A. I.; Malyarenko, T. V.; Popov, R. S.; Malyarenko, O. S.; Ermakova, S. P.; Thuy, T. T. T.; Long, P. Q.; Ivanchina, N. V. *Nat. Prod. Res.* **2019**, *0*, 1–8.
- Ivanchina, N. V.; Kicha, A. A.; Malyarenko, T. V.; Ermolaeva, S. D.; Yurchenko, E. A.; Pislyagin, E. A.; Van Minh, C.; Dmitrenok, P. S. *Nat. Prod. Res.* **2019**, *33*, 2623–2630.
- Popov, R. S.; Ivanchina, N. V.; Kicha, A. A.; Malyarenko, T. V.; Grebnev, B. B.; Stonik, V. A.; Dmitrenok, P. S. *Mar. Drugs* **2019**, *17*, 1–14.

-----

**31. Articles reporting additional examples of isolation of water-soluble guanidine, amidine and 2-aminoimidazole bromopyrrole alkaloids.**

- Forenza, S.; Minale, L.; Riccio, R.; Fattorusso, E. *Chem. Commun.* **1971**, 285, 1129–1130.
- De Nanteuil, G.; Ahond, A.; Guilhem, J.; Poupat, C.; Dau Huu Tran, E.; Potier, P.; Pusset, M.; Pusset, J.; Laboute, P. *Tetrahedron* **1985**, *41*, 6035–6039.

- Kobayashi, J.; Ohizumi, Y.; Nakamura, H.; Hirata, Y.; Wakamatsu, K.; Miyazawa, T. *Experientia* **1983**, *39*, 1064–1065.
- Pettit, G. R.; Herald, C. L.; Leet, J. E.; Gupta, R.; Schaufelberger, D. E.; Bates, R. B.; Clewlow, P. J.; Doubek, D. L.; Manfredi, K. P.; Rützler, K.; Schmidt, J. M.; Tackett, L. P.; Ward, F. B.; Bruck, M.; Camou, F. *Can. J. Chem.* **1990**, *68*, 1621–1624.
- Morales, J. J.; Rodriguez, A. D. *J. Nat. Prod.* **1991**, *54*, 629–631.
- D'Ambrosio, M.; Guerriero, A.; Debitus, C.; Ribes, O.; Pusset, J.; Leroy, S.; Pietra, F. *J. Chem. Soc. Chem. Commun.* **1993**, 1305–1306.
- Cafieri, F.; Fattorusso, E.; Mangoni, A.; Taglialatela-Scafati, O. *Bioorg. Med. Chem. Lett.* **1995**, *5*, 799–804.
- Groszek, G.; Kantoci, D.; Pettit, G. R. Correction. *Liebigs Ann.* **1995**, *11*, 2057–2057.
- Cafieri, F.; Fattorusso, E.; Mangoni, A.; Taglialatela-Scafati, O. *Tetrahedron Lett.* **1996**, *37*, 3587–3590.
- Inaba, K.; Sato, H.; Tsuda, M.; Kobayashi, J. *J. Nat. Prod.* **1998**, *61*, 693–695.
- Eder, C.; Proksch, P.; Wray, V.; Steube, K.; Bringmann, G.; van Soest, R. W. M.; Sudarsono; Ferdinandus, E.; Pattisina, L. A.; Wiryowidagdo, S.; Moka, W. *J. Nat. Prod.* **1999**, *62*, 184–187.
- Assmann, M.; Lichte, E.; Van Soest, R. W. M.; Köck, M. *Org. Lett.* **1999**, *1*, 455–457.
- Tsukamoto, S.; Tane, K.; Ohta, T.; Matsunaga, S.; Fusetani, N.; Van Soest, R. W. M. *J. Nat. Prod.* **2001**, *64*, 1576–1578.
- Assmann, M.; Köck, M. *Zeitschrift für Naturforsch. - Sect. C J. Biosci.* **2002**, *57*, 153–156.
- Nakadai, M.; Harran, P. G. *Tetrahedron Lett.* **2006**, *47*, 3933–3935.
- Grube, A.; Köck, M. *J. Nat. Prod.* **2006**, *69*, 1212–1214.
- Piña, I. C.; White, K. N.; Cabrera, G.; Rivero, E.; Crews, P. *J. Nat. Prod.* **2007**, *70*, 613–617.
- Aiello, A.; Fattorusso, E.; Giordano, A.; Menna, M.; Müller, W. E. G.; Perović-Ottstadt, S.; Schröder, H. *C. Bioorganic Med. Chem.* **2007**, *15*, 5877–5887.
- Atodiresei, I.; Zöllinger, M.; Lindel, T.; Fleischhauer, J.; Raabe, G. *Chirality* **2007**, *19*, 542–549.
- Kuramoto, M.; Miyake, N.; Ishimaru, Y.; Ono, N.; Uno, H. *Org. Lett.* **2008**, *10*, 5465–5468.
- Vergne, C.; Appenzeller, J.; Ratinaud, C.; Martin, M.-T.; Debitus, C.; Zaparucha, A.; Al-Mourabit, A. *Org. Lett.* **2008**, *10*, 493–496.
- Davis, R. A.; Fechner, G. A.; Sykes, M.; Garavelas, A.; Pass, D. M.; Carroll, A. R.; Addepalli, R.; Avery, V. M.; Hooper, J. N. A.; Quinn, R. J. *Bioorganic Med. Chem.* **2009**, *17*, 2497–2500.
- Moldovan, R. P.; Lindel, T. *Zeitschrift für Naturforsch. - Sect. B J. Chem. Sci.* **2009**, *64*, 1612–1617.
- Feldman, K. S.; Fodor, M. D.; Skoumbourdis, A. P. *Synthesis (Stuttg.)* **2009**, *18*, 3162–3173.
- Imaoka, T.; Iwamoto, O.; Noguchi, K.-I.; Nagasawa, K. *Angew. Chemie - Int. Ed.* **2009**, *48*, 3799–3801.
- Hertiani, T.; Edrada-Ebel, R. A.; Ortlepp, S.; van Soest, R. W. M.; de Voogd, N. J.; Wray, V.; Hentschel, U.; Kozytska, S.; Müller, W. E. G.; Proksch, P. *Bioorganic Med. Chem.* **2010**, *18*, 1297–1311.
- Imaoka, T.; Akimoto, T.; Iwamoto, O.; Nagasawa, K. *Chem. Asian J.* **2010**, *5*, 1810–1816.

