

Quality Control of Physicochemistry
Parameter of Oil and Eugenol Isolated
From Flower and Leaves of *Eugenia
caryophyllata* Thunb (Zanzibar Type) in
Tolitoli Central of Sulawesi, Indonesia

By ENDANG DARMAWAN

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**Quality Control of Physicochemistry Parameter of Oil and Eugenol Isolated From
Flower and Leaves of *Eugenia caryophyllata* Thunb
(Zanzibar Type) in Tolitoli Central of Sulawesi, Indonesia**

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Abstract

An investigation of quality control of physicochemistry parameter of oil and eugenol isolated from flowers and leaves of *Eugenia caryophyllata* Thunb (Zanzibar Type) in Tolitoli, Central of Sulawesi has been done. Clove oil was obtained by water-steam distillation. After that, the density, refractometry index, solubility and concentration (by gas chromatography) of oil and eugenol were assayed. The results show that oil of flowers and leaves have density $d = 1.04$ and 1.04 g/ml; $n = 1.5346$ and 1.5346 ; solubility in alcohol 1:1 and 1:1, eugenol concentration 79.42 and 78.57%. The isolated eugenol had the concentration of 80.73 and 83.53%, $d = 1.07$ and 1.06 yml $n = 1.5415$ and 1.5417 and solubility in alcohol 1:1 and 1:1. There were no significant differences between flowers and leaves in these parameter ($p < 0.05$).

Key word: Eugenia caryophyllata Thunb (Zanzibar type), eugenol, physicochemistry

A. Introduction

In Tolitoli, Central of Sulawesi, Indonesia, *Eugenia caryophyllata* Thunb (Zanzibar type) has been used as a commodity. The clove oil is contained almost in all part of plant (root, cortex, leaves, flower and seed) (Guenther, 1987). The percentage in each of part may be difference in eugenol content as marker compound in clove oil. For example, in the cortex, eugenol content was more than eugenyl acetate (Sunanti, 1982). Commercially the quality of oil was determined by eugenol content. The use of clove oil and eugenol are for industrial area, perfume, food and beverage, pharmaceutical (antiseptics, analgesic, carminative) (Lutony, et al, 2000; Anonim,

1995, Haris, 1987, Hadiwijaya, 1986). Based on these data, an investigation has been done for quality control of physicochemistry parameter of oil from flowers and leaves of *Eugenia caryophyllata* Thunb (Zanzibar type) in Tolitoli, Central of Sulawesi, Indonesia.

B. Material and Method

1. Plant material

Eugenia caryophyllata Thunb were collected from Tolitoli, Central of Sulawesi in May 2003. Then flowers and leave were separated (150 g).

2. Isolation of oil

The caryophyllen oil and essential oil from flowers and leaves were isolated using steam distillation apparatus.

3. Oil and essential oil,

The density was determined using picnometer. The refractometry index was determined using refractometer ABBE. Solubility were dropped with ethanol 70%. GC-analysis was performed using GC apparatus (Simadzu): HP 5 nonpolar 30 meters, Initiated temperature: 120°C. Initiated time: 5 menit, Increase: 10/menit, Final temperature: - 250°C (oil), 200°C (eugenol), Detector: FID, Detector temperature: 280°C, Injector temperature: 270°C, mobile Gas: He, Total Flow: 40, Split (Kpa): 60, injection Volume: 0,1 µl and eugenol standard as reference.

C. Result and Discussion

The maximum clove oil yield was found in the flowers (0,5%) and in leaves (0,3%). But in the other investigation was found until 15% in flowers (Ekawaty, 2000, Windarti, 1991). This may be affected by harvest time and environmental condition of growth. The percentage composition of the clove oil, isolated from flowers and

leaves did not vary much (table 1). Both of oils were analyzed with GC as shown in table 2. GC-spectra was obtained 4 peaks. The highest peak is eugenol (as the major component in *Eugenia caryophyllata* Thunb). From the spectra seeing the concentration of eugenol is 79,42% (flowers) and 80,20% (in leaves) as shown in figure 1 and figure 2.

