ANTI-INFLAMMATORY EFFECT OF AROMATHERAPY OIL OF LEMONGRASS (*CYMBOPOGON CITRATUS*) ON MALE MICE (*MUS MUSCULLUS*) INDUCED BY CARRAGEENIN

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Abstract

Backgrounds; Kitchen lemongrass (*Cymbopogon citratus*) is a type of plant from the grass family that has a strong and fragrant aroma because it contains essential oils**; Objectives**; This study aims to determine the aromatherapy activity of lemongrass oil as an anti-inflammatory. **Methods**; This research is experimental in nature, where aromatherapy is made from lemongrass stems using the distillation method, then made into a dosage form and tested on male mice (*Mus muscullus*). Male mice were divided into 3 groups, group 1 negative control (Aquades), group 2 (Lemongrass oil aromatherapy) and group 3 positive control (hydrocortisone cream 2.5%). **Results;** The results of the percentage of mouse edema inhibition were obtained from distilled water (0 %), lemongrass (*Cymbopogon citratus*) oil aromatherapy (11.83%) and hydrocortisone cream 2.5% (9.15%). **Conclusions**; Based on the conclusion that lemongrass oil aromatherapy (Cymbopogon citratus) has an anti-inflammatory effect on mice.

Keywords*:* Anti-inflammatory, lemongrass stems (*Cymbopogon citratus*), male mice (*Mus muscullus*)

BACKGROUND

Citronella (*Cymbopogon icitratus*) is a type of plant from the grass family that has a strong aroma and fragrance because it contains essential oils (Umi, 2015). Kitchen lemongrass (*cymbopogon icitratus*) is one of the plants that produce essential oil. In Indonesia, the more well-known species is lemongrass and people generally use isereh as a mixture of kitchen herbs and spices because it has a distinctive aroma like lemon. This aroma is obtained from the essential compounds contained in isereh essential oil (Ella *et al*., 2013).

Essential oil is one type of inabati oil that has many benefits. Its physical characteristics are in the form of a thick liquid that can be stored at room temperature. The raw material for this oil is obtained from various plants such as leaves, flowers, fruit, seeds, seed bark, stems, roots or rhizomes. One of the main characteristics of essential oils is that they are easy to evaporate and have a special aroma. Because of this, this oil is widely used as a basic ingredient for making perfumes and cosmetics (Syahbana, 2010).

Judging from its chemical content, Kitchen lemongrass (Cymbopogon icitratus) contains many active substances including saponin, flavonoid, tannin, polyphenol, alkaloid, and essential oils which contain sitral, citronellal, geraniol, mirsene, nerol, farsenol, metilheptenone, dipentene, eugenol, metil eter, kadinen, kadinol, limonene (Wilis et al., 2017).

Inflammation is a process of protecting white blood cells together with other chemical compounds to protect the body from infection by foreign objects, such as bacteria and viruses. More simply, inflammation is the body's tissue response to damage. When inflammation occurs, it is usually followed by an increase in white blood cells with fast blood flow (Paramawati, 2010).

Treatment of inflammation usually uses oral or topical medication at the site of inflammation.Topical use has advantages, namely that it does not pass through first pass effects, does not pass through the digestive tract, and does not have side effects and irritates the stomach (Nurcholis *et a*l., 2018).

The topical administration of herbal ingredients has been known to provide optimal results in wound healing, especially in accelerating wound contraction. This is caused by topical use, drug compounds accumulate more in the contents of the wound (Yunanda & Rinanda, 2018).

METHODS

Making Essential Oils (Distillation Method)

Weigh 400 grams of lemongrass stalks that have been cut to a size of 3 - 4 cm. Place the sample in a distilled kettle. Add 600 ml of distilled water to the distilled kettle. Distill the sample using the distillation method for 2 hours after the first drop. Repeat the first to fourth steps. 2 repetitions, Collect the distillation results into an Erlenmeyer and measure how much essential oil is obtained using a measuring cup. Obtain 85 ml of essential oil. Put the essential oil into a brown bottle and close tightly.

Making Aromatherapy

Prepare camphor, menthol, lemongrass stem essential oil (*Cymbopogon citratus*), and propylene glycol. Weigh out 0.5 grams of camphor and menthol each. Mix the camphor and menthol in a beaker, stir using a stirrer until homogeneous. Add lemongrass stem essential oil according to the formula, namely 25%, add 10 ml of propylene glycol to the volume, stir until homogeneous, put the preparation into add 10 ml brown bottle, pack it in a roll on container of the preparation that has been obtained.

Care and Preparation of Test Animals

The test animals used were male mice (Mus muscullus) with a body weight of 20-40 grams aged 2-3 months. There were 12 male mice used, which were divided into 3 treatment

groups, consisting of 4 mice in each group. Test animals were fasted for about 8 hours but still given water. On the day of testing, the test animals were weighed and grouped randomly, namely negative control group, positive control group and test group.

