# Effect of Fortification of Massage Oil for Breastfeeding Mothers on Physical, Chemical and Organoleptic Tests of Jitu Oil

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AB ST R ACT

This massage oil is called Jitu Oil, which means complementary therapy massage oil. The addition of oil is expected to help facilitate the massage process and provide relaxation for nursing mothers, and can produce hormones that play a major role in the process of lactation and breastfeeding to the fullest. The oil used virgin coconut oil with the addition of lavender and lime to add relaxation during the massage process. This research is an experimental research with 5 treatments. The location of the research was carried out in the Working Area of the Arjasa Health Center. The time of the research was conducted from February to March 2023. The population in this study were breastfeeding mothers. The sample in this study consisted of 31 respondentused simple random sampling technique. The clarity test was found to be clear without impurities, the chemical test showed the substances contained in the oil and the organoleptic test p-value = 0.000 <0.05, it can be concluded that there is a difference between the composition and the organoleptic quality parameters of color. If seen from the Mean Rank value, it shows that F5 is higher than the others. p-value = 0.000 <0.05, it can be concluded that there is a difference between the composition of the organoleptic aroma quality parameters. If seen from the Mean Rank value, it shows that F4 is higher than the others. So that Jitu Oil can be widely used and produced to complement massage for nursing mothers.

## I. Introduction

Midwives as women's companions who help the process of health welfare for mothers and babies throughout the life cycle. So that the care provided by midwives is centered on women (Ningsih, 2021). Midwives and women are good partners so that the care provided by midwives can be well received by women as care recipients (Dewi Andariya Ningsih, 2015). One of the care provided by midwives during the postpartum period which helps teach complementary massage therapy methods to facilitate the breastfeeding process using massage oil. Oil is one of the media to facilitate methods in facilitating breast milk production. The massage method using aromatherapy oils is a popular way of using aromatherapy oils because they can work in several ways at the same time. Where the skin will absorb the oil and aromatherapy will enter through breathing, plus physical therapy from the massage itself. In order to reduce infant morbidity and mortality the United Nation International Children's Emergency Fund (UNICEF) (UNICEF, 2016)(UNICEF, 2020) and the World Health Organization (WHO) recommend that babies only consume breast milk for at least 6 months and continue breastfeeding until the baby is two years old. Saving a mother's life also helps her other children, because without a mother, they are between three and ten times more likely to die. To be able to maintain exclusive breastfeeding for 6 months, WHO recommends carrying out early breastfeeding initiation

(IMD) in the first hour of life, babies only receive mother's milk (ASI) without any additional food or drink, including water, breastfeed on demand or as often that the baby wants and is not recommended to use assistive devices in feeding bottles or pacifiers (WHO, 2018).

The Sustainable Development Goals in The 2030 Agenda For Sustainable – Development target that by 2030 it can reduce neonatal mortality by at least 12 per 1,000 live births and deaths in children under the age of 5 by at least 25 per 1,000 live births. This can be achieved one of them by implementing exclusive breastfeeding properly (WHO, 2014b). According to WHO 2021, Neonatal mortality reached 17 per 1000 live births (90% UI 17 to 19) in 2019, which is a 52% decrease from 37 in 1990 (90% UI 36 to 38) (WHO, 2021). However, only 44% of newborns in the world are breastfed within the first hour after birth, and even a few babies under six months of age are exclusively breastfed. The coverage of exclusive breastfeeding in developing countries is 46%. Overall, less than 50% of children under six months of age are exclusively breastfed (WHO, 2015). This is not in accordance with the WHO target, which is to increase exclusive breastfeeding in the first 6 months to at least 50%. This is WHO's fifth target in 2025 (WHO, 2014b). In Indonesia, there are 29.5% of babies who have been exclusively breastfed until the age of six months. (Kemenkes, 2018). This is not in accordance with the target of the Ministry of Health's Strategic Plan for 2015-2019, namely the percentage of infants aged less than 6 months who receive exclusive breastfeeding is 50%. The global nutrition 2025 targets state that optimal breastfeeding practices are key to ensuring the healthy growth and development of children. Early initiation and exclusive breastfeeding for 6 months provides protection against gastrointestinal infections, which can cause stunting (WHO, 2014a). According to the profile of Situbondo Regency, exclusive breastfeeding coverage for Situbondo Regency in 2020 based on monthly reports was 74.2%, namely 758 babies out of 1022 babies examined. Coverage of infants aged 6 months receiving exclusive breastfeeding in 2020 has exceeded 50% of the target set by the Province (Dinkes Situbondo, 2021). At the Arjasa Health Center in 2021, there will be 4 cases of infant mortality. The death rate for neonates 0-6 days is 2 cases and the death rate for neonates 7-28 days is 2 cases. (*Profil Puksesmas Arjasa Kabupaten Situbondo*, 2021).

