Study of Local Plant as a Functional Food to Increase Breast Milk Supply

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Abstract

Exclusive breastfeeding for 6 months is one of the global strategies to improve infant growth, development, health and survival. One of the efforts that support the success of breastfeeding is by providing additional food in the form of local plants as functional food ingredients to increase breast milk supply and avoid less than optimal milk production. This study was conducted to explain the content of local plants as functional food ingredients that can help increasing breast milk supply. This literature study used secondary data from the Google Scholar, Pubmed, Science Direct database with the last 5 years published, and then the journals obtained were identified according to the inclusion and exclusion criteria set by the researcher. The results of a review of 12 journals stated that local plants Moringa leaf, katuk leaf, mung beans, and soybeans as functional food ingredients that can increase breast milk supply because the four plants contain laktagogum effects that can stimulate, maintain and increase breast milk. Local plants Moringa leaf, katuk leaf, mung beans and soybeans as functional food ingredients to increase breast milk supply because they have a laktagogum effect which are consumed in varying doses and ways of consumption, but have the same efficacy, namely increasing the rate of secretion and production of breast milk.

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INTRODUCTION

Infants aged less than 6 months receiving exclusive breastfeeding are one of the indicators listed in the Strategic Plan of the Ministry of Health for the period 2020-2024. This indicator is an Activity Performance Indicator/Indikator Kegiatan (IIK) of the Directorate of Community Nutrition, because it is related to the government's priority program in efforts to reduce stunting (Profil Kesehatan Jawa Timur, 2020).

The data obtained in 2018 showed that the coverage of breastfeeding in Indonesia in 2014 was 37.3%, in 2015 it was 55.7%, in 2016 it was 54%, in 2017 it was 61.3% and in 2018 there was a significant decrease, that is 37.3% (Riskesdas, 2018). Data from the Regency/City shows that the coverage of infants receiving exclusive breastfeeding in East Java in 2020 is 61.0%. This coverage has decreased when compared to 2019 which was 68.2%. The decrease was due to the Covid-19 pandemic which caused the number of targets being examined to decrease. In Kediri Regency, out of 23,691 babies born in 2020, there were 11,915 babies who were less than 6 months old and only 1,550 babies (13.0%) received exclusive breastfeeding (Profil Kesehatan Jawa Timur, 2020).

The failure of exclusive breastfeeding is influenced by several factors, one of them is the condition of the mother, including delayed initiation, inexperienced mother, maternal parity, maternal age, lack of support from family, lack of knowledge, and socio-cultural factors related to breastfeeding. Breastfeeding failure is also caused by the mother's nutritional status (Umami, 2018).

One of the actions that support the success of exclusive breastfeeding is that mothers must get additional food to avoid less than optimal milk production. If the food that the mother consumes does not meet the nutritional intake needed, the glands that produce milk in the breast will not work optimally so that it will affect milk production. Breastfeeding mothers must pay attention to nutritional intake to increase the quality and volume of breast milk, so the use of lactagogum is frequently considered because it can help facilitate milk production (Suksestiy, 2017).

Factors that affect breast milk production; adequate nutritional intake during breastfeeding, peace of mind and soul of the mother, the use of contraception, breast care, breast anatomy, physiological factors, rest patterns, sucking of the baby while breastfeeding or feeding frequency, birth weight of the baby, gestational age during childbirth and cigarette consumption (Florida, 2019).

Some local plants as functional food ingredients are added to food to help increasing breast milk production, including Moringa leaf, katuk leaf, soybeans and mung beans. Galactagogue or lactagogum is a food or drug that is used to stimulate, maintain, and increase the production of breast milk (Wulandari et al., 2020).

Foods consumed as lactagogums are foods that contain protein. High protein is needed by mothers during the lactation process, especially proteins that contain amino acids so that they can stimulate breast milk secretion (Suksestiy, 2017). In addition, foods that contain active compounds such as polyphenols and flavonoids are functionate to increase the hormone prolactin. High levels of prolactin will help increase, accelerate, and facilitate the production of breast milk (Baequny, 2017).

METHOD

This study was a literature review study. The scientific articles reviewed were selected by the researcher on one research topic, and selected based on the knowledge and experience possessed by the researcher. In this study, a literature review was carried out by mapping the research results by identifying relationships that were often analyzed in the studies that had been obtained relating to the research topic, namely the study of local plants as functional food ingredients to increase breast milk supply. All scientific articles found were selected using inclusion criteria that had been previously determined by the researcher. The researcher determined the inclusion criteria for the selection of scientific articles to be reviewed, it was the journal in which there was a population of postpartum mothers whom breastfeed and consume local plants such as Moringa leaf, katuk leaf, mung beans and soybeans. Scientific articles discussed the content of local plants that affect the production and supply of the breast milk, published in the last 5 years between 2017-2022, in Indonesian and English.
RESULT

A. Research Characteristics

In this literature study, 12 articles were found that were adjusted to the inclusion criteria. The research design used was quasi experimental, pre-post test design, two group pre-post test design, pre-experimental, one group pre-post test, randomized control trial and controlled intervention study. The studies that are in accordance with this research were carried out in Indonesia on average as many as 10 articles, and studies conducted abroad there are 2 articles, in Bangkok, Thailand and Berlin, Germany.