Treatment of Test Animals

Before carrying out the treatment, the volume of the mice's legs was measured to determine Vo (before being induced by carrageenin) using a sledgehammer thread. Before injection, the soles of the mice's feet were cleaned with 70% iethanol. Then each mouse's paw was injected intraplantarly with 0.3 iml of 1% carrageenin suspension. One hour after the carrageenin injection, each group was given topical treatment according to their group, namely group 1 was given distilled water as a negative control, group 2 was given essential oil as a comparison and group 3 was given hydrocortisone i2.5% as a positive control. After 1 hour of application of distilled water, essential oil, and 2.5% hydrocortisone, the volume of the mice's feet was measured again using a sledgehammer thread every 1 hour for 7 hours and expressed as the final volume.

RESULTS AND DISCUSSION

Table 1. Percentage of Reduction in Edema

No.	Treatment group	Reduction in Edema (%)	edema inhibition (%)
1.	Aquades (Negative control)	0.89	0
2.	Hydrocortisone cream 2.5% (Positive control)	1.21	9.15%
3.	Lemongrass oil aromatherapy (test sample)	1.32	11.83%

Inflammation is the body's tissue response to damage. When inflammation occurs it is usually followed by a rapid increase in white blood cells. Inflammation treatment usually uses oral or topical medication at the site of inflammation. Topical use has the advantages, namely that it does not have first-pass effects, does not pass through the digestive tract, and does not have the side effect of irritating the stomach.

Kitchen lemongrass (Cymbopogon citratus) is a type of plant from the grass family that has a strong and fragrant aroma because it contains essential oils. Judging from its chemical content, kitchen lemongrass (Cymbopogon icitratus) contains many active substances including saponins, flavonoids, tannins, polyphenols, alkaloids, and essential oils which contain citral, citronellal, geraniol, myrsenol, nerol, farsenol, methylheptenone, dipentene, eugenol , methyl ether, kadinen, kadinol, and limonene.

Lemongrass stems (Cymbopogon citratus) were extracted using the distillation method. The distillation method is a chemical separation technique to separate two or more components that have large differences in boiling points. A mixture can be separated by this distillation to obtain pure compounds (Walangare & Sugiorso, 2013). After extracting the lemongrass stems (Cymbopogon citratus), 10 ml of essential oil was obtained.

In this study, the test animals used were mice, because they are an animal that has almost the same body physiology as humans, with a body weight ranging from 20-40 grams. In this study, before treatment was carried out, the test animals were fasted for 8 hours, this was done to empty the mice's stomachs so as not to affect the absorption of the drug, but they were still given something to drink.

In this study, the size Vo = Volume of the soles of the mice's feet at time 0 (before carrageenin induction) were all almost the same, because this study used mice with the same body weight. Next, 0.3 grams of carrageen was weighed for each mouse so that the volume given to mice was uniform with a body weight of 22 grams. Edema was created by inducing the soles of mice's feet with 1% carrageenin with an injection volume of 0.3 ml. according to Corsini et al. (2005) Carrageenin is a large molecular sulfated polysaccharide as an inflammation inductor. Carrageenin does not cause other tissue damage and does not cause scars, and provides a more sensitive response to anti-inflammatory drugs. Anti-inflammatory power was measured by looking at the ability of lemongrass essential oil to reduce swelling. Measurement of edema in mice's feet was carried out using a sledgehammer thread.

The results of calculating the percentage of edema obtained from the Aquades group as a negative control were 0.89%, from the hydrocortisone cream 2.5% group as a positive control it was 1.21%, and from the Aromatherapy group lemongrass oil as a test sample it was 1.32%. Based on the results of calculating the percentage of edema inhibition, the results obtained were that the percentage of edema inhibition when giving hydrocortisone cream 2.5% as a positive control was 9.15%, and when giving aromatherapy lemongrass oil (*Cymbopgon icitratus*) as a test sample, it was 11.83%.

The results of the research above are in line with research conducted by Hairi *et al.* (2019) who tested the healing of incised wounds on the labial mucosa of mice using 100% and 50% lemongrass extract which accelerated the healing of incisional wounds on the labial mucosa of mice when compared to the negative control. in the form of distilled water. Likewise, research conducted by Juniastuti and Fatluna (2003) which used mice induced using carrageenin showed that the application of lemongrass extract could reduce the level of inflammation of the oral mucosa, and kitchen lemongrass had a better anti-inflammatory effect.

According to Melinda Hairi et al. (2016) Anti-inflammatory substances such as flavonoids, phenolics The acid and tannins in lemongrass also work as Antioxidants can inhibit the release of radicals such as cyclooxygenase (COX), lipooxygenase, and inducible Nitric Oxide Synthase (iNOS) and changes intracellular pathways in cells immune. These substances trigger various responses against inflammation and immunity.

CONCLUSION

Based on the research that has been carried out, it was concluded that lemongrass oil aromatherapy (Cymbopogon citratus) has an anti-inflammatory effect on male mice, and the results obtained were a percentage of 2.5% hydrocortisone cream (positive control) edema inhibition, namely 9.15%, and lemongrass oil aromatherapy (test sample) namely 11.83%.

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