

Supplementary data

Table S-1. The information of the collected ginseng samples

| Sample Name   | Suppliers                                                   | Cultivation Location      | Number of sample | Sample Age/Quality class |
|---------------|-------------------------------------------------------------|---------------------------|------------------|--------------------------|
| White ginseng | Plusone native Co., Ltd.                                    | Changbai, Jilin, China    | 2                | 6                        |
|               | Changbai Mountain Shizhu Wild Ginseng Development Co., Ltd. | Dandong, Liaoning, China  | 8                | 5,6,10,15                |
|               | Ji An (City) Xinkaihe Liability Co., Ltd.                   | Ji An, Jilin, China       | 8                | 3,4,5,6                  |
|               | Jilin Fusong Ginseng provenance Co., Ltd.                   | Fusong, Jilin, China      | 12               | 3,4,5,6                  |
|               | Jilin Hongjiu Ginseng Co., Ltd.                             | Fusong, Jilin, China      | 2                | 5                        |
|               | Ji An Earth Ginseng Co., Ltd.                               | Ji An, Jilin, China       | 2                | 4                        |
|               | GuangDong ZhengHan Pharmaceutical Share Co., Ltd;           | Maoming, Guangdong, China | 5                | 6                        |
| Red ginseng   | Changbai Mountain HuangFeng Ginseng Co., Ltd.               | Jing-Yu, Jilin, China     | 2                | 6                        |
|               | Jilin Province China Ginseng Processing Co., Ltd.           | Wangqing, Jilin, China    | 1                | 6                        |
|               | Kangmei Pharmaceutical Co., Ltd. (Xinkaihe)                 | Ji An, Jilin, China       | 4                | 6                        |
|               | Kaicheng Ginseng Co., Ltd.                                  | Kaesong, North Korea      | 1                | 6                        |
|               | Wholesale market                                            | North Korea               | 2                | 6                        |
|               | Longbao Ginseng and Antler Co., Ltd.                        | Benxi, Liaoning, China    | 2                | 6                        |
|               | Wholesale market                                            | Jilin, China              | 3                | 6                        |
|               | South Korean ginseng commune Co., Ltd.                      | South Korea               | 3                | 6                        |

|                     |                                                 |                                   |    |    |             |
|---------------------|-------------------------------------------------|-----------------------------------|----|----|-------------|
| American<br>ginseng | Wholesale market                                | Jilin, China                      | 4  | -  |             |
|                     | Wholesale market                                | Wisconsin, U.S.                   | 2  | -  |             |
|                     | Wholesale market                                | Ontario, Canada                   | 15 | -  |             |
| <i>Sanqi</i>        |                                                 | Laozhai, Mengzi, Yunnan           | 1  |    |             |
|                     |                                                 | Lengtian, Mengzi, Yunnan          | 1  |    |             |
|                     |                                                 | Hong-Zhai, Mengzi, Yunnan         | 1  |    |             |
|                     |                                                 | Mingjiu, Mengzi, Yunnan           | 1  |    |             |
|                     |                                                 | Shilin, Kunming, Yunnan           | 1  |    |             |
|                     |                                                 | Zhuilibian, Wenshan, Yunnan       | 1  |    |             |
|                     |                                                 | Yanshan, Wenshan, Yunnan          | 1  |    |             |
|                     |                                                 | Xichou, Wenshan, Yunnan           | 1  |    |             |
|                     |                                                 | Laohuilong, Wenshan, Yunnan       | 1  |    |             |
|                     | Kunming University of Science and<br>Technology | Maguan, Wenshan, Yunnan           | 1  | 80 | <i>Tou</i>  |
|                     |                                                 | Tonghai, Yuxi, Yunnan             | 1  |    | (approxim   |
|                     |                                                 | Dongshan, Luxi, Yunnan            | 2  |    | ately 80    |
|                     |                                                 | Puxiong, Jianshui, Yunnan         | 1  |    | pieces of   |
|                     |                                                 | Longpeng, Shiping, Yunnan         | 2  |    | dried roots |
|                     |                                                 | Nijiao, Qiubei, Yunnan            | 1  |    | per 500     |
|                     |                                                 | Shuanglongying, Qiubei,<br>Yunnan | 1  |    | grams)      |
|                     |                                                 | Shupi, Qiubei, Yunnan             | 1  |    |             |
|                     |                                                 | A Meng, Yanshan, Yunnan           | 1  |    |             |
|                     |                                                 | Jiayi, Yanshan, Yunnan            | 1  |    |             |
|                     |                                                 | Luoping, Qujing, Yunnan           | 1  |    |             |
|                     |                                                 | Shizong, Qu Jing, Yunnan          | 1  |    |             |
|                     |                                                 | Dongfeng, Mile, Yunnan            | 1  |    |             |
|                     |                                                 | Malipo, Daping, Yunnan            | 1  |    |             |
|                     | Macau Gong-Shu-Gen Pharmacy                     | Yunnan                            | 4  |    |             |

Table S-2. The discriminant result comparison between the chemometric and DNA sequencing

|                           |             | method                                           |                                                  |
|---------------------------|-------------|--------------------------------------------------|--------------------------------------------------|
| Product                   | Sample name | DNA sequencing                                   | OPLS-DA                                          |
| American ginseng Tea      | AGT-1       | Mixture of American ginseng and <i>P.ginseng</i> | Mixture of American ginseng and <i>P.ginseng</i> |
|                           | AGT-2       | <i>P.ginseng</i>                                 | White ginseng                                    |
|                           | AGT-3       | Mixture of American ginseng and <i>P.ginseng</i> | Mixture of American ginseng and red ginseng      |
|                           | AGT-4       | <i>P.ginseng</i>                                 | Mixture of American ginseng and <i>P.ginseng</i> |
| White Ginseng             | WGB-1       | <i>P.ginseng</i>                                 | White ginseng                                    |
|                           | WGB-2       | <i>P.ginseng</i>                                 | White ginseng                                    |
| Bolus and tea (P.ginseng) | WGB-3       | <i>P.ginseng</i>                                 | White ginseng                                    |
|                           | WGB-4       | <i>P.ginseng</i>                                 | White ginseng                                    |
| Red ginseng tea           | RGT-1       | <i>P.ginseng</i>                                 | Mixture of red ginseng and white ginseng         |
| (P.ginseng)               | RGT-2       | <i>P.ginseng</i>                                 | White ginseng                                    |
|                           | RGT-3       | <i>P.ginseng</i>                                 | White ginseng                                    |

The discriminant result of the 11 ginseng herbal products using the DNA sequencing method has been published in our previous study<sup>13</sup>.