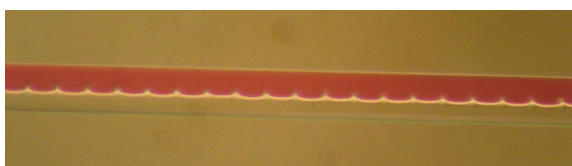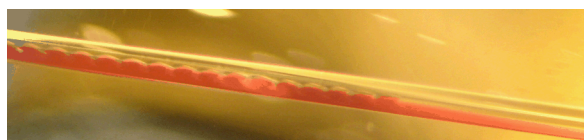**Phase separation in two- and three-phase microchips**

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Streams of water and chloroform (Sudan dye) for a) an uncoated two-phase chip, b) a selectively non-polar coated two-phase chip, and c) a selectively non-polar coated three-phase chip at various flow rates
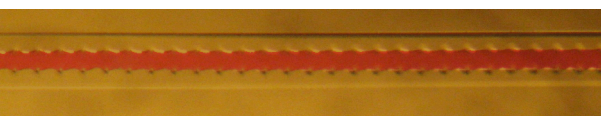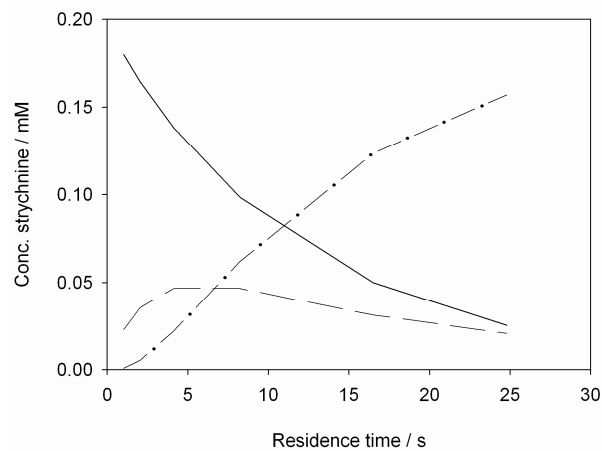
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a)

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b)

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c)

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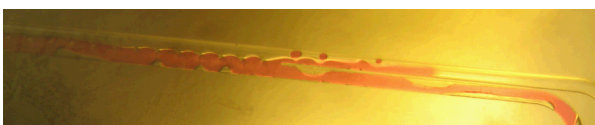
Model data obtained with change of various parameters

Modeling results obtained by changing two parameters (viscosity
30 of organic solvent and flow rate of the system) (– is basic aq. phase model data; -- is chloroform model data; -●- is acidic aq. phase model data).
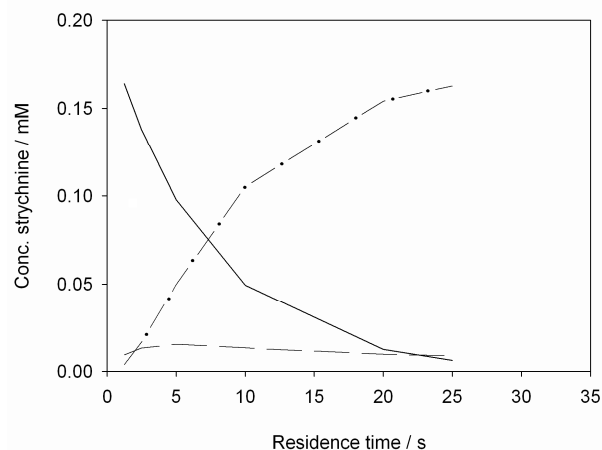
35

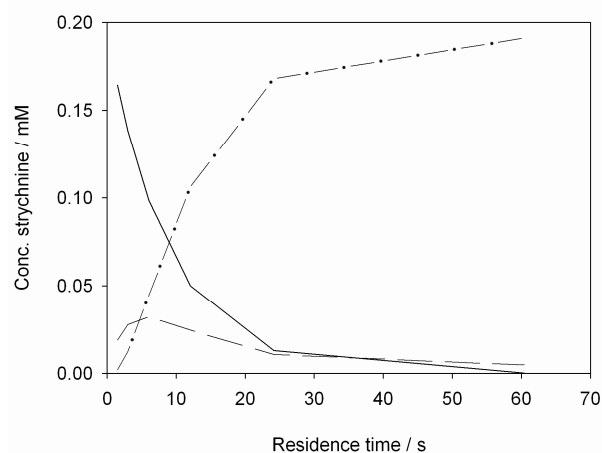40 a) **Flow rate of the system 1:1:1 µL/min**

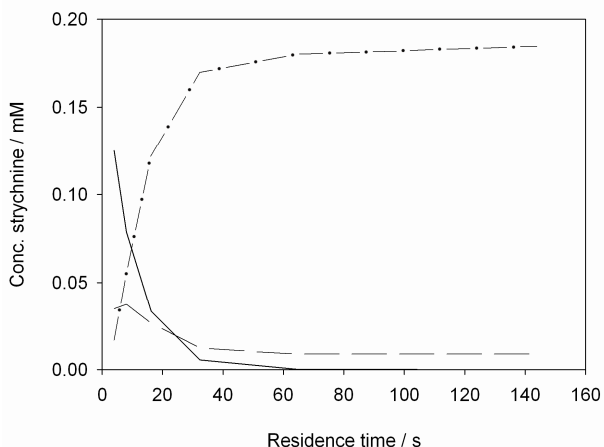b) **Narrow width of the middle (organic) channel**