To support exclusive breastfeeding in his research, Raharjo explained that there are points on the body that can facilitate breastfeeding, such as three points on the breast (a point above the nipple, a point below the nipple, and a point right on the nipple). In addition, the point of the body that can facilitate breastfeeding is the point on the back (Purwaningsih et al., 2013). Endhoprine massage can also help facilitate breast milk (Ningsih et al., 2023). To increase breastfeeding expenditure can be done in various ways as has been done by Fithrah Nurhanifah, 2013 and (Enok Nurliawati, 2016) there are several methods that can be used to help expedite the production of postpartum milk including adequate maternal nutrition, avoid giving formula milk, avoid using pacifiers/pacifiers, avoid stress, oxytocin massage methods, Mermet techniques, warm compresses, back rolling massages, breast care, and the SPEOS method, but due to limited information in services, these methods are only known but rarely given by health workers (Yuliati, 2017).

Barriers to exclusive breastfeeding in newborns are often caused by breast milk that has not come out and reduced milk production, this is due to reduced stimulation of the hormone prolactin and the hormone oxytocin which play a very important role in the smooth release of milk (Setyowati, 2016). The production and secretion of breast milk is a physiological process of lactation, so the factors that influence the lactation process include the correct position and fixation of the baby at the breast and the frequency and duration of breastfeeding, emptying the breast, nutrition, the condition of the mother both physically and psychologically and the condition of the breast. Disturbances in lactation occur due to various factors including infant, maternal and environmental factors (Delima et al., 2020). Breast care is beneficial by stimulating the breasts to influence the pituitary to secrete the hormones oxytocin and prolactin (Wiji, 2013).

There are many techniques to relax the body and mind including hypnobreastfeeding, music therapy, deep breathing techniques, Benson techniques, and so on. One of the relaxation techniques is by using Jitu Oil. The use of Jitu Oil can help mothers to relax and feel comfortable so that it is hoped that breast milk production can increase. Jitu Oil is an oil made from a blend of lemon essential oil. The main active ingredients in Jitu Oil which play a role in anti-anxiety (relaxation) effects are linalool and linalyl acetate. Massage oil or massage oil is one of the traditional medicines made from a combination of essential oils such as lemon oil, eucalyptus oil or lavender oil and vegetable oils such as VCO (Songkro et al., 2010). Traditional medicine has several advantages, namely the side effects of

traditional medicine are relatively small when used correctly and precisely and traditional medicine is more suitable for metabolic and degenerative diseases such as gout, diabetes and hepatitis. (Katno & Pramono, 2003). The use or application of this massage oil is recommended to improve skin function (Darmstadt et al., 2002), improve skin condition (Blanken et al., 1989), improve skin moisture, antimicrobial activity and reduce scarring on the skin (Edwards et al., 2001). Massage is a mediating process for reducing physiological and psychological stress. Massage has a relaxing effect which can reduce the secretion of norepinephrine and ADH, as well as increase the secretion of endorphins (Fatih haris Maulana, 2016). One of its compounds is β-endorphins which has a positive effect on the body and mind, where when hormone endorphins are released, blood pressure will decrease. (Solihah, 2011). Hormone endorphin is an anti-stress hormone that can cause a relaxing effect. β-endorphin activity suppresses sympathetic nerve activity which can reduce cortisol levels and adrenaline hormones, so that blood pressure decreases (Fatih haris Maulana, 2016). The smell produced from tuberose essential oil from benzene derivative compounds can treat stress. Smells that cause a sense of calm will stimulate an area in the brain called the raple nucleus to secrete serotonin (Solihah, 2011). Serotonin has the effect of lowering blood pressure by suppressing the sympathetic nerves. Serotonin has an important role in the regulation of blood vessels, where serotonin has a vasodilating effect through S1 receptor activity. Serotonin also functions to suppress ACTH activity and reduce cortisol levels, where cortisol has an effect on blood vessel vasoconstriction. (Fatih haris Maulana, 2016).