The physicochemistry parameter results of flowers and leaves shown that density $d = 1.04$ and 1.04 g/ml; $n = 1.5346$ and 1.5346 ; solubility in alcohol 1:1 and 1:1, eugenol concentration 79.42 and 78.57%. The Eugenol isolated shown that concentration 80.73 and 83.53%, $d = 1.07$ and 1.06 g/ml, $n = 1.5415$ and 1.5417 and solubility in alcohol 1:1 and 1:1 (table 2). There were no significant differences between Mowers and leaves in these parameters ($p < 0.05$).

D. Conclusion

There were no significant differences between fowers and leaves of oil ($p < 0.05$), based on density, solubility in alcohol, eugenol concentration and refractometry index parameters.

Table 1. Result of steam distillation of oil and eugenol in flowers and leaves

No	Oil yielded (ml)		X ± SD		Rendement (%)	
	Flowers	Leaves	Flowers	Leaves	Flowers	Leaves
1	8.0	3.0	7.3 ± 0.7	3.1 ± 0.7	0.5	0.3
2	6.6	3.1				
3	7.2	3.2				
Total	21.8	9.3				

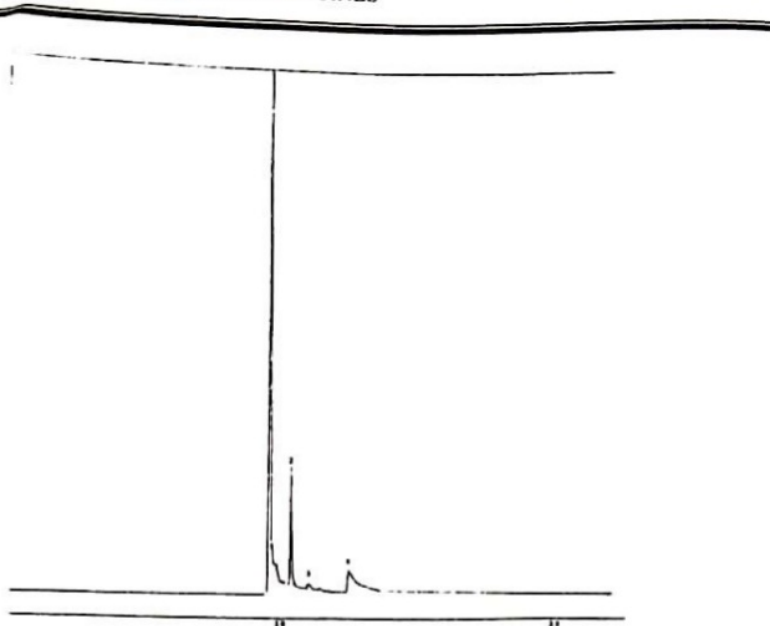


Figure 1. GC- spectra of clove oil in flowers

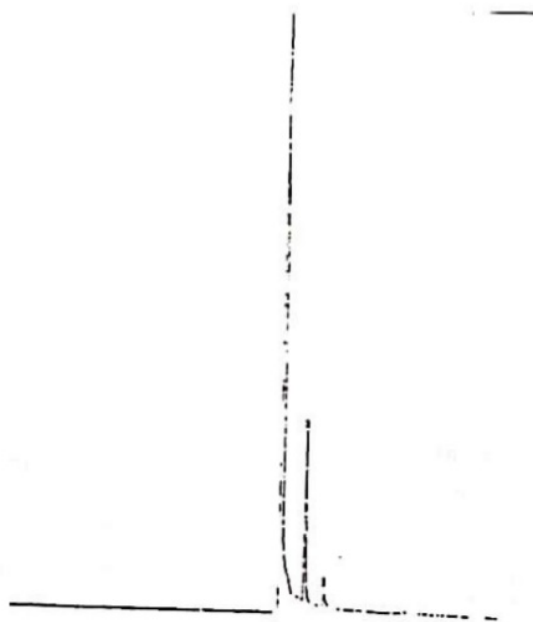


Figure 2. GC spectra of clove oil in leaves

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Table 2. Physicochemistry parameter from flowers and leaves of Clove Zanzibar type

Physicochemistry Parameter	Oil		Eugenol	
	Flowers	Leaves	Flowers	Leaves
Density 20°C	1.04	1.04	1.07	1.06
Refractometry index 20°C	1.5334	1.5346	1.5415	1.5417
Solubility in alcohol 70%	1 : 1	1 : 1	1 : 1	1 : 1
Concentration of Eugenol %	79.42	78.57	80.73	80.53

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