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**PRELIMINARY STUDY OF SYZYGIUM AROMATICUM (L.)
ON ANALGESIC ACTIVITY IN RATS**

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INTRODUCTION

Syzygium aromaticum (Linn.) Merr.&L.M.Perry is commonly known as clove tree in the Myrtaceae family. The clove tree is an evergreen that grows to a height ranging from 8-12 m, used as a spice in cuisines all over the world. In Thailand, it is widely used as a medicinal plant to treat a variety of diseases including inflammation, tooth pain, and analgesia. Its chemical composition showed that the essential oils mainly contained about 87.00% eugenol, 8.01% eugenol acetate, and 3.56% β -caryophyllene¹. Pain, the most common reason for patients, is an unpleasant sensory. It generally caused by inflammatory reaction in the tissue or tissue damage and produced emotional reaction. Non steroidal anti-inflammatory drugs (NSAIDs) are widely used in the treatment of pain, inflammation, and fever. However, these drugs has many side effects, especially irritating the gastrointestinal tract. In nowadays, many people determine to select medicinal plants to relief pain instead of drugs because it has less toxic effects. and can treat a variety of diseases. Therefore, the purpose of this study was to evaluate the analgesic activity of clove oil on tail flick method in rats. The procedures followed and applied are based on those described by Yashpal *et al.* (1993)².

MATERIALS AND METHODS

Materials Male Wistar rats were purchased from the National Laboratory Animal Center, Mahidol University, Salaya, Nakorn Pathom. Age of the rats at the beginning of study was 2 months old. All procedures and animal care were approved by Institutional Animal Care and Use Committee of Thailand Institute of Scientific and Technological Research. They were kept in cages at 25±2 °C under alternate of 12 hours light/dark cycle and fed with standard pellet and tap water *ad libitum*. All rats were acclimatized for 7 days before starting the experiments.

Clove oil was isolated by water steam distillation and stored in brown bottle at 4°C. It was prepared in a cream base (vehicle) at a various concentrations at 1%, 5%, and 10% w/w. Cream base was also used as a vehicle. 5% w/w indomethacin in cream base were used as standard drugs for analgesic activity. The analgesic activity was assessed by tail flick meter (Ugo Basile, Italy).

Methods Rats were randomly divided into six groups of four rats in each group. From the five groups comprised of the control ; rats were received with cream base, standard ; 5% w/w indomethacin, and the rest three groups ; 1%, 5% and 10% w/w clove oil, respectively. All tested materials were topically applied to the tail within 3 cm from the tip after measured the baseline. Tail flick latency was assessed by tail flick meter (Ugo Basile, Italy). The intensity of heat was set at 50. To prevent tissue damage, a cut off time was set at 10 seconds. The baseline was measured 3 times for each animal and mean was used as predrug latency. The reaction time was measured at 0, 30, 60, 90, 120, 180, and 240 minutes after receiving drug and oil. The number (in seconds) of each rat's tail withdrawal was calculated for the maximal possible effect percent as follows;

$$\% \text{ MPE} = [(\text{test latency} - \text{baseline latency}) / (\text{cut off time} - \text{baseline latency})] \times 100$$

All data were expressed as mean ± standard error. The results were analyzed for statistical significance by one-way ANOVA. Statistical significance was defined as $p < 0.05$.

RESULTS

Analgesic activity of *Syzygium aromaticum* (L.) (Clove oil) was assayed by using tail flick meter (Ugo Basile, Italy) and results are presented in Table 1. The results showed that 5% w/w clove oil had significantly ($p < 0.05$) higher reaction time than the control group at 90 and 120 min and 5% w/w indomethacin showed significantly ($p < 0.05$) of reaction time at 120 and 180 min. The effects of clove oil

and indomethacin increased with time. Indomethacin had the highest of maximal possible effect percent (%MPE) for 36.76% at 180 min, and 5% w/w clove oil had the highest %MPE for 18.62% at 90 min were presented in Figure 1.