## II. Method

This research is an experimental research with 5 treatments. The location of the research was carried out in the Working Area of the Arjasa Health Center. The time of the research was conducted from February to March 2023. The population in this study were breastfeeding mothers. The sample in this study consisted of 31 respondents. Sampling using simple random sampling technique. The inclusion criteria for this study sample are as follows:

a. Breastfeeding mothers
b. Not including mothers who are picky in using massage oil
c. Willing to use 5 types of Jitu Oil formulas
d. Willing to be a research respondent.

Data collection was carried out using primary data with the following stages:

1. Preparation of Jitu oil 5 formula. Comparison of formulas as Table 1. Formula Massage Jitu Oil

Table 1 Formula *Massage Jitu Oil*

| Code | Treatment Type | Total Oil |
|---|---|---|
| F1 | 0,2 mL lavender essential oil: 0,8 mL lime essential oil | VCO 60 mL |
| F2 | 0,4 mL lavender essential oil: 0,6 mL lime essential oil | VCO 60 mL |
| F3 | 0,5 mL lavender essential oil: 0,5 mL lime essential oil | VCO 60 mL |
| F4 | 0,6 mL lavender essential oil: 0,4 mL lime essential oil | VCO 60 mL |
| F5 | 0,8 mL lavender essential oil : 0,2 mL lime essential oil | VCO 60 mL |

2. Organoleptic testing was carried out on 31 breastfeeding mothers at random. This test was carried out to find the Jitu Oil formula that respondents liked the most based on organoleptic test indicators, namely color and aroma. The instruments in this study were 1) an organoleptic test questionnaire Uji LSD (Least Significance Difference) using a Likert scale with 2 indicators namely color and aroma 2) A set of tools and materials for making Jitu Oil fortification. Data analysis was performed using univariate and bivariate tests. Univariate test to describe the level of respondents'

preference for each Moringa nugget formula. Bivariate test was conducted to determine the effect of moringa nugget fortification on organoleptic using the Kruskal-Wallis test.

Procedure for Making Jitu Oil

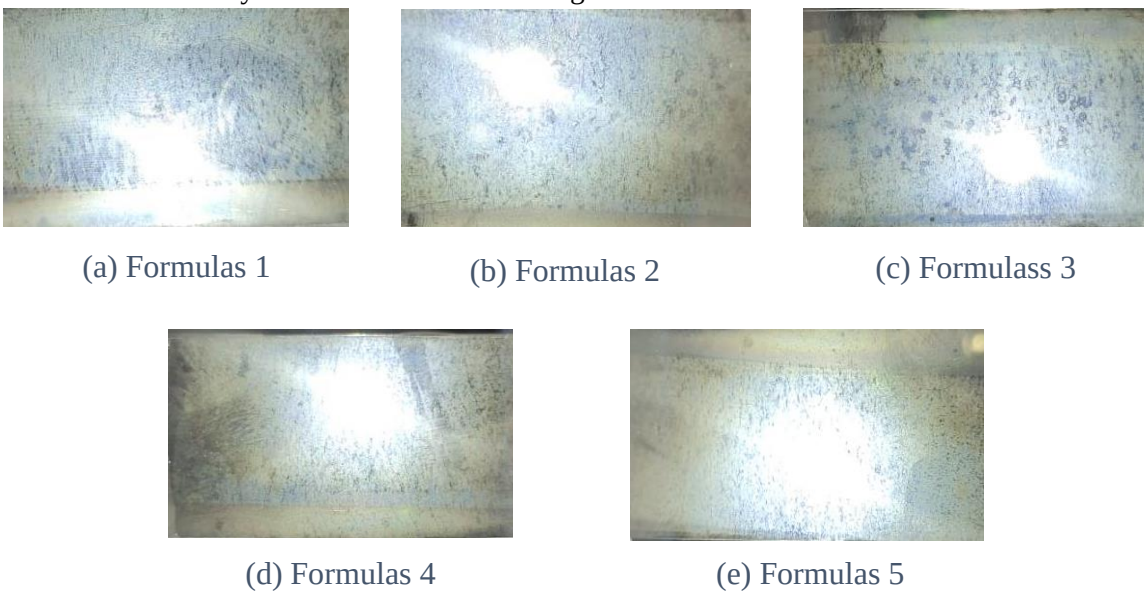
Virgin coconut oil is weighed using a digital scale with a measurement of 50 ml. Then mixed with tuberose essential oil and lime essential oil according to the treatment used. After that, stir until homogeneous using an iron spatula. Furthermore, aromatherapy oils are stored in tightly closed containers and subjected to a physical, chemical and consumer preference testing process.