Patel, K.; Laville, R.; Martin, M.-T.; Tilvi, S.; Moriou, C.; Gallard, J.-F.; Ermolenko, L.; Debitus, C.; Al-Mourabit, A. *Angew. Chemie - Int. Ed.* **2010**, *49*, 4775–4779.

Sauleau, P.; Retailleau, P.; Nogues, S.; Carletti, I.; Marcourt, L.; Raux, R.; Mourabit, A. A.; Debitus, C. *Tetrahedron Lett.* **2011**, *52*, 2676–2678.

Kubota, T.; Iwai, T.; Takahashi-Nakaguchi, A.; Fromont, J.; Gonoï, T.; Kobayashi, J. *Tetrahedron* **2012**, *68*, 9738–9744.

Zhang, H.; Khalil, Z.; Conte, M. M.; Plisson, F.; Capon, R. J. *Tetrahedron Lett.* **2012**, *53*, 3784–3787.

Plisson, F.; Prasad, P.; Xiao, X.; Piggott, A. M.; Huang, X. C.; Khalil, Z.; Capon, R. J. *Org. Biomol. Chem.* **2014**, *12*, 1579–1584.

Ebada, S. S.; Linh, M. H.; Longeon, A.; De Voogd, N. J.; Durieu, E.; Meijer, L.; Bourguet-Kondracki, M. L.; Singab, A. N. B.; Müller, W. E. G.; Proksch, P. *Nat. Prod. Res.* **2015**, *29*, 231–238.

Iwai, T.; Kubota, T.; Fromont, J.; Kobayashi, J. *Chem. Pharm. Bull.* **2014**, *62*, 213–216.

Iwata, M.; Kanoh, K.; Imaoka, T.; Nagasawa, K. *Chem. Commun.* **2014**, *50*, 6991–6994.

Abdul, D. B.; Yamazaki, H.; Kanno, S. ichi; Tomizawa, A.; Rotinsulu, H.; Wewengkang, D. S.; Sumilat, D. A.; Ukai, K.; Kapojos, M. M.; Namikoshi, M. *J. Nat. Med.* **2017**, *71*, 531–536.

-----  
**32. Articles reporting additional examples of isolation of water-soluble macrocyclic lactones with an alkyl-guanidine side chain.**

Takesako, K.; Beppu, T. *J. Antibiot. (Tokyo)*. **1984**, *37*, 1170–1186.

Grabley, S.; Hammann, P.; Raether, W.; Wink, J.; Zeeck, A. *J. Antibiot. (Tokyo)*. **1990**, *43*, 639–647.

Kumazawa, S.; Asami, Y.; Awane, K.; Ohtani, H.; Fukuchi, C. *Anal. Sci.* **1991**, *7*, 809–810.

Fréchet, D.; Danzer, M.; Debu, F.; Monegier du Sorbier, B.; Reisdorf, D.; Snozzi, C.; Vuilhorgne, M. *Tetrahedron* **1991**, *47*, 61–70.

Namikoshi, M.; Sivonen, K.; Evans, W. R.; Sun, F.; Carmichael, W. W.; Rinehart, K. L. *Toxicon* **1992**, *30*, 1473–1479.

Kobinata, K.; Koshino, H.; Kusakabe, H.; Kobayashi, Y.; Yamaguchi, I.; Isono, K.; Osada, H. *J. Antibiot. (Tokyo)*. **1993**, 1912–1915.

