INTRODUCTION

Cough is an important defensive reflex (response) that enhances the clearance of secretions and particles from the airways and protects the lower airways from the aspiration of foreign materials. Cough is a very common symptom observed in many diseases other than those affecting the respiratory system [1]. Cough reflex is a multifaceted, precisely timed, a neuromuscular phenomenon characterized by the precise concurrent and sequential coordination of the activation patterns of the diaphragm, various muscle groups of the chest wall, cervical muscles, abdominal muscles, laryngeal abductor and adductor muscles, medullary and higher cortical regions of the brain. Cough response is due to stimulation of a mechanically-sensitive cough receptor. Both the chemically-and mechanically-sensitive airway nerves take part in mediating the cough reflex and establishing synapses in the brain [2]. Cough is one of the most common symptoms for which patients seek medical attention from primary care physicians and pulmonologists [1].

Herbal products have gained increasing popularity in the last decade, and are now used by approximately 20% of the population. Herbal products have gained increasing popularity in the last decade, and are now used by approximately 20% of the population. Herbal products are complex mixtures of organic chemicals that may come from any raw or processed part of a plant, including leaves, stems, flowers, roots, and seeds [3]. The enduring popularity of herbal medicines may be explained by the tendency of herbs to work slowly, usually with minimal toxic side effects [4].

Herbal medicine frequently used in Indonesia as cough therapy is Sage (Lantana camara L.) leaves. Sage (Lantana camara L.) leaves is a medicinal aromatic plant that belongs to the family Verbenaceae and occurs in most parts of the world as an evergreen notorious weed species. Recent studies revealed that leaf extracts and essential oil of Sage (Lantana camara L.) leaves possess larvicidal activities, antioxidant, anti-inflammatory, analgesic, anti-diabetic, hypolipidemic, anthelmintic, cytotoxic, wound healing, and antipyretic properties [5-11].

The present study was aimed to assay the cough therapy of Sage (Lantana camara L.) leaves as antitussive on guinea pig using Adobe Audition 1.5 Program.
Table 1: Result of phytochemical screening of the *L. Camara* leaves extract

<table>
<thead>
<tr>
<th>No</th>
<th>Compound</th>
<th>Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alkaloid</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Flavonoid</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Saponin</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Tannin</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Kuinin</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Steroid/Triterpenoid</td>
<td>+</td>
</tr>
</tbody>
</table>

**Antitussive assay**

Antitussive activity test is based on the breathing pattern guinea pig artificial cough swab ethanol extract of sage (*Lantana camara* L.) by treating the water fraction, ethyl acetate and n-hexane, a dose of 4.58 mg/kg bw; 9.17 mg/kg bw and 18.35 mg/kg bw. Comparison of the frequency of breathing patterns guinea pig artificial water fraction groups sage dose of 4.58 mg/kg bw and a dose of 9.17 mg/kg bw have the result was not significant (p<0.05) at a dose of 18.35 mg/kg bw show results significantly different from the positive control. Comparison of the guinea pig cough frequency artificial breathing patterns on the fraction of ethyl acetate and n-hexane at a dose of 4.58 mg/kg bw, a dose of 9.17 mg/kg bw, and a dose of 18.35 mg/kg bw statistically significantly different results. It is evident from the very significant differences when compared with the control group tested positive after statistics (can be seen in table 1, 2 and 3). This emphasis on cough frequency is already underway from the first period to fourth period of observation, seen that improvement guinea pig cough frequency artificial breathing pattern.

![Fig. 1: Changes in the respiratory of guinea pigs cough with water fraction. 1) Positive control (CMC Na. 1%); 2) negative control (Citrit acid 10%); 3) period I (Test extract+induction in the minutes 0-15); 4) period II (Test extract+induction in the minutes 15-30); 5) period III (Test extract+induction in the minutes to 30-45); 4) period IV (test extract+induction in the minutes to 45-60)](image1)

![Fig. 2: Changes in the respiratory of guinea pigs cough with ethyl acetate fraction. 1) Positive control (CMC Na. 1%); 2) negative control (Citrit acid 10%); 3) period I (Test extract+induction in the min 0-15); 4) Period II (Test extract+induction in the min 15-30); 5) period III (Test extract+induction in the min to 30-45); 4) period IV (test extract+induction in the min to 45-60)](image2)
Fig. 3: Changes in the respiratory of guinea pigs cough with n-hexane fraction. 1) Positive control (CMC Na. 1%); 2) negative control (Citric acid 10%); 3) period I (Test extract+induction in the min 0-15); 4) period II (Test extract+induction in the min 15-30); 5) period III (Test extract+induction in the min 30-45); 4) period IV (Test extract+induction in the min to 45-60)

The ratio of intensity of artificial breathing patterns guinea pig cough water fraction groups of sage leaves at a dose of 4.58 mg/kg bw, a dose of 9.17 mg/kg bw violence did not differ significantly (P<0.05), whereas in fraction ethyl acetate and n-hexane dose of 4.58 mg/kg bw, dose of 9.17 mg/kg bw, and a dose of 18.35 mg/kg bw showed significantly different results (P<0.05), which means that the fraction and the dose can be improve the intensity of violence guinea pig cough artificial breathing pattern seen also by the improvement of the guinea pig cough intensity artificial respiration patterns ranging from the first period to fourth period of observation.

Fig. 4: Changes in the intensity of guinea pigs cough with water fraction. 1) Positive control (CMC Na. 1%); 2) negative control (Citric acid 10%); 3) period I (Test extract+induction in the min 0-15); 4) period II (Test extract+induction in the min 15-30); 5) period III (Test extract+induction in the min 30-45); 4) period IV (Test extract+induction in the min to 45-60)

Fig. 5: Changes in the intensity of guinea pigs cough with ethyl acetate fraction. 1) Positive control (CMC Na. 1%); 2) negative control (Citric acid 10%); 3) Period I (Test extract+induction in the min 0-15); 4) period II (Test extract+induction in the min 15-30); 5) period III (Test extract+induction in the min 30-45); 4) period IV (Test extract+induction in the min to 45-60)
**CONCLUSION**

Recording guinea pig cough artificial respiration pattern using the program Adobe Audition 1.5 can be used to evaluate the antitussive activity.

Ethanol extract of sage (*Lantana camara* L.) water fraction (dose of 9.17 mg/kg bw, dose 18.35 mg/kg bw), fraction of ethyl acetate and n-hexane fraction was significantly improve the guinea pig cough frequency artificial breathing pattern. In fractions of ethyl acetate and n-hexane dose of 9.17 mg/kg bw and doses 18.35 mg/kg bw can improve breathing pattern guinea pig intensity artificial cough was significantly (p<0.05).

**CONFLICT OF INTERESTS**

Declare none

**REFERENCES**


**How to cite this article**