## III. Results

A. Clarity Test Results

The clarity test aims to determine the clarity of the product from impurities. The clarity test uses a 2-sided glass which is illuminated using light to see the impurities present. Based on the test results, the results of the 5 tested formulas were clear without impurities.

The results of the clarity test can be seen in the image below.



(a) Formulas 1 (b) Formulas 2 (c) Formulass 3

(d) Formulas 4 (e) Formulas 5

Figure 1. Jitu Oil Clarity Test Results

B. Jitu Oil Chemical Test Results

Table 2. Chemical test results

| Parameter | Unit | Result | Limit of Detection |
|---|---|---|---|
| Hg | mg/kg | Not Detected | 0.004 |
| Cd | mg/kg | Not Detected | 0.00011 |
| As | mg/kg | Not Detected | 0.008 |
| Pb | mg/kg | Not Detected | 0.006 |
| Copper | mg/kg | Not Detected | 0.005 |
| Iron | Mg/100 g | 0.14 | - |
| TPC | Colony/g | <10 | - |
| Insolube Impurities | % | 0 | - |
| Odor | - | Normal | - |
| Color | - | Colorless | - |
| Taste | - | Tasty | - |
| Lodine Value | Wijs | 7.88 | - |
| Free Fatty Acid | % | 0.08 | - |
| Moisture Content (Karl Fischer) | % | 0.09 | - |
| Specific Gravity | g/mL | 0.9193 | - |
| 12:0 (Asam laurat) | % | 49.90 | - |

C. Organoleptic test results for making Jitu Oil as massage oil for nursing mothers using the Kruskal-Wallis Test

Table 3. Organoleptic test results

| Treatment | | N | Mean Rank |
|---|---|---|---|
| Warna | F1 | 31 | 34.19 |
| | F2 | 31 | 39.34 |
| | F3 | 31 | 74.11 |
| | F4 | 31 | 116.89 |
| | F5 | 31 | 125.47 |
| | Total | 155 | |
| Aroma | F1 | 31 | 37.16 |
| | F2 | 31 | 37.66 |
| | F3 | 31 | 76.31 |
| | F4 | 31 | 120.02 |
| | F5 | 31 | 118.85 |
| | Total | 155 | |

a. p-value = 0.000 <0.05, it can be concluded that there is a difference between the composition of the organoleptic quality parameters of color. If seen from the Mean Rank value, it shows that F5 is higher than the others.

b. p-value = 0.000 <0.05, it can be concluded that there is a difference between the composition of the organoleptic aroma quality parameters. If seen from the Mean Rank value, it shows that F4 is higher than the others.

From the results of the clarity test, it was found that all samples were in good condition. The chemical test showed the content contained in VCO and the results of the organoleptic test found that the organoleptic color F5 was more attractive to nursing mothers. For aroma, F4 is more attractive to nursing mothers.