Koshino, H.; Kobinata, K.; Uzawa, J.; Uramoto, M.; Isono, K.; Osada, H. *Tetrahedron* **1993**, *49*, 8827–8836.

Grabley, S.; Kretzschmar, G.; Mayer, M.; Philipps, S.; Thiericke, R.; Wink, J.; Zeeck, A. *Liebigs Ann. der Chemie* **1993**, 573–579.

Kumazawa, S.; Asami, Y.; Awane, K.; Ohtani, H.; Fukuchi, C.; Mikawa, T.; Hayase, T. *J. Antibiot. (Tokyo)*. **1994**, *47*, 688–696.

Ubukata, M.; Morita, T.-I.; Osada, H. *J. Antibiot. (Tokyo)*. **1994**, *48*, 293–299.

Stephan, H.; Kempter, C.; Metzger, J. W.; Jung, G.; Potterat, O.; Pfefferle, C.; Fiedler, H. P. *J. Antibiot. (Tokyo)*. **1996**, *49*, 765–769.

Ivanova, V.; Gushterova, A. *J. Antibiot. (Tokyo)*. **1997**, *50*, 965–969.

Ivanova, V.; Schlegel, R.; Dornberger, K. *J. Basic Microbiol.* **1998**, *38*, 415–419.

- Ivanova, V.; Gesheva, V.; Kolarova, M. Dihydroniphimycin. *J. Antibiot. (Tokyo)*. **2000**, *53*, 627–632.
- Reshef, V.; Carmeli, S. *Tetrahedron* **2006**, *62*, 7361–7369.
- Ivanova, V.; Kolarova, M.; Aleksieva, K. *Zeitschrift fur Naturforsch. - Sect. B J. Chem. Sci.* **2007**, *62*, 1187–1192.
- Yuan, G.; Lin, H.; Wang, C.; Hong, K.; Liu, Y.; Li, J. *Magn. Reson. Chem.* **2011**, *49*, 30–37.
- Yuan, G.; Hong, K.; Lin, H.; She, Z.; Li, J. *Mar. Drugs* **2013**, *11*, 817–829.
- Singh, B.; Parshad, R.; Khajuria, R. K.; Guru, S. K.; Pathania, A. S.; Sharma, R.; Chib, R.; Aravinda, S.; Gupta, V. K.; Khan, I. A.; Bhushan, S.; Bharate, S. B.; Vishwakarma, R. A. *Tetrahedron Lett.* **2013**, *54*, 6695–6699.
- 
33. Additional articles reporting additional examples of **isolation of water-soluble guanidines**.
- Pearce, A. N.; Chia, E. W.; Berridge, M. V.; Mass, E. W.; Page, M. J.; Harper, J. L.; Webb, V. L.; Copp, B. R. *Tetrahedron* **2008**, *64*, 5748–5755.
- Tadesse, M.; Tørfoss, V.; Strøm, M. B.; Hansen, E.; Andersen, J. H.; Stensvåg, K.; Haug, T. *Biochem. Syst. Ecol.* **2010**, *38*, 827–829.
- Annals, A. M.; York, N.; Chase, M. Aurin M. *Annals of the New York Academy of Sciences*, **1948**, *49*, 353–375.
- Shimomura, O.; Goto, T.; Hirata, Y. *Cryst. Cypridina Luciferin* **1957**, *30*, 929–933.
- Johnson, F. H.; Sugiyama, N.; Shimomura, O.; Saiga, Y.; Haneda, Y. *Proc. Natl. Acad. Sci.* **1961**, *47*, 486–489.
- Hirata, Y.; Shimomura, O.; Eguchi, S. *Tetrahedron Lett.* **1959**, *929*, 4–9.
- Haneda, Y.; Johnson, F. H.; Masuda, Y.; Saiga, Y.; Shimomura, O.; Sie, H. C.; Sugiyama, N.; Takatusuki, I. *J Cell Comp Physiol* **1961**, *57*, 55–62.
- Marfey, P.; Craig, L. C.; Harvey, E. N. *Arch. Biochem. Biophys.* **1961**, *92*, 301–311.
- Shimomura, O.; Johnson, F. H.; Saiga, Y. *J. Cell. Comp. Physiol.* **1961**, *58*, 113–123.
- Hori, K.; Cormier, M. J. *Biochim. Biophys. Acta* **1965**, *2*, 386–396.
- Kishi, Y.; Goto, T.; Hirata, Y.; Shimomura, O.; Johnson, F. H. *Tetrahedron Lett.* **1966**, *29*, 3427–3436.
- Inoue, S.; Kakoi, H.; Okada, K.; Goto, T. *Chem. Lett.* **1979**, 253–256.
- Nakamura, M.; Suzuki, T.; Ishizaka, N.; Sato, J. I.; Inouye, S. *Tetrahedron* **2014**, *70*, 2161–2168.
- Finlay, A. C.; Hochstein, F. A.; Sobin, B. A.; Murphy, F. X. *J. Am. Chem. Soc.* **1951**, *73*, 341–343.
- Tatsuta, K.; Tsuchiya, T.; Someno, T.; Umezawa, S.; Umezawa, H.; Naganawa, H. *J. Antibiot. (Tokyo)*. **1971**, *24*, 735–746.
- Tatsuta, K.; Tsuchiya, T.; Umezawa, S.; Naganawa, H.; Umezawa, H. *J. Antibiot. (Tokyo)*. **1972**, *25*, 674–676.
- Tatsuta, K.; Fujimoto, K.; Yamashita, M.; Tsuchiya, T.; Umezawa, S.; Umezawa, H. *J. Antibiot. (Tokyo)*. **1973**, *26*, 606–608.



