

# **ANALGESIC ACTIVITY OF AN ESSENTIAL OIL OF SINTOC (*Cinnamomum sintoc* BL.) BARK WITH THE WRITHING METHOD ON MICE\***

**By**

**Sri Adi Sumiwi ;Anas Subarnas;; Supriyatna;Rini Hendriani; Dwintha Lestari**

**Faculty of Pharmacy, Padjadjaran University**

**E-mail: sri.adi@unpad.ac.id**

---

## **Abstract**

A study on analgesic activity of an essential oil of sintoc (*Cinnamomum sintoc* BL.) bark was conducted on male mice using the writhing method with acetic acid 0.7% as a pain induction. The extract was given orally at doses of 0.02 mL/20 g, 0.01 mL/20 g and 0.05 mL/20 g of body weight. The result showed that each dose reduced writhing of mice significantly as compared with the control. The three doses gave protection percentage of 56.1%, 50.3% and 18.8% respectively. Their analgesic effectiveness percentage was 93.3%, 83.7% and 31.3% respectively, compared with aspirin. This study concluded that essential oil of sintoc barks had analgesic activity.

Keyword: Analgesic, Sintoc, Essential oil

---

**Presented at International Seminar on Chemistry 2008, 30-31 October 2008, Bandung, Indonesia**

## INTRODUCTION

Analgesic is drug applied to relief of pain without eliminating awareness (Dzulkarnain, 1996). Analgesic is group of drug that having activity to depress or reduce of pain. Pain is sensory and emotional feeling which is uncomfortable and relates to threat of tissue impairment (Tan, 2002). Pain effect can be reachable variously like depressing pain receptor like mechanic, thermic, electric or chemical stimulation in central or peripheral nerve system or by inhibits forming of prostaglandin as mediator sensation of pain (Sirait, 1993).

Analgesic drugs which commonly use by the public are Non Steroid Anti-inflammatory Drugs (NSAID) like aspirin, mefenamic acid, paracetamol and others. However the drugs have undesirable side effects like hypersensitivity, while salicylic acid derivate causes gastric irritation and nausea. See the reality hence needing effort to get new drugs that having optimal therapy effect and side effects as minimum as possible, one of them is with looking for new drug coming from nature source to involve by way of developing research and exploiting of traditional drugs (Pusparini, 2000).

Sintoc is plant with long wood bar and comes from family Lauraceae. Sintoc can be used as external and internal drug. A part which can be used as drug is bark, twig bark and leaf, while the fruit can be used as shampoo and soaps to blacken hair and eliminates dirt or grime with fragrant and refresh aroma. Sintoc bark applied as anthelmintic to poisonous twinge or animal bite and rheumatism, cures syphilis disease, to reduce secretion of intestine (dysentery), and can eliminate underbelly spastic pain (Heyne, 1987).

Based on the result of BPOM research (BPOM, 2006) explained that sintoc bark contains faction compounds of phenyl propanoid or alkenyl benzene. Besides according to Phutdhawong (Phutdhawong, et al, 2007) express that main content of essential oils sintoc leaf is linalool (36,9%) and cadinol (7,03%). At Sunardi, et al research (Sunardi, et al, 2005) reported that main content of sintoc bark is eugenol and methyl eugenol. Phenyl propanoid

compound like eugenol is known to gives analgesic and Anti-inflammatory effect.

Essential oil is a volatile matter at room temperature, contains multiple chemical compound and ordinary it obtained from plant by steam distillation. Essential oils gained many from certain family like Apiaceae, Laminaceae, Lauraceae, Myrtaceae and Rutaceae. At essential oils, the primary part is terpenoid which found on volatile oil faction. This terpenoid gives fragrant aroma, odorous or typical aroma at many plants (Ketaren, 1985).

At this research determined analgesic activity using the writhing method, by seeing capacity to eliminate pain or analgesic as result of giving acetic acid intra peritoneal on mice experiment. Pain symptom at mice as result of giving acetic acid is existence from abdomen contraction, head and foot pulled rearward so that abdomen touch space base occupied by it, this symptom named writhes. This pain sign can be eliminated with an analgesic. By counting writhes during certain, determinable analgesic activity compared to control that is mice which have been given test matter (Zulkarnain, 1986). This method is sensitive, simple, and easy to be repeated and observed for light analgesic examination.

To know the truth of special quality and to complement pharmacology data from sintoc (*Cinnamomum sintoc* BL) bark hence held examination at animal experiment. In this study will be determined one of its special quality that is eliminating pain or analgesic activity.

