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Standardization of South Korean Propolis

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Objectives

This study was investigated total flavonoid and phenolic contents, heavy metals, *et al.* for standardization on the south Korean propolis. The propolis collected from the whole part of South Korea, such as central, southern and Jeju island.

Materials and methods

1. Propolis samples

   The propolis samples collected by *Apis mellifera* were obtained from the whole part of Korea peninsula.

2. Determination of Total Flavonoids Concentration

   Total flavonoids concentration was determined spectrophotometrically at 415 nm on a Perkin-Elmer Lambda 10 UV/VIS Spectrophotometer and was calculated using quercetin as standard (Moreno *et al.*, 2000).

3. Determination of Total Phenolics Contents

   The amount of total phenolic in the extracts was determined according to a modification of the Folin-Ciocalteu method (Kuyala *et al.*, 2000).

4. The heavy metals contents

   The metal (Cadmium, Chrome, Copper, Nickel, Lead, Zinc, Arsenic, Mercury) concentrations of the propolis were determined using a ICP-MS(Agilent 7500a), the samples for analysis of heavy metal content were degraded with ternery solution.

Results and discussion

1. To analyze the characteristics of Korean propolis according to the region of Korean peninsula, total flavonoids and phenolic contents were measured(table 1). Total flavonoids and phenolic contents of middle region in Korean peninsula(4.26% and 13.05 g/100 g gallic acid) were higher than southern region (2.53%, 10.9 g/100 g gallic acid) and Jeju island(0.03%, 7.22 g/100 g gallic acid), respectively. Our results demonstrate that the qualities and quantities of flavonoids are different among the regional provinces of Korea.

2. A comparative study of total phenolic content of the propolis was undertaken. Total phenolic contents appeared similarly as those of flavonoids did. Moreno *et al*(2000) reported that total flavonoids content of Argentine propolis was 1 to 4%. In our studies, the flavonoids and phenolic contents of Korean propolis which collected from middle region of Korean peninsula was higher than Argentine propolis. This meant quantity and quality of Korean propolis were similar or even superior than Argentine propolis.

Table 1. Total flavonoids and phenolic contents of Korean propolis.

Region		Total flavonoids contents		Total phenolic contents	
		(%)	average	(g/100g gallic acid)	average
Middle	Suwon	5.37	4.26	19.78	13.05
	Yeoju	4.33		13.79	
	Yeongwol	5.22		7.97	
	Hongcheon	2.6		11.91	
	Dangjin	6.67		13.69	
	Daejeon	4.72		12.77	
	Chungju	2.49		10.21	
	Danyang	2.67		14.25	
South	Daegu	2.95	2.53	9.65	10.91
	Mungyeong	1.44		9.18	
	Jinju	3.44		11.1	
	Changnyeong	2.08		9.51	
	Jeonju	2.08		12.27	
	Namwon	1.76		7.84	
	Gurye	3.34		14.57	
	Hwasun	3.16		14.45	
Jeju	Jeju 1	0.08	0.03	4.42	7.22
	Jeju 2	0		12.05	
	Jeju 3	0		5.18	

3. Although the propolis collected some regions of Korea contained Pb less than 1 ppm, we concluded that Korean propolis would be suitable for the sources of health food because a harmful heavy metal including Cr, As and Hg were not detected at all in our experiments. On the other hand, Zn contents were found in 0.44±0.2 ppm.

References

Kujala, Tytti S., Jyrki M. Loponen, Karel D. Klika, and Kalevi Pihlaja (2000), Phenolics and Betacyanins in Red Beetroot (*Beta vulgaris*) Root: Distribution and Effect of Cold Storage on the Content of Total Phenolics and Three Individual Compounds, *Journal of Agriculture Food Chemistry,* 48, 5338~5342

Moreno, M.I.N., Isla, M.I., Sampietro, A.R., Vattuone, M.A. (2000) Comparison of the free radical-scavenging activity of propolis from several regions of Argentina, *Journal of Ethnopharmacology,* 71, 109~114.