- Mynderse, J. S.; Samlaska, S. K.; Fukuda, D. S.; Du Bus, R. H.; Baker, P. J. *J. Antibiot. (Tokyo)*. **1985**, *38*, 1003–1007.
- Chung, J. H.; Bhat, A.; Kim, C. J.; Yong, D.; Ryu, C. M. *Sci. Rep.* **2016**, *6*, 1–11.
- Sakemi, S.; Ichiba, T.; Kohmoto, S.; Saucy, G.; Higa, T. *J. Am. Chem. Soc.* **1988**, *110*, 4851–4853.
- Kourany-lefoll, E.; Pais, M.; Sévenet, T.; Guittet, E.; Montagnac, A.; Fontaine, C.; Guénard, D.; Adeline, T.; Debitus, C. *J. Org. Chem.* **1992**, *57*, 3832–3835.
- Tsuda, M.; Shigemori, H.; Ishibashi, M.; Kobayashi, J. *Tetrahedron Lett.* **1992**, *33*, 2597–2598.
- Casapullo, A.; Finamore, E.; Minale, L.; Zollo, F. *Tetrahedron Lett.* **1993**, *34*, 6297–6300.
- VanWagenen, B. C.; Larsen, R.; Cardellina, J. H.; Randazzo, D.; Lidert, Z. C.; Swithenbank, C. *J. Org. Chem.* **1993**, *58*, 335–337.
- Tsukamoto, S.; Kato, H.; Hirota, H.; Fusetani, N. Stelletadine A: *Tetrahedron Lett.* **1996**, *37*, 5555–5556.
- Mourabit, A. A.; Pusset, M.; Chtourou, M.; Gaigne, C.; Ahond, A.; Poupat, C.; Potier, P. *J. Nat. Prod.* **1997**, *60*, 290–291.
- Sperry, S.; Crews, P. *J. Nat. Prod.* **1998**, *61*, 859–861.
- Matsunaga, S.; Yamashita, T.; Tsukamoto, S.; Fusetani, N. *J. Nat. Prod.* **1999**, *62*, 1202–1204.
- Tsukamoto, S.; Yamashita, T.; Matsunaga, S.; Fusetani, N. *Tetrahedron Lett.* **1999**, *40*, 737–738.
- Cohen, J.; Paul, G. K.; Gunasekera, S. P.; Longley, R. E.; Pomponi, S. A. *Pharm. Biol.* **2004**, *42*, 59–61.
- Capon, R. J.; Peng, C.; Dooks, C. *Org. Biomol. Chem.* **2008**, *6*, 2765–2771.
- 
34. Additional articles reporting additional examples of **isolation of water-soluble peptides**.
- Finlay, A. C.; Hochstein, F. A.; Sobin, B. A.; Murphy, F. X. *J. Am. Chem. Soc.* **1951**, *73*, 341–343.
- Roncari, G.; Kurylo-Borowska, Z.; Craig, L. C. *Biochemistry* **1966**, *5*, 2153–2159.
- Hettinger, T. P.; Craig, L. C. *Biochemistry* **1968**, *7*, 4147–4153.
- Hettinger, T. P.; Kurylo-Borowska, Z.; Craig, L. C. *Biochemistry* **1968**, *7*, 4153–4160.
- Higashide, E.; Hatano, K.; Shibata, M. Nakazawa, K. *J. Antibiot.* **1968**, *21*, 126–137.
- Horii, S.; Kameda, Y. *J. Antibiot.* **1968**, *21*, 665–667.
- Asai, M.; Muroi, M.; Sugita, N.; Kawashima, H.; Mizuno, K.; Miyake, A. *J. Antibiot.* **1968**, *21*, 138–146.
- Kondo, S.-I.; Kawamura, K.; Iwanaga, J.; Hamada, M.; Aoyagi, T.; Maeda, K.; Takeuchi, T.; Umezawa, H. *Chem. Pharm. Bull.* **1969**, *17*, 1896–1901.
- Aoyagi, T.; Takeuchi, T.; Matsuzaki, A.; Kawamura, K.; Kondo, S.; Hamada, M.; Maeda, K.; Umezawa, H. *J. Antibiot.* **1969**, *22*, 283–286.
- Umezawa, H.; Aoyagi, T.; Morishima, H.; Kunimoto, S.; Matsuzaki, M.; Hamada, M.; Takeuchi, T. *J. Antibiot.* **1970**, *23*, 425–427.
- Umezawa, S.; Tatsuta, K.; Tsuchiya, T.; Umezawa, H.; Naganawa, H. *Tetrahedron Lett.* **1971**, *2*, 259–262.
- Suda, H.; Aoyagi, T.; Hamada, M.; Takeuchi, T.; Umezawa, H. *J. Antibiot.* **1972**, *25*, 263–265.