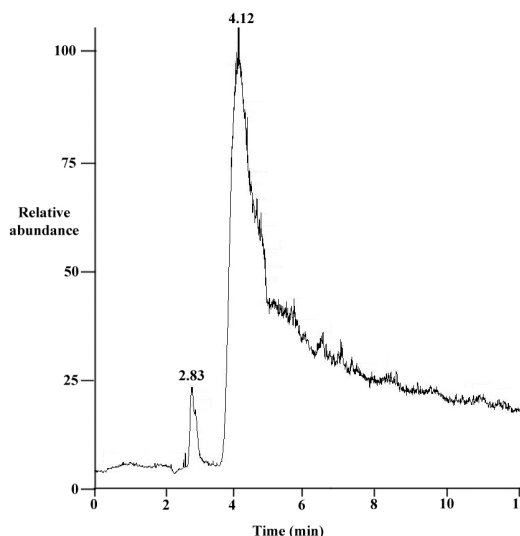
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c) **Change of organic solvent**
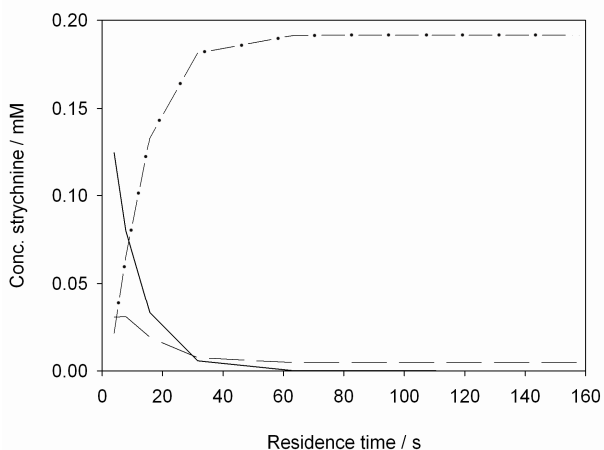
e) Standard case with channel length - 9.3 cm

20 MS-TIC profile of strychnine injection obtained using a two-phase microchip
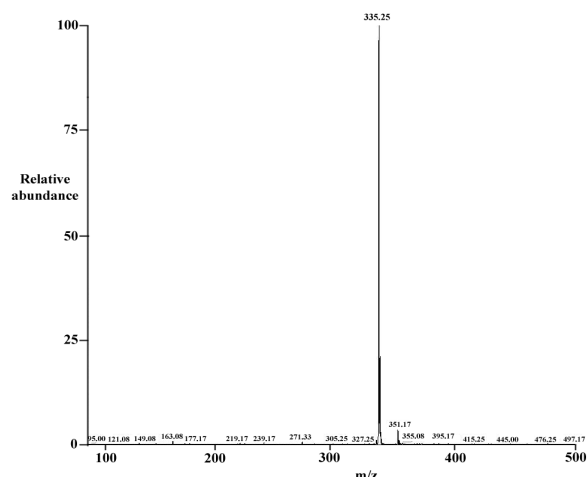

f) change of organic solvent with channel length - 9.3 cm
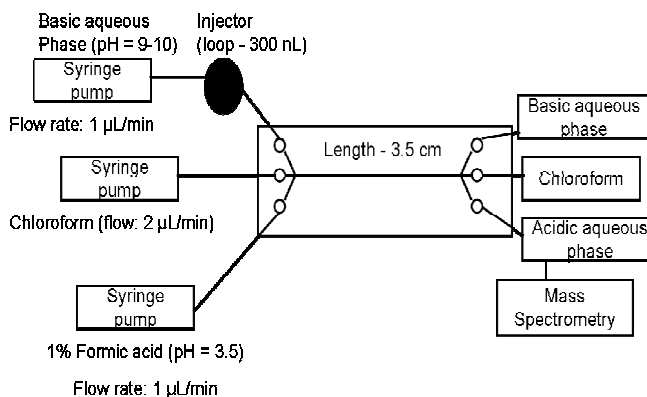
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25 (+)-ESI-mass spectrum of strychnine injection obtained using a two-phase microchip
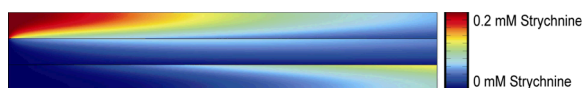

Schematic design of on-line screening of plant extracts using three-phase chip interfaced with nanospray ESI-MS

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30 A visual representation of three-phase microchip extraction efficiency at a flow rate of 0.5:1:0.5 μL/min flow rate, 12.5 sec residence time

Wilke-Chang equation [25]

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$$D = 7.4 X 10^{-8} \frac{(xM)^{1/2}T}{\eta V^{0.6}}$$

D = diffusion coefficient, cm²/sec

40 x = association parameter, multiple of nominal molecular weight of solvent to give effective value

M = molecular weight of solvent

15

T = temperature, °K

η = viscosity of solution, centipoise

5 V = molar volume of solute at normal boiling point, cm³/ mole