## EQUIPMENT AND MATERIALS

### EQUIPMENT

Simplicia huller, balance, cotton, aluminum foil, distillation Stahl equipment, graduated glass, mice weighing-machine, oral sonde, 1 ml syringe, mice observation canister, time meter and common glass equipments in Pharmacology Laboratory Faculty of Pharmacy Padjajaran University.

## **MATERIALS**

The *Simplicia* used in this research was *sintoc* (*Cinnamomum sintoc* BL.) bark. This *simplicia* was obtained from Pasar Baru, Bandung. Experimental animals applied were white male mice of DDY strain with weight 20-30 g, having age 6-8 weeks. Experimental animals were obtained from Biologi Department, Mathematics and Natural Sciences Faculty, Padjadjaran University. Chemicals applied were aqua distillate, acetylsalicylic acid, PGA 10%, acetic acid 0,7%.

## **EXPERIMENTAL**

### **Collecting and Determination Plant Material**

*Sintoc* bark (*Cinnamomum sintoc* BL.) was taken from ingredients shop at Bandung and was collected in Juli 2008. The bark was determined at Plant Taxonomy Laboratory, Biology Departement, Mathematics and Science Faculty, Padjadjaran University.

### **Plant Processing**

Dry *sintoc* bark (*Cinnamomum sintoc* BL.) was homogenized and blended

### **Distillation**

The essential oil was gained using Stahl vapor distillation apparatus. The process was conducted at Organic Chemistry Laboratory, Chemistry Departement, Mathematics and Science Faculty, Padjadjaran University. The dry *sintoc* bark used for distillation was 2,950 grams. The fine *sintoc* bark powder was placed into distillation squash, and was soaked with distilled water, Stahl vapor distillation apparatus was turned on. The distillation was conducted slowly for 7-8 hours using heating mantle to control the heat. Essential oil would be

released from oil gland through the pipe to the condenser and would be collected into a burette filled with distilled water. The process was completed if there was no drop of oil occurred. Note the volume of the oil gained in the burette.

### **Analgesic Activity Test**

Mice were divided randomly into control and test groups. Each group consisted of 5 mice. Each mouse was given 0,7% acetic acid intraperitoneally

( 0,1mL/10 g) 30 min after the perorally administration of the test compounds or control vehicle. A 1% Arabic gum suspension and acetylsalicylic acid were used as control vehicle and standard analgesic compound, respectively. Immediately after administration of acetic acid, mice were placed individually in plastic cages and the writhing response was observed. The number of writhings was counted every min in a 60 min period. The percent protection at each dose level and percent efectivity were calculate.

## **RESULTS**

### **Distillation Results**

The Results was got 2,950 g of weight *simplicia* with 3 day distillation process. Essential oils volume was 42 ml, and essential oils rate was 1,424 %. With specification of yellows colour, aroma likes spices and bitter taste.

### **The Result of Analgesic Activity Examination**

Table 1 ANAVA List Amount of Mice Writhing during 60 Minutes after Giving of Essenal Oils of Sintoc Bark

Mice	Amount of writhing every group					Total
	I	II	III	IV	V	
1	38	26	90	84	42	280
2	40	51	63	169	30	353
3	48	58	83	80	37	306
4	49	61	90	81	42	323
5	44	52	79	85	48	308
Total	219	248	405	499	199	1570
Average	43.8	49.6	81	99.8	39.8	

Table 2 Result of Newman-Keuls Spread Test of Analgesic Activity after Giving of Essential Oils of Sintoc  $\alpha = 0.05$

Groups	Difference average of between groups Comparison	RST	Result
IV Vs V	$99.8 - 39.8 = 60$	36.81	+
IV Vs I	$99.8 - 43.8 = 56$	34.38	+
IV Vs II	$99.8 - 49.6 = 50.2$	31.08	+
IV Vs III	$99.8 - 81 = 18.8$	25.61	-
III Vs V	$81 - 39.8 = 41.2$	34.38	+
III Vs I	$81 - 43.8 = 37.2$	31.08	+
III Vs II	$81 - 49.6 = 31.4$	25.61	+
II Vs V	$49.6 - 39.8 = 9.8$	31.08	-
II Vs I	$49.6 - 43.8 = 5.8$	25.61	-
I Vs V	$43.8 - 39.8 = 4$	25.61	-

(+)= difference significantly  
 (-) = difference unsignificantly

Table 3. Result of Newman-Keuls Spread Test of Analgesic Activity after Giving of Essential Oils of Sintoc  $\alpha = 0.01$