- Umezawa, S.; Tatsuta, K.; Fujimoto, K.; Tsuchiya, T.; Umezawa, H.; Naganawa, H. *J. Antibiot.* **1972**, *25*, 267–270.
- Tatsuta, K.; Tsuchiya, T.; Umezawa, S.; Naganawa, H.; Umezawa, H. R. *J. Antibiot.* **1972**, *25*, 674–676.
- Miyamura, S.; Ogasawara, N.; Otsuka, H.; Niwayama, S.; Tanaka, H.; Take, T.; Uchiyama, T.; Ochiai, H. *J. Antibiot.* **1973**, *26*, 479–484.
- Tatsuta, K.; Mikami, N.; Fujimoto, K.; Umezawa, S.; Umezawa, H.; Aoyagi, T. *J. Antibiot.* **1973**, *26*, 625–646.
- Umezawa, H.; Aoyagi, T.; Okura, A.; Morishima, H.; Takeuchi, T.; Okami, Y. *J. Antibiot.* **1973**, *26*, 787–789.
- Hori, M.; Sugita, N.; Miyazaki, M. *Chem. Pharm. Bull.* **1973**, *21*, 1171–1174.
- Omura, S.; Tanaka, H.; Awaya, J.; Narimatsu, Y.; Konda, Y.; Hata, T. *Agric. Biol. Chem.* **1974**, *38*, 899–906.
- Okura, A.; Morishima, H.; Takita, T.; Aoyagi, T.; Takeuchi, T.; Umezawa, H. *J. Antibiot.* **1975**, *28*, 337–339.
- Shoji, J.; Sakazaki, R.; Wakisaka, Y.; Koizumi, K.; Mayama, M.; Shinzo, M. *J. Antibiot.* **1975**, *28*, 122–125.
- Argoudelis, A. D.; Reusser, F.; Mizensak, S. A.; Baczynskyj, L. *J. Antibiot.* **1976**, *29*, 1007–1014.
- Argoudelis, A. D.; Mizensak, S. A.; Baczynskyj, L.; Wnuk, R. J. *J. Antibiot.* **1976**, *29*, 1117–1119.
- MacDonald, J. C.; Bishop, G. G. *Can. J. Biochem.* **1977**, *55*, 165–172.
- Murao, S.; Watanabe, T. *Agric. Biol. Chem.* **1977**, *41*, 1313–1314.
- Hanada, K.; Tamai, M.; Yamagishi, M.; Ohmura, S.; Sawada, L.; Tanaka, I. *Agric. Biol. Chem.* **1978**, *42*, 523–528.
- Hanada, K.; Tamai, M.; Ohmura, S.; Sawada, J.; Seki, T.; Tanaka, I. *Agric. Biol. Chem.* **1978**, *42*, 529–536.
- Gurusiddaiah, S.; Winward, L. D.; Burger, D.; Graham, S. O. *Mycologia* **1979**, *71*, 103–118.
- Miyaki, T.; Numata, K.-I.; Nishiyama, Y.; Tenmyo, O.; Hatori, M.; Imanishi, H.; Konishi, M.; Kawaguchi, H. *J. Antibiot.* **1981**, *34*, 665–674.
- Shin-Watanabe, T.; Fukuhara, K.; Murao, S. *Tetrahedron* **1982**, *38*, 1775–1780.
- Ohuchi, S.; Suda, H.; Naganawa, H.; Takita, T.; Aoyagi, T.; Umezawa, H.; Nakamura, H.; Iitaka, Y. *J. Antibiot.* **1983**, *36*, 1576–1580.
- Umezawa, H.; Aoyagi, T.; Ohuchi, S.; Okuyama, A.; Suda, H.; Takita, T.; Hamada, M.; Takeuchi, T. *J. Antibiot.* **1983**, *36*, 1572–1575.
- Wojciechowska, H.; Zgoda, W.; Borowski, E.; Dziegielewski, K.; Ulikowski, S. *J. Antibiot.* **1983**, *36*, 793–798.
- Ciabatti, R.; Kettenring, J. K.; Winters, G.; Tuan, G.; Zerilli, L.; Cavalleri, B. *J. Antibiot.* **1989**, *42*, 254–267.
- Cavalleri, B.; Pagani, H.; Volpe, G.; Selva, E.; Parenti, F. *J. Antibiot.* **1984**, *37*, 309–317.
- Ohfuné, Y.; Kurokawa, N. *Tetrahedron Lett.* **1984**, *25*, 1587–1590.