According to Ali B, 2015 that the use of essential oils or essential oils is important for therapy, aromatics, perfumes and also for spiritual use because there is a strong composition of components in essential oils that affect the human nerves, especially in the nasal passages so that they often have certain psychological effects. In addition, the use of essential oils is no less important as an aromatherapy product. Aromatherapy is "the science of using highly concentrated essential oils or essences distilled from plants to take advantage of their therapeutic properties." The oil can be massaged into the skin, or

inhaled using a steam infusion. Aromatherapy products have benefits for humans to help with daily needs, including relaxing the body, refreshing the mind, improving mood and as a placebo in healing diseases that have physiological effects (25). Forms of aromatherapy products that are currently circulating in the market vary widely. One of the aromatherapy products that utilize essential oils is massage oil.

In particular, among the essential oils of plant origin with sedative and relaxing properties, lavender has always been recognized in traditional medicine as a remedy that helps achieve psychophysical relaxation. Evidence from in vitro and in vivo laboratory studies indicates that lavender essential oil, whose main bioactive components are linalool and linalyl acetate, can interact with several neuropharma ecological targets, including the serotonin transporter and the ionotropic MAO-A, GABA-A, and NMDA receptors, thereby exerting central anxiolytic, antidepressant, and relaxing actions. From a pharmacokinetic point of view, the two main bioactive compounds (linalool and linalyl acetate) of lavender essential oil administered via massage are absorbed best via inhalation. and through skin penetration. Their blood concentrations can be detected 5 minutes after the massage, tend to peak after 20 minutes, and usually disappear within 90 minutes after the end of the treatment. In general, aromatherapy massage is quite popular as a relaxation technique and has been reported to be one of the most commonly used complementary therapies in the UK. The results of another controlled study also reported beneficial effects of lavender aromatherapy hand massage on emotional status and aggressive behavior in subjects with dementia. Aroma massage with lavender essential oil is useful as a complementary and integrative therapy for symptom management of various conditions, especially psychological disorders and benign taste-related disorders. ill, and possibly, in palliative care of advanced incurable life-limiting disease. Some compelling evidence underscores the significant additional benefits when aroma massage is compared to massage alone, especially in assisting anxiety management and good musculoskeletal pain control. In general, the interventions studied appear to be safe and well tolerated by patients, provided all precautions are followed by the therapist (Antonelli & Donelli, 2020).

Lime (Citrus aurantifolia) is a plant from the rutaceous family which can produce essential oils in its fruit skin. The pharmacological effects of lime essential oil can cause physical and psychological relaxing effects because they contain the bioactive substances linalool and linalyl acetate. Lime essential oil also contains high ester substances that have pharmacological effects such as natural analgesic effects to relieve muscle pain. This is related to the effects of anti-stress and antidepressants which provide the body's response to deal with pain. In several studies, massage therapy usually uses lotion for topical massage therapy (Ali et al., 2015). Massage therapy can facilitate the removal of lactic acid from the tissues by increasing the flow of lymphatic fluid or blood, so that lactic acid can diffuse out of the muscles and into the blood. (Pinar et al., 2012). The results showed that massage using lime essential oil as a topical oil after exercise for athletes speeds up the DOMS recovery process. This can prevent fatigue because it reduces lactic acid levels and pain intensity compared to other groups. The decrease in lactic acid levels and pain intensity in the EMC group was caused by the effect of massage therapy as a form of active recovery. Indeed, the use of lime essential oil as a topical oil has a greater effect in reducing lactic acid and pain intensity. Thus it can increase tolerance to lactic acid and increase the buffering capacity of bicarbonate and phosphate in the muscles. Massage therapy with lime essential oil as a topical oil is an efficient effort to remove lactic acid in athletes so as to prevent DOMS. Increased oxygen demand, especially with muscle contraction, causes ischemic reperfusion and can trigger free radical formation. An increase in lactic acid can stimulate reactive oxygen compounds to become more reactive, thus interfering with athletic performance. Free radicals that are formed during strenuous and tiring physical exercise will cause tissue damage, including liver muscle tissue, blood, and other tissues (Simioni et al., 2018). Lime essential oil can cause physical and psychological relaxation effects because it contains the bioactive substances linalool and linalyl acetate. (Antonelli & Donelli, 2020). Pharmacologically, the two main bioactive compounds (linalool and linalyl acetate) in lime essential oil which are administered through massage are well absorbed through skin penetration. Essential oils are immediately absorbed into the bloodstream when applied to the massage, directly affecting the muscles and the effects can last long after the massage. (Suja et al., 2018). The natural analgesic effect of lime essential oil is safe because its components can penetrate the skin as well as penetrate the lower layers of the skin. After being applied to the skin, the essential oil and its components are rapidly metabolized, do not accumulate in the organism, and are excreted quickly. Massage therapy using

