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The Formulation of Hypoallergenic Massage oil using Local Essential Oil of Indonesia

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ABSTRACT

A laboratory study was conducted to investigate the possibility of producing a hypoallergenic massage oil using local essential oil. The main concept behind the study was the application of massage oil formula which is in contact with skin need to be allergen free. This study used four types of local essential oil, i.e. cananga, clove, citronella and a fraction of citronella oil. Two types of carrier oils were used, i.e. extra virgin olive oil and grape seed oil. The study searches the concentration of essential oil which is safe to be used in the formula, not giving an allergy reaction. The concentration of essential oil studied were one and two percent respectively, and an allergy test will also be conducted to the carrier oil themselves. The allergy test was conducted toward 30 respondents. After a formula was proved to be safe for using in the massage oil, a further research will be done for the relaxation effect.

KEYWORDS

Indonesian local essential oil, massage oil, hypoallergenic.

INTRODUCTION

Essential oil is one of the non-mining, superior products from Indonesia, who supply 90% of world market or 1,400 ton annually with a value of about US $50,000 to $1,000,000 per year [7]. Some essential oil is used in perfumery and health care industries. In many studies, some researchers showed that body massage using massage oil is able to give a stimulation to the body. In the massage oil formula there are some components, i.e. carrier oil which give a slippery effect and essential oils which have a role to give a pleasant and comforting odor.

In Indonesia, essential oil is produced by steam distillation and mostly been accomplished in rural communities with simple traditional technology [4] [1].

Essential oils are widely used as raw material for various aromatherapy products. One of the aromatherapy products is as additive in massage oil for giving an aroma which is relaxing but non allergenic. Various local essential oil of Indonesia can be used as additives in massage oil, like cananga oil, clove oil, and citronella oil. Essential oil can cause irritation if directly applied on the skin, so a carrier oil is needed, like olive oil, grape seed oil, coconut oil and others. The use of essential oil in the carrier oil could give a relaxation effect. However, it is important to ensure that it does not have an allergic effect on the skin and can be a substituted or supplementary to various existed massage oil. A research work is needed for studying the concentration, composition and type of local Indonesian Essential oil or its fractions, that can be used as an agent of aromatherapy in massage oils which is hypoallergenic and could be produced commercially. In the production processes an allergic test was done to ensure

the safety of its applications. The first yeai multiple year's research has used four k essential oil, i.e. citronella oil, clove oil, ca oil and rhodinol (fraction of citronella oil), additive with a concentration of 1 – 2 % carrier oils. As carrier oils, olive oil and seed oil were used. As a control, carrier use as its own without the essential oils. A test has been done to 30 subjects accor ethical code (ethical clearance) as regula ethical team of medical faculty, Bra University, Indonesia. Results show that those 4-essential oil with 2 kinds of carri the cananga oil gave the best respons irritations, no allergic with either carrier oil and with 2 level of concentration, i.e. 1 and 2 %. Clove oil gave good responds while added to the two carrier oils, only at 1 % concentration. Citronella oil gave irritation and/or allergic effect with either carrier oil at 2 level of concentration. The result will be used to develop a formula of massage oil which is able to give a relaxing effect by measuring cortisol hormone levels.

MATERIALS AND METHODS

Indonesian local Essential oil were used. Three types of local essential oil i.e. clove oil, Cananga oil, citronella oil. For citronella oil, a component was fractionated giving a rhodinol fraction, a component which were widely used in perfumery industries. The essential oil used were provided by Essential oil Institut Brawijaya University. Fraction of citronella oil, rhodinol, were prepared in the chemical engineering department of Brawijaya University. All the oil was dried first before using. The experiment used commercial natural carrier oil, i.e. extra virgin olive oil and grape seed oil.

Massage oil is made from a mixture of essential oils with carrier oil. Concentrations of 1% and 2% of essential oils in carrier oils used are considered as a safe concentration.

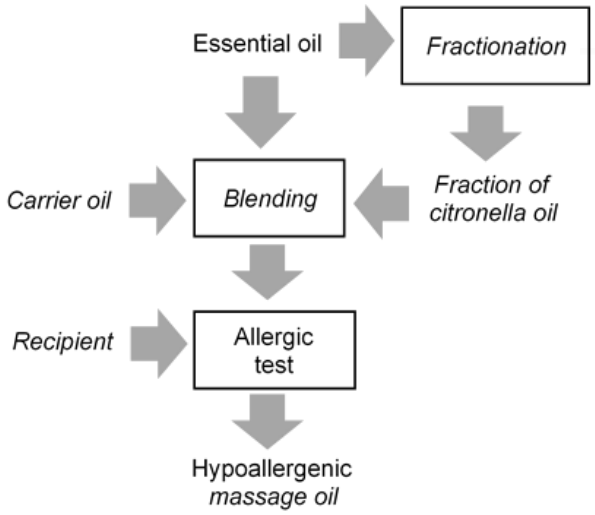

Fig 1. Flow diagram of hypoallergenic message oil preparation

Some laboratory work has been done in the Bioprocess Laboratory of Chemical Engineering Engineering Department of Brawijaya University, Malang, Indonesia, i.e. pretreatment and formulation of raw materials which consist of drying of the essential oils, fractionation of citronella oil and massage oil formulation. The massage oil of laboratory results was then used as samples for allergy test using patch testing method and performed at the Dermatology and Venereology Department of Medical Faculty, Brawijaya University, Malang, Indonesia.

Preparation of massage oil

The massage oil was prepared by mixing thoroughly the two ingredients using a bar magnetic stirrer at room temperature, for 30 minutes in a laboratory glass.