- Takesako, K.; Beppu, T. *J. Antibiot.* **1984**, *37*, 1161–1169.
- Huang, L.; Rowin, G.; Dunn, J.; Sykes, R.; Dobna, R.; Mayles, B. A.; Gross, D. M.; Burg, R. W. *J. Antibiot.* **1984**, *37*, 462–465.
- Hensens, O. D.; Liesch, J. M. *J. Antibiot.* **1984**, *37*, 466–468.
- Mynderse, J. S.; Samlaska, S. K.; Fukuda, D. S.; Du Bus, R. H.; Baker, P. J. *J. Antibiot.* **1985**, *38*, 1003–1007.
- Ezaki, M.; Iwami, M.; Yamashita, M.; Hashimoto, S.; Komori, T.; Umehara, K.; Mine, Y.; Kohsaka, M.; Aoki, H.; Imanaka, H. *J. Antibiot.* **1985**, *38*, 1453–1461.
- Uchida, I.; Shigematsu, N.; Ezaki, M.; Hashimoto, M.; Aoki, H.; Hiroshi, I. *J. Antibiot.* **1985**, *38*, 1462–1468.
- Umezawa, H.; Aoyagi, T.; Ogawa, K.; Obata, T.; Iinuma, H.; Naganawa, H.; Hamada, M.; Takeuchi, T. *J. Antibiot.* **1985**, *38*, 1813–1815.
- Komori, T.; Ezaki, M.; Kino, E.; Kohsaka, M.; Aoki, H.; Imanaka, H. *J. Antibiot.* **1985**, *38*, 691–698.
- Ogura, K.; Maeda, M.; Nagai, M.; Tanaka, T.; Nomoto, K.; Murachi, T. *Agric. Biol. Chem.* **1985**, *49*, 799–805.
- Murao, S.; Shin, T.; Katsu, Y.; Nakatani, S.; Hirayama, K. *Agric. Biol. Chem.* **1985**, *49*, 895–897.
- Imada, C.; Maeda, M.; Hara, S.; Taga, N.; Simidu, U. *J. Appl. Bacteriol.* **1986**, *60*, 469–476.
- Sano, S.; Ikai, K.; Kuroda, H.; Nakamura, T.; Obayashi, A.; Ezure, Y.; Enomoto, H. *J. Antibiot.* **1986**, *39*, 1674–1684.
- Sano, S.; Ijai, K.; Katayama, K.; Takesako, K.; Nakamura, T.; Obayashi, A.; Ezure, Y.; Enomoto, H. *J. Antibiot.* **1986**, *39*, 1685–1696.
- Kurusu, K.; Ohba, K.; Arai, T.; Fukushima, K. *J. Antibiot.* **1987**, *40*, 1506–1514.
- Ando, T.; Okada, S.; Uchida, I.; Hemmi, K.; Nishikawa, M.; Tsurumi, Y.; Fujie, A.; Yoshida, K.; Okuhara, M. *J. Antibiot.* **1987**, *40*, 468–475.
- Rapp, C.; Jung, G.; Katzer, W.; Loeffler, W. *Angew. Chem. Int. Ed. Engl.* **1988**, *27*, 1733–1734.
- Harada, K.-I.; Suzuki, M.; Dahlem, A. M.; Beasley, V. R.; Carmichael, W. W.; Rinehart, K. L. *Toxicon* **1988**, *26*, 433–439.
- Wakamiya, T.; Terashima, S.-I.; Kawata, M.; Teshima, T.; Shiba, T. *Bull. Chem. Soc. Jpn.* **1988**, *61*, 1422–1424.
- Yaginuma, S.; Asahi, A.; Morishita, A.; Hayashi, M.; Tsujino, M.; Takada, M. *J. Antibiot.* **1989**, *42*, 1362–1369.
- Masaki, S.; Konishi, T.; Tsuji, N.; Shoji, J. *J. Antibiot.* **1989**, *42*, 463–466.
- Kondo, E.; Katayama, T.; Kawamura, Y.; Yasuda, Y.; Matsumoto, K.; Ishii, K.; Tanimoto, T.; Hino, H.; Kato, T.; Kyotani, H.; Shoji, J. *J. Antibiot.* **1989**, *42*, 1–6.
- Murata, H.; Kojima, N.; Harada, K.-I.; Suzuki, M.; Ikemoto, T.; Shibuya, T.; Haneishi, T.; Torikata, A. *J. Antibiot.* **1989**, *42*, 691–700.
- Fusetani, N.; Matsunaga, S.; Matsumoto, H.; Takebayashi, Y. *J. Am. Chem. Soc.* **1990**, *112*, 7053–7054.
- Martin, C.; Sivonen, K.; Matern, U.; Dierstein, R.; Weckesser, J. *FEMS Microbiol. Lett.* **1990**, *68*, 1–6.

