Asian Journal of Chemistry; Vol. 23, No. 11 (2011), 5167-5168

ASIAN JOURNAL OF CHEMISTRY

www.asianjournalofchemistry.co.in

NOTE

Determining Trace Elements and Heavy Metals in Chinese Herbal Medicine *Panax notoginseng* from Tibet

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(*Received*: 24 December 2010; *Accepted*: 30 July 2011) AJC-10239

Wild *Panax notoginseng* from Tibet were determined the contents of trace elements and heavy metals by ICP-MS. Data proved that *Panax notoginseng* from Tibet contains more Fe, Mn, Zn and Se than *Panax notoginseng* from Guangxi province of China and more Fe, Mn, Zn, Se and Mo than *Panax notoginseng* from Yunnan proveince of China, but *Panax notoginseng* from Tibet contains less Cu than that from Guangxi proveince of China and less Ca and Se than that from Yunnan province of China, which proved that wild *Panax notoginseng* from Tibet of China has higher quality in terms of trace elements. Compared with *Panax notoginseng* from Guangxi province, *Panax notoginseng* from Tibet contains less Pb and more As and more Pb than *Panax notoginseng* from Yunnan province, so we should control and detect the heavy metals content when control the quality of Chinese traditional medicine.

Key Words: ICP-MS, Panax notoginseng, Tibet, Trace elements, Heavy metals.

Panax notoginseng, as well-known traditional Chinese medicine, has many pharmacological actions on blood system, cardiovascular system, nervous system, immune system, metabolic system and on antiinflammation, antiaging and anti-tumor[1,2].

Most studies on active constituents from plants of *Panax notoginseng* and their pharmacological activities were focused on organic compound, such as *Panax notoginsenosides*, dencichine[3], panaxynol, β-sitosterol, daucossterol, tripalmitin, lupeol, β-hydroxy lupeol and kaempferol[4]. But many researches proved that the contents of trace elements and heavy metals have reference value in the quality evaluation and control of Chinese traditional medicine[5,6]. So it is important to detect trace elements and heavy metals in *Panax notoginseng* from Tibet to control its quality.

With the quick development of analytical chemistry, some new instruments and analytical technologies make testing content of trace elements and heavy metals easier, such as ICP-MS and ICP-AES, which has many advantages, especially the ability to detect many kinds of elements simultaneously[7,8].

Treatments of the samples: *Panax notoginseng* were collecting from Tibetan autonomous region of China. All the *Panax notoginseng* were washed with distilled water to remove the dust, washed with deionized water 3-5 times, air-dried and grinded with stainless steel grinder. Inductively coupled plasma mass spectrometry apparatus (ELAN DRCI) was used. The parameters of instruments and the extracting methods as referred by previous workers[9,10]

The data showed that wild *Panax notoginseng* from Tibet of China contain a large amount of trace elements, they are Ca 992.89 μg/g, Fe 730.30 μg/g, Mn 63.66 μg/g, Zn 29.43 μg/g, Cu 4.73 μg/g, Se 28.11 ng/g and Mo 21.32 ng/g, respectively (Table-1). All these results proved that *Panax notoginseng* from Tibet contains more Fe, Mn, Zn and Se than *Panax notoginseng* from Guangxi proveince of China[11] and more Fe, Mn, Zn, Se and Mo than *Panax notoginseng* from Yunnan proveince of China[12], but *Panax notoginseng* from Tibet contains less Cu than that from Guangxi proveince of China and less Ca and Se than that from Yunnan proveince of China. All these data showed that wild *Panax notoginseng* from Tibet of China has higher quality in terms of trace elements.

TABLE-1
CONTENT OF TRACE ELEMENTS
IN *Panax notoginseng* FROM TIBET

Elements	Content
Ca	992.89 μg/g
Fe	730.30 μg/g
Zn	29.43 μg/g
Mn	63.66 μg/g
Cu	4.73 μg/g
Se	28.11 ng/g
Mo	21.32 ng/g

From Table-2, it is clear that *Panax notoginseng* from Tibet also contains much heavy metals, such as As, Cd, Pb and Cr whose concentration are 4099.51 ng/g, 230.09 ng/g, 252.98 ng/g and 1091.57 ng/g respectively. Compared with *Panax notoginseng* from Guangxi proveince[11], *Panax notoginseng* from Tibet contains less Pb and more As and more Pb than *Panax notoginseng* from Yunnan province[12].

TABLE-2
CONTENT OF HEAVY METALS IN
Panax notoginseng FROM TIBET (ng/g)

Elements	Content
As	4099.51
Cd	230.09
Pb	252.98
Cr	1091.57

Panax notoginseng contains different contents of trace elements and heavy metals from different place of origin, which is relative to local geological soil and growth period[12] and climate[13]. Present results showed that *Panax notoginseng* from Tibet has higher quality in terms of trace elements and heavy metals, which proved that Tibet is suitable for growing herbs.

ACKNOWLEDGEMENTS

The authors thank Ouyang Li (School of Public Health, Peiking University, China) for help.

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