Groups	Difference average of between groups Comparison	RST	Result
IV Vs V	99.8 - 39.8 = 60	45.92	+
IV Vs I	99.8 - 43.8 = 56	43.57	+
IV Vs II	99.8 - 49.6 = 50.2	40.28	+
IV Vs III	99.8 - 81 = 18.8	34.89	-
III Vs V	81 - 39.8 = 41.2	43.57	-
III Vs I	81 - 43.8 = 37.2	40.28	-
III Vs II	81 - 49.6 = 31.4	34.89	-
II Vs V	49.6 - 39.8 = 9.8	40.28	-
II Vs I	49.6 - 43.8 = 5.8	34.89	-
I Vs V	43.8 - 39.8 = 4	34.89	-

Description:

(+)= difference significantly

(-)= difference unsignificantly

Table 4 Protection Percentage to pain sensation from Each Group of Treatment of Essential Oils of Sintok Bark.

Group of Treatment	Doses	% Protection
Positive Control	65 mg/kg of body weight	60.12
Essential Oils	0.02 ml/20g of body weight	56.11
Essential Oils	0.01 ml/20g of body weight	50.30
Essential Oils	0.005 ml/20g of body weight	18.84

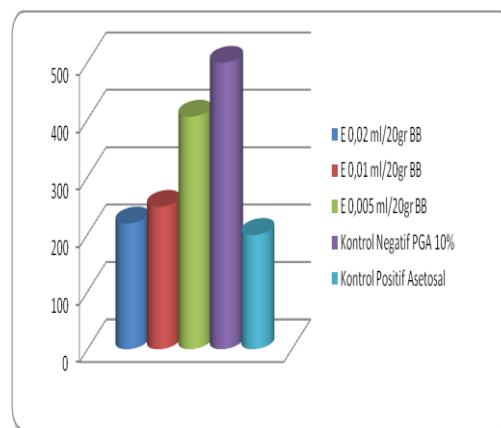


Figure 1 Bar diagram Amount of mice writhing at group of treatment of essential oils of sintoc

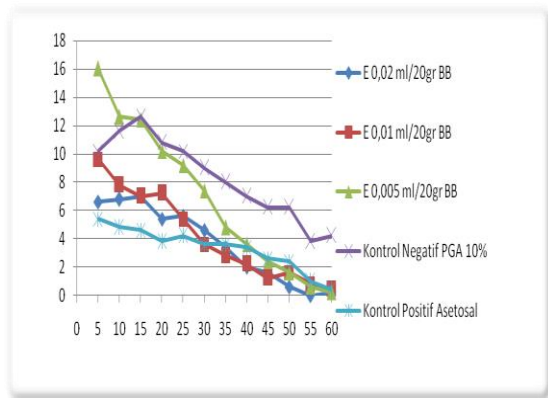


Figure 2. Average graph amount of mice writhing after giving of essential oils of sintoc to time

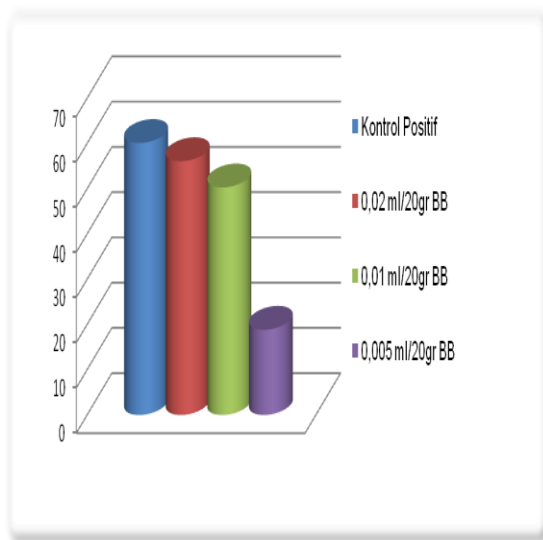


Figure 3 Bar diagram of protection percentage each group of treatment after giving of essential oils of sintoc

Table 5 Analgesic Effectiveness Essential Oils of Sintoc Bark Compared with Acetylsalicylic acid.