- Muramatsu, R.; Abe, S.-I.; Hayashi, H.; Yamaguchi, K.; Jinda, K.; Sakano, K.-I.; Inouye, Y.; Nakamura, S. *J. Antibiot.* **1991**, *44*, 1222–1227.
- Yamashita, T.; Iijima, M.; Nakamura, H.; Isshiki, K.; Naganawa, H.; Hattori, S.; Hamada, M.; Ishizuka, M.; Takeuchi, T. *J. Antibiot.* **1991**, *44*, 557–559.
- Fusetani, N.; Nakao, Y.; Matsunaga, S. *Tetrahedron Lett.* **1991**, *32*, 7073–7074.
- Hatsu, M.; Naganawa, H.; Aoyagi, T.; Takeuchi, T. *J. Antibiot.* **1992**, *45*, 1084–1087.
- Aoyagi, T.; Hatsu, M.; Kojima, F.; Hayashi, C.; Hamada, M.; Takeuchi, T. *J. Antibiot.* **1992**, *45*, 1079–1083.
- Kamiyama, T.; Umino, T.; Nakayama, N.; Itezono, Y.; Satoh, T.; Yamashita, Y.; Yamaguchi, A.; Yokose, K. *J. Antibiot.* **1992**, *45*, 424–427.
- Ezaki, M.; Shigematsu, N.; Yamashita, M.; Komori, T.; Umehara, K.; Imanaka, H. *J. Antibiot.* **1993**, *46*, 135–140.
- Luukkainen, R.; Sivonen, K.; Namikoshi, M.; Fardig, M.; Rinehart, K. L.; Niemela, S. I. *Appl. Environ. Microbiol.* **1993**, *59*, 2204–2209.
- Kaneto, R.; Chiba, H.; Kazuyuki, D.; Kojima, I.; Sakai, K.; Shibamoto, N.; Nishida, H.; Okamoto, R.; Akagawa, H.; Mizuno, S. *J. Antibiot.* **1993**, *46*, 1622–1624.
- Funabashi, Y.; Tsubotani, S.; Koyama, K.; Katayama, N.; Harada, S. *Tetrahedron* **1993**, *49*, 13–28.
- Katayama, N.; Fukusumi, S.; Funabashi, Y.; Iwahi, T.; Ono, H. *J. Antibiot.* **1993**, *46*, 606–613.
- Murakami, M.; Okita, Y.; Matsuda, H.; Okino, T.; Yamaguchi, K. *Tetrahedron Lett.* **1994**, *35*, 3129–3132.
- Kamiyama, T.; Umino, T.; Nakamura, Y.; Itezono, Y.; Sawairi, S.; Satoh, T.; Yokose, K. *J. Antibiot.* **1994**, *47*, 959–968.
- Swersey, J. C.; Ireland, C. M.; Cornell, L. M.; Peterson, R. W. *J. Nat. Prod.* **1994**, *57*, 842–845.
- Luukkainen, R.; Namikoshi, M.; Sivonen, K.; Rinehart, K. L.; Niemelä, S. I. *Toxicon* **1994**, *32*, 133–139.
- Bauer, K.; Müller, H.; Schedel, M.; Truscheit, E.; Schnabel, E. *Int. J. Pept. Protein Res.* **1995**, *46*, 205–208.
- Bauer, K.; Kurz, J.; Rosentreter, H.; Schedel, M.; Weber, B.; Wünsche, C.; Schnabel, E. *Int. J. Pept. Protein Res.* **1995**, *46*, 302–305.
- Matsuda, H.; Okino, T.; Murakami, M.; Yamaguchi, K. *A Tetrahedron* **1996**, *52*, 14501–14506.
- Shin, H. J.; Murakami, M.; Matsuda, H.; Yamaguchi, K. *Tetrahedron* **1996**, *52*, 8159–8168.
- Kato, A.; Nakaya, S.; Kokubo, N.; Aiba, Y.; Ohashi, Y.; Hirata, H.; Fujii, K.; Harada, K.-I. *J. Antibiot.* **1998**, *51*, 929–935.
- Nakao, Y.; Oku, N.; Matsunaga, S.; Fusetani, N. *J. Nat. Prod.* **1998**, *61*, 667–670.
- Expósito, M. A.; López, B.; Fernández, R.; Vázquez, M.; Debitus, C.; Iglesias, T.; Jiménez, C.; Quiñoá, E.; Riguera, R. *Tetrahedron* **1998**, *54*, 7539–7550.
- Tomishima, M.; Ohki, H.; Yamada, A.; Takasugi, H.; Maki, K.; Tawara, S.; Tanaka, H. *J. Antibiot.* **1999**, *52*, 674–676.
- Nakao, Y.; Masuda, A.; Matsunaga, S.; Fusetani, N. *J. Am. Chem. Soc.* **1999**, *121*, 2425–2431.