Table 1. The randomized design of experiment

Conc. (%)	w/o EO	Citronella Oil	Cananga Oil	Clove Oil	Fraction of citronella oil
Carrier oil: Olive oil					
0	1.0.				
1		1.1.1.	1.2.1.	1.3.1.	1.4.1.
2		1.1.2	1.2.2.	1.3.2.	1.4.2.
Carrier oil: Grape seed oil					
0	2.0.				
1		2.1.1.	2.2.1.	2.3.1.	2.4.1.
2		2.1.2.	2.2.2.	2.3.2.	2.4.2.

All formulas indicated homogeneous massage oil, no layers or droplets of water trapped in the massage oil, also no deposit remains.

Allergic test

The design of this allergy testing is a quasi-experimental double blinded trial. Allergy test performed using patch test method with IQ Ultimate® patch test unit was carried out on the back area of the study subjects as many as 20 substances, namely 18 essential oils with various concentrations and 2 standard ingredients as fragrance markers namely fragrance mix I and fragrance mix II. The patch test procedure performed by clinicians who are not members of the researcher (blinding) and the procedure for reading the patch test results is also carried out by clinicians who are not members of the researcher (blinding). The patch test technique involves application of the test substances onto the skin under occlusion for 2 days (48 h). Reading is further performed at day 3 and 4 after occlusion (i.e., 1 and 2 days after the removal of the patch test strips) thereafter [5].

Research subjects are subjects or volunteers who are physically and mentally healthy and are willing to be the subject of research and meet the sample selection criteria. Criteria for inclusion of subjects included male or female subjects, aged 18 - 60 years, understanding the research procedures and possible side effects and being willing to become research subjects and signing informed consent. Subject exclusion criteria included subjects who were taking antihistamines, high-dose systemic corticosteroids (prednisone more than 20 mg / day), were using topical corticosteroids in patch test areas, were consuming antidepressant drugs such as imipramin and phenothiazine, were taking dopamine, clonidin, immunosuppressant drugs and immunomodulators, are undergoing immunotherapy and have dermatitis in the area to be tested for allergies.

RESULTS AND DISCUSSION

The Formula of Massage Oil

A homogenic mixture of the four essential oils and the two-carrier oil was attained, in all concentration used, i.e. 1 % and 2 %. These concentrations are commonly use in the field of cosmetics. The visualization of the carrier oils alone gives no different compare to its mixture with the essential oil.

The allergy tests

Essential oils are containing many different constituents, which can vary depending on part of the plant which is used, the season of harvesting, and the climate and also part of the world in which they are grown [7]. There may also be varying degrees of oxidation of the constituents, which may alter their potential to produce an allergic response [3]. Some essential oils contain a high percentage of an allergen that is present in the fragrance markers in the baseline series and that is also available for separate testing, which is also use in this research (Fragrance mix I and Fragrance mix II) [6].

De Groot and Schmidt (2016) conducted a review of the incidence of allergies to essential oils. From that study, there were almost 54 types of essential oils that were proven to cause allergic reactions with positive patch test results. Therefore, to develop an essential oil product with new ingredients, an allergy test is necessary [2].

From the patch test results below (Table 2), there were 8 (26.67%) subjects who gave positive patch irritation results to one of the formulas, and 3 (10%) subjects gave positive patch allergy results to 1 formula and 2 ingredients control. Most subjects gave negative patch test results (no allergic or irritant reactions) to the test formula. From the results of this study, we can conclude that the essential oil formula used in this study is safe and hypoallergenic.

Table 2. The Result of Patch test of massage oil formulas

Code Formula	*Patch Test Result* (N = 30)		
	Negative (%)	Iritation (%)	Allergy (%)
1.0.0	30 (100)	0 (0)	0 (0)
1.1.1	30 (100)	0 (0)	0 (0)
1.1.2	30 (100)	0 (0)	0 (0)
1.2.1.	30 (100)	0 (0)	0 (0)
1.2.2.	30 (100)	0 (0)	0 (0)
1.3.1.	30 (100)	0 (0)	0 (0)
1.3.2.	29 (96,7)	1 (3,33)	0 (0)
1.4.1.	29 (96,7)	1 (3,33)	0 (0)
1.4.2.	29 (96,7)	1 (3,33)	0 (0)
2.0.0	29 (96,7)	1 (3,33)	0 (0)
2.1.1.	30 (100)	0 (0)	0 (0)
2.1.2.	28 (93,3)	1 (3,33)	1 (3,33)
2.2.1.	30 (100)	0 (0)	0 (0)
2.2.2.	30 (100)	0 (0)	0 (0)
2.3.1.	30 (100)	0 (0)	0 (0)
2.3.2.	29 (96,7)	1 (3,33)	0 (0)
2.4.1.	29 (96,7)	1 (3,33)	0 (0)
2.4.2.	29 (96,7)	1 (3,33)	0 (0)
Fragrance mix I	29 (96,7)	0 (0)	1 (3,33)
Fragrance mix II	29 (96,7)	0 (0)	1 (3,33)
TOTAL		**8 (26,67)**	**3 (10)**

Annotation:
Code number 1 indicates the type of carrier oil (1. Olive; 2. Grape seed); Code number 2 indicates the type of EO (0. w/o EO; 1. Citronella; 2 Cananga; 3. Clove; 4. Fraction of citronella; Code number 3 indicates the the EO concentration (1. Conc 1 %; 2. conc 2 %).

CONCLUSIONS and SUGGESTION

The best essential oil for the formulation of massage oil is cananga oil mixture with either olive of grape seed oil, with a concentration up to 2 %. Clove oil gave good result at a concentration of 1 % only in the two carrier oils, whereas citronella or its fraction are not recommended to be used in massage oil formula. The best formula can be considered to be used in future research for massage oil giving a relaxation effect

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