Treatment groups	Doses (ml/20g BB)	% Effectiveness
Essential Oils	0.02	93.33
Essential Oils	0.01	83.67
Essential Oils	0.005	31.34

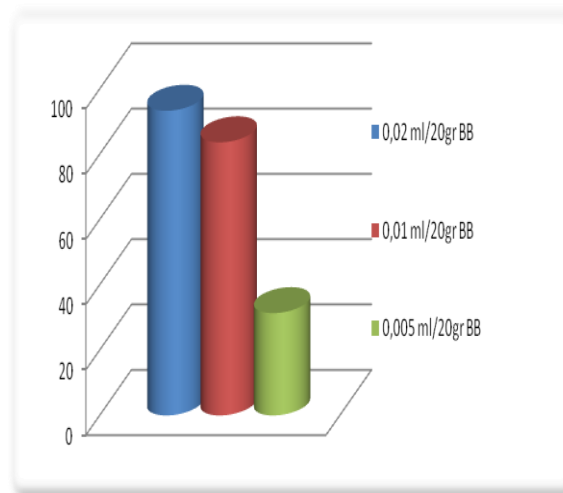


Figure 4. Bar diagram of effectiveness percentage each group of treatment after giving of essential oils of sintoc

## CONCLUSION

The result of analgesic activity research of an essential oil of sintoc (*Cinnamomum sintoc* BL.) bark using the writhing method on mice induced by acetic acid 0,7 % v/v concluded that essential oil of sintoc bark at doses 0,02ml/20g; 0,01ml/20g; 0,005ml/20g of body weight shows existence of analgesic activity with each protection percentage was 56,11%; 50,30%; 18,84% respectively compared with the control, and effectiveness percentage analgesic was 93,33%; 83,67%; 31,34% respectively compared to aspirin. Based On Newman-Keuls with  $\alpha$  (0,05) or with level of trust of 95% and  $\alpha$  (0,01) or with level of trust of 99% analgesic activity essential oils of sintoc bark significantly between positive controls (acetylsalicylic acid), group of doses test 0,02 ml/20 gram and 0,01 ml/20 gram of body weight to negative control (PGA 10%).

## SUGGESTION

Due to have been done research before, the result of this research is early stage examination of pharmacology effect of sintoc bark especially analgesic activity, therefore:

1. Need to be done the examination of analgesic activity with other method which the result its more accurately or other inducer.
2. Need to be done the further research about examination of analgesic activity until obtained which compound gives analgesic activity.

## REFERENCES

- BPOM. 2006. *Laporan Standarisasi Mutu Ekstrak Simplisia Kulit Batang Sintok (Cinnamomum sintoc BL.)*. Jakarta : Badan Pengawas Obat dan Makanan RI. p.45
- Guenther, E., A.J-Haagen-Smit, Edward E.L., George U. 1987. *Minyak Atsiri*. Jilid I. Penerjemah : S. Ketaren. Jakarta : Penerbit UI-Press. p 122-129
- Heyne,K. 1987. *Tumbuhan Berguna Indonesia*. Jilid II. Jakarta : Yayasan Sarana Wana Jaya. p 805.
- Mutschler, E. 1991, *Dinamika Obat Buku Ajar Farmakologi dan Toksikologi*, Edisi kelima, Bandung : Penerbit ITB. p 542-543.
- Phutdhawong, W., R. Kawaree., S. Sanjaiya and D. Buddhasukh. 2007. Microwave-Assisted Isolation of Essential Oil of *Cinnamomum Iners Reinw-ex BL.*: Comparison with Conventional Hydrodistillation. *Molecules*, 12 : 868-877
- Pusparini, D., Subarnas, A., Supriyatna. 2000. *Prosiding Seminar Nasional Tumbuhan Obat Indonesia XVII*. Bandung : Penerbit Puslitbang Kimia Terapan-LIPI. p 569-588.
- Sirait, M. 1993. *Pedoman Pengujian dan Pengembangan Fitofarmaka, Penerapan Farmakologi, Pengujian Fitokimia dan Pengujian Klinik*. Jakarta : Kelompok Kerja Ilmiah Yayasan Pengembangan Obat Bahan Alam Phyto Medica, Pusat Pemeriksaan Obat dan Makanan Departemen Kesehatan Republik Indonesia.
- Sunardi, Dr. Clara, Drs. Yoppi I, dkk. 2005. *Laporan Pengujian Laboratorium Untuk Penetapan Mutu dan Keamanan Ekstrak Obat Asli Indonesia Cinnamomum sintok BL*. Bandung : Jurusan Farmasi. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Padjadjaran.
- Wilmana, P. F. 1995. *Farmakologi dan Terapi*. Edisi 4. Jakarta : Bagian Farmakologi Fakultas Kedokteran Universitas Indonesia. hal 207-222.
- Yalvema, Mira., and Ayop, Norsiha. 2005. *Constituents of the Essential Oils of Cinnamomum sintoc Blume from a Mountain Forest of Peninsular Malaysia*. <http://www.wiley.interscience/journal/abstract.htm>. [20 April 2007]