- Fusetani, N.; Fujita, M.; Nakao, Y.; Matsunaga, S.; van Soest, R. W. M. *Bioorg. Med. Chem. Lett.* **1999**, *9*, 3397–3402.
- Arai, N.; Shiomi, K.; Iwai, Y.; Ōmura, S. *J. Antibiot.* **2000**, *53*, 609–614.
- Brittain, S.; Mohamed, Z. A.; Wang, J.; Lehmann, V. K. B.; Carmichael, W. W.; Rinehart, K. L. *Toxicon* **2000**, *38*, 1759–1771.
- Otsuka, T.; Muramatsu, Y.; Nakanishi, T.; Hatanaka, H.; Okamoto, M.; Hino, M.; Hashimoto, S. *J. Antibiot.* **2000**, *53*, 449–458.
- Nagano, Y.; Ikedo, K.; Fujishima, A.; Izawa, M.; Tsubotani, S.; Nishimura, O.; Fujino, M. *J. Antibiot.* **2001**, *54*, 934–947.
- Murakami, Y.; Takei, M.; Shindo, K.; Kitazume, C.; Tanaka, J.; Higa, T.; Fukamachi, H. *J. Nat. Prod.* **2002**, *65*, 259–261.
- Milanowski, D. J.; Gustafson, K. R.; Rashid, M. A.; Pannell, L. K.; McMahon, J. B.; Boyd, M. R. *J. Org. Chem.* **2004**, *69*, 3036–3042.
- Göransson, U.; Svängård, E.; Claeson, P.; Bohlin, L. *Curr. Protein Pept. Sci.* **2005**, *5*, 317–329.
- Svängård, E.; Göransson, U.; Hocaoglu, Z.; Gullbo, J.; Larsson, R.; Claeson, P.; Bohlin, L. *J. Nat. Prod.* **2004**, *67*, 144–147.
- Yoshimura, S.; Sato, B.; Takase, S.; Terano, H. *J. Antibiot.* **2004**, *57*, 429–435.
- Lautru, S.; Deeth, R. J.; Bailey, L. M.; Challis, G. L. *Nat. Chem. Biol.* **2005**, *1*, 265–269.
- He, H. *Appl. Microbiol. Biotechnol.* **2005**, *67*, 444–452.
- Lee, J. E.; Bae, I. Y.; Lee, H. G.; Yang, C.-B. *Food Chem.* **2006**, *99*, 143–148.
- Huang, Y.-F.; Li, L.-H.; Tian, L.; Qiao, L.; Hua, H.-M.; Pei, Y.-H. *J. Antibiot.* **2006**, *59*, 355–357.
- An, T.; Kumar, T. K. S.; Wang, M.; Liu, L.; Lay, J. O.; Liyanage, R.; Berry, J.; Gantar, M.; Marks, V.; Gawley, R. E.; Rein, K. S. *J. Nat. Prod.* **2007**, *70*, 730–735.
- Azumi, M.; Ogawa, K.-Ichi; Fujita, T.; Takeshita, M.; Yoshida, R.; Furumai, T.; Igarashi, Y. *Tetrahedron* **2008**, *64*, 6420–6425.
- Iwatsuki, M.; Uchida, R.; Yoshijima, H.; Ui, H.; Shiomi, K.; Kim, Y.-P.; Hirose, T.; Sunazuka, T.; Abe, A.; Tomoda, H.; Omura, S. *J. Antibiot.* **2008**, *61*, 230–236.
- Iwatsuki, M.; Uchida, R.; Yoshijima, H.; Ui, H.; Shiomi, Matsumoto, A.; Takahashi, Y.; Abe, A.; Tomoda, H.; Omura, S. *J. Antibiot.* **2008**, *61*, 222–229.
- Gualtieri, M.; Aumelas, A.; Thaler, J.-O. *J. Antibiot.* **2009**, *62*, 295–302.
- Smaoui, S.; Mellouli, L.; Lebrihi, A.; Coppel, Y.; Fguira, L. F. B.; Mathieu, F. *Nat. Prod. Res.* **2011**, *25*, 806–814.
- Matsuo, Y.; Kanoh, K.; Jang, J.-H.; Adachi, K.; Matsuda, S.; Miki, O.; Kato, T.; Shizuri, Y. *J. Nat. Prod.* **2011**, *74*, 2371–2376.
- Hirota-Takahata, Y.; Kozuma, S.; Kuraya, N.; Fukuda, D.; Nakajima, M.; Ando, O. *J. Antibiot.* **2014**, *67*, 243–251.
- Kruglyak, N.; Williams, D. E.; Chen, H.; Law, S.; Kaleta, J.; Villanueva, I.; Davies, J. E.; Andersen, R. J.; Brömme, D. *Bioorg. Med. Chem. Lett.* **2017**, *27*, 1397–1400.