essential oils is easier, cheaper, and without side effects. Massage therapy is effective for reducing pain and allows athletes to exercise easily. The results of this study prove that massage therapy can increase lactic acid elimination during the recovery period after high-intensity exercise (A. Döner, 2021). When aroma massage is applied to the skin and into the bloodstream through the skin pores, it provides a feeling of comfort and reduces the need for invasive methods of pain relief. It was reported in a study that aromatherapy helps relieve pain, anxiety, depression, fatigue and creates self-confidence and creativity. (Janula & Mahipal, 2015).

Non-pharmacological methods called complementary therapies are safer and less dangerous than drug treatments (Bikmoradi et al., 2015). One such method is aromatherapy. Aromatherapy, which is a type of complementary therapy, has recently attracted the attention of many researchers (Nategh et al., 2015) Aromaterapi berarti penggunaan minyak aromatik secara sengaja untuk meningkatkan dan meningkatkan kesehatan (Gnatta et al., 2016). Aromatherapy is used through massage, inhalation and baths with mineral and herbal ingredients (Bikmoradi et al., 2015) One of these aromatic oils is lavender. The results of various studies have demonstrated the sedative and analgesic properties of this plant (Bagheri-Nesami et al., 2017). Linalool and Linalyl acetate are the main components of lavender. These compounds have analgesic and sedative properties, stimulate the parasympathetic system which causes a decrease in heart rate and an increase in heart function.g (Bikmoradi et al., 2015). Massage is also one of the complementary therapies used in health services as an additional therapy (McFeeters et al., 2016). Massage can stimulate the central nervous system and cause a decrease in heart rate and respiration, resulting in a feeling of calm (Zadkhosh et al., 2015). If the massage is done together with aromatic oils, it is called aromatherapy massage, where this oil can be quickly absorbed by the skin and enters the bloodstream. (Metin & Ozdemir, 2016)

Breastfeeding is a natural thing, but simply knowing that breastfeeding is the nature of all women is not enough. Correct knowledge and understanding is needed about breastfeeding and breastfeeding, both the advantages and benefits of breastfeeding as well as the correct breastfeeding technique and how to overcome the obstacles encountered during breastfeeding. . Even better if the mother knows the correct source of information for breastfeeding. Without sufficient understanding and knowledge, mothers may be trapped by erroneous opinions about breastfeeding circulating in society. Breastfeeding is not just giving food to the baby, but more than that, when breastfeeding the mother's eyes are fixed with affection on the baby, this feeling creates a feeling of comfort and food for the baby. Babies feel understood and their needs are loved and loved. Through breastfeeding, babies and mothers both learn to love and feel the pleasure of being loved. The decrease in milk production in the first days after giving birth is related to the lack of stimulation of the hormones prolactin and oxytocin as hormones that greatly affect the smooth production of breast milk. Another factor that influences milk production is the mother's psychology where support from the closest people and the environment greatly influences the psychological readiness of the mother to breastfeed. Factors of peace of mind and mind that are the focus of researchers in efforts to influence or increase breast milk production. One of the attempts to influence milk production by researchers is breast massage. In massage practice using Virgin coconut oil combined with essential oils of lavender and lime which gives a refreshing effect, strengthens, revives and soothes the skin (Satiatava & Rizema, 2016).

## IV. Conclusion

The solution from the results of this study is that the clarity test of all sample colors is in good condition, chemical tests in all samples show VCO content and organoleptic tests show that in terms of color F5 predominates and in terms of aroma, F4 is more attractive to breastfeeding mothers so that Jitu Oil can be used and produced widely to complement massage in nursing mothers.

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