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NOTE

Atomic Absorption Spectrophotometric Determination of Potassium Content of Soil and Leaf of *Camellia oleifera* from the Main Producing Areas of Guangxi, China

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The development of *Camellia oleifera* has a very important role on promoting integrated mountain development and the employment of rural income in Guangxi province. The concentrations of potassium in tea leaves and soils from ten major Camellia producing areas in Guangxi were measured by atomic absorption spectrophotometry. The results showed that most of the soils in central and northern Guangxi province were very deficient for potassium, so potassium deficiency is an important reason leading to low yield of Camellia forest in central and northern Guangxi.

Key Words: *Camellia oleifera*, Soil, Leaf, Potassium, Atomic absorption spectrophotometry.

Camellia oleifera is a species of tree which has a certain collectively cultivated area, belong to Camellia genus, whose seed oil content is high[1]. *Camellia oleifera* is originated in China is called one of the world's four major woody oil plants as olive, oil palm, coconut. *Camellia oleifera* is one of the health-based cooking oils focused on promoting by FAO, whose unsaturated fatty acid content is more than 90 %, known as the "Oriental olive oil."[2]. The development of *Camellia oleifera* has an important role on promoting integrated mountain development, promoting the employment of rural income and safeguarding national grain security and improve people's health[3].

Guangxi province has 300,000 hm^2 Camellia forest, the average annual yield of oil per 667 m^2 is less than 5 kg and income per 667 m^2 is less than 300, which has been a serious impediment to the development of *Camellia oleifera* one of the most important reasons resulted to the low yield of Camellia forest is poor soil due to lack of management[4]. To promote Camellia production, the concentrations of potassium in tea leaves and soils from major Camellia producing areas in Guangxi were measured.

Sampling sites: Samples were collected from Cenxi, Napo, Babu, Bama, Zhaoping, Taine of central Guangxi and Rongan, Rongshui, Sanjiang, Longsheng of northern Guangxi on July in 2011, the range is latitude 23°12'-25°52' and longitude 105°50'-111°12' between. The soils of Cenxi and Zhaoping are the red loam and soils from Sanjiang and Rongshui are sandy loam, other six soils are all yellow loam (Table-1).

Sampling method: The soils and leaves were collected by random sampling method. The soils were collected from depth of 0-40 cm, mature leaves were collected on normal growth of Camellia plants in different directions. Samples were mixed by point, seal back to the laboratory for determination[5-7].

Determination of potassium: Soil available potassium was determined by ammonium acetate extraction-atomic absorption spectrophotometry. Total potassium of leaves was determined by atomic absorption spectrophotometry with nitric acid-perchloric acid digestion[5-8].

The results showed that the available potassium concentrations in sampling soils are all very low. The available potassium concentration in Napo soil was lack grade; Babu, Tiane and Rongan were the very lack grade; the other six soils were the extreme lack grade (Tables 2 and 3).

The results showed that leaf total potassium of *Camellia oleifera* from northern Guangxi ranged from 3509-4658 mg/kg and that from central Guangxi is 4659-8723 mg/kg which is obviously higher than central Guangxi.

The previous research proved that potassium is a potential limiting factor for the growth of *Camellia oleifera*[6] and soil potassium levels of high-yielding *Camellia oleifera* forest were significantly higher than low-yield *Camellia oleifera* forest[4], in this paper the results showed that most of the soils in central and northern Guangxi province were very deficient for

TABLE-1
BASIC SITUATION OF SAMPLING SITES

Region	Sampling sites		Latitude and longitude		Soil type
	County	Village	North latitude	East longitude	
Central Guangxi	Cenxi	Liuchen	23°12'	110°43'	Red loam
	Napo	Pingmeng	23°22'	105°50'	Yellow loam
	Babu	Baizhu	23°49'	111°12'	Yellow loam
	Bama	Fuxiang	24°08'	107°15'	Yellow loam
	Zhaoping	Zouma	24°11'	110°55'	Red loam
	Tiane	Pingli	24°51'	107°29'	Yellow loam
Northern Guangxi	Rongan	Zhuyu	24°53'	109°34'	Yellow loam
	Rongshui	Dalang	25°27'	109°25'	Sandy loam
	Sanjiang	Liangkou	25°42'	109°28'	Sandy loam
	Longsheng	Sishui	25°52'	110°07'	Yellow loam

TABLE-2
AVAILABLE POTASSIUM CONCENTRATIONS OF SOILS AND LEAVES

Region	Sampling sites		Soil	Leaf
	County	Village	Available K (mg/kg)	Total K (mg/kg)
Central Guangxi	Cenxi	Liuchen	24.2	6655
	Napo	Pingmeng	57.2	5808
	Babu	Baizhu	34.1	6655
	Bama	Fuxiang	22.0	8723
	Zhaoping	Zouma	23.1	5264
	Tiane	Pingli	30.8	4659
Northern Guangxi	Rongan	Zhuyu	31.4	3630
	Rongshui	Dalang	29.4	4658
	Sanjiang	Liangkou	27.5	3872
	Longsheng	Sishui	9.9	3509

TABLE-3
GRADING STANDARDS OF SOIL NUTRIENT CONTENT

Grade	Organic matters (%)	Available K (mg/kg)
1 Very rich	> 4	> 200
2 Rich	3-4	150-200
3 Moderate	2-3	100-150
4 Lack	1-2	50-100
5 Very lack	0.6-1	30-50
6 Extreme lack	< 0.6	< 30

potassium and potassium is essential on the formation and enlargement of the fruit[9], so potassium deficiency is an important reason leading to low yield of Camellia forest in central and northern Guangxi, especially in northern Guangxi.

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