Table 1 Effect of Clove oil on tail flick method in rats

Groups	Reaction time \pm S.E.							
	Baseline	0 min	30 min	60 min	90 min	120 min	180 min	240 min
Control	2.75 \pm 0.10	4.20 \pm 0.30	3.30 \pm 0.10	3.20 \pm 0.26	3.10 \pm 0.23	2.75 \pm 0.35	3.35 \pm 0.25	3.15 \pm 0.05
Indomethacin	2.41 \pm 0.04	3.33 \pm 0.24	3.97 \pm 0.29	3.78 \pm 0.48	3.75 \pm 0.40	4.28 \pm 0.40*	5.20 \pm 0.06*	3.88 \pm 0.59
Clove oil 1%	2.41 \pm 0.06	3.93 \pm 0.07	3.67 \pm 0.09	2.93 \pm 0.17	3.23 \pm 0.15	2.70 \pm 0.24	2.88 \pm 0.44	3.05 \pm 0.33
Clove oil 5%	2.59 \pm 0.06	3.90 \pm 0.05	3.57 \pm 0.38	2.97 \pm 0.27	3.97 \pm 0.22*	3.80 \pm 0.21*	3.07 \pm 0.29	4.07 \pm 0.20
Clove oil 10%	2.48 \pm 0.10	4.25 \pm 1.05	3.10 \pm 0.70	2.67 \pm 0.47	3.33 \pm 0.61	2.80 \pm 0.36	2.93 \pm 0.38	3.63 \pm 0.19

Value are represented as a Mean \pm S.E. (n=4 in each group). Data expressed by using one-way ANOVA. * $p < 0.05$ was considered as significant were compared to the control group at a specific time.

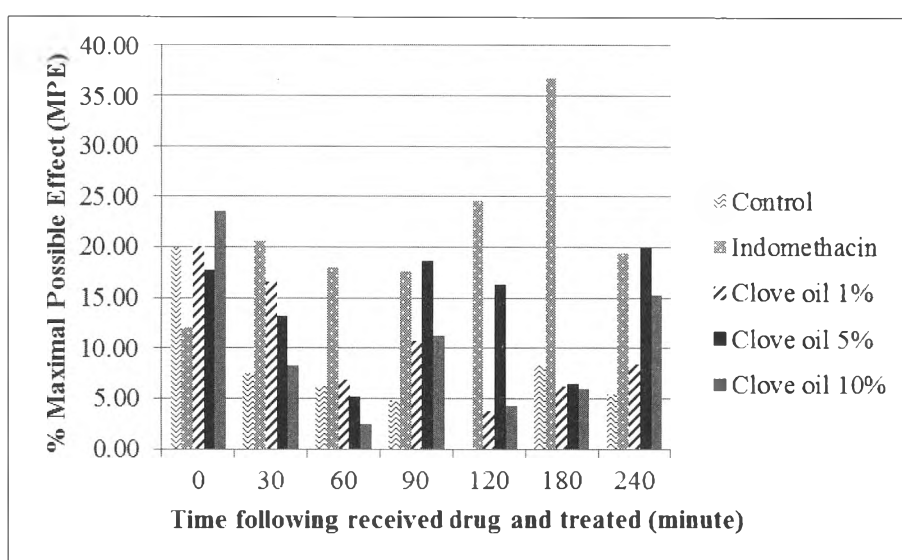


Figure 1 Maximal possible effect percent (%MPE) on tail flick method in rats

DISCUSSION

In the tail flick model of acute pain in rats, it was shown that indomethacin and 5% w/w clove oil increased tail flick withdrawal latency. However, the standard drug (indomethacin) showed greater effect than the clove oil did. These results are consistent with previously published data³. The analgesic studies revealed that clove oil exhibited potent analgesic central analgesic activity effect against thermal noxious stimuli³. Agents such as histamine, serotonin, and bradykinin are natural pain substances liberated by injured tissues which stimulate the nociceptive mechanism to elicit pain⁴. Clove oil may possibly have acted as an analgesic agent from heat which stimulates the nociceptive mechanism.

CONCLUSION

The present study on the analgesic activity of clove oil was confirmed to have a promising role in pain management and to select optimal concentration to the experiment study.

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