Table 1: Journal Publication Year

<table>
<thead>
<tr>
<th>Publication Year</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>1</td>
<td>8,33</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>8,33</td>
</tr>
<tr>
<td>2019</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>2020</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>2021</td>
<td>4</td>
<td>33,34</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

In Table 1 the articles that are widely used are those published in 2021 with a total of 4 articles, articles for 2019-2020 each with 3 articles and articles in 2017-2018 each with 1 article with a total of 12 scientific articles.

Table 2: Local Plants Used

<table>
<thead>
<tr>
<th>Herbal Ingredients</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daun Katuk (Sauropus Androgynus)</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Daun Kelor (Moringa Oleifera)</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Kacang Kedelai (Soybeans)</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Kacang Hijau (Mungbeans)</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

In Table 2, the local plants used are Daun Katuk (Sauropus Androgynus), Daun Kelor (Moringa Oleifera), Kacang Kedelai (Soybeans), and Kacang Hijau (Mungbeans), with 3 articles each so that the total number is 12 articles.

B. Respondent Characteristics

Respondents in this literature review were postpartum mothers who breastfeed with an age range of 20-35 years from several regions in Indonesia, such as Madiun Regency, Bandar Lampung, South Lampung Regency, Central Lampung, Palangka Raya, South Kalimantan, Malang Regency, Pekanbaru City, and in foreign countries, namely Bangkok, Thailand, and Berlin, Germany. All of them were in primiparous and multiparous mother status.

DISCUSSION

A. Katuk Leaf (Sauropus Androgynus) Content to Increase Breast Milk Supply

Articles obtained and reviewed, there are 3 out of 12 articles stating that katuk leaf are used as laktagogums to help breast milk production.

The research entitled "Effectiveness of Giving Katuk Leaf Extract on Breast Milk Production and Weight Gaining for Babies Independent Practice of Midwives in Madiun Regency" This study used 2 samples, namely the experimental group and the control group. The experimental group consisted of postpartum women who were given a different intervention, namely by giving extra katuk leaves, while the control group was postpartum women who were not given any intervention. The average milk production in the experimental group before the intervention was 170 cc/day and increased after the intervention to 670 cc/day. While in the control group, the average milk production was 163 cc/day. There was a significant difference between the experimental group and the control group, which could be due to several factors, namely the administration of katuk leaf extract (Erlanda et al., 2021).

Katuk leaf contain active compounds of polyphenols and steroids which functioned in the
prolactin reflex or stimulate the alveoli to produce breast milk, and stimulate the hormone oxytocin to stimulate the production and flow of breast milk. Breast milk production is influenced by several factors, such as the frequency of breastfeeding, the food consumed by the mother and adequate nutritional intake, also rest patterns. This can be seen from the increase in the average before and after being given treatment with katuk leaf consumption.

Katuk leaves are popular because of their benefits in increasing breast milk. An active compound called laktagogum plays an important role in this process. In addition, the content of steroid compounds and polyphenols also plays a role in increasing prolactin levels, high prolactin levels function to increase, accelerate and facilitate breastfeeding (Rizky, 2016). This is in line with the theory stated that katuk leaves contain polyphenols and steroids that play a role in the prolactin reflex or stimulate the alveoli to produce breast milk, and also stimulate the hormone oxytocin to stimulate production and flow of breast milk (Erlanda et al., 2021).

Research on katuk leaf was also carried out on experimental animals with the title “The Effect of Katuk (Sauropus androgynous) And Gamal (Glistridia sepium) supplementation on the dry matter digestibility, organic matter digestibility and milk quality of Friesian Holstein” (Syawal et al., 2020). Utilization of katuk and gamal leaves in lactating cows showed an increase in erythrocyte levels, hemoglobin levels and blood hematocrit values. The use of katuk leaves at a dose of 100, 150, 200 grams per cow per day without any additional gamal, found a positive response to milk production.

B. Moringa Leaf (Moringa Oleifera) Content to Increase Breast Milk Supply

The articles obtained and reviewed were 3 out of 12 articles which stated that Moringa leaves can be used as laktagogums to facilitate breast milk production.

Research conducted by (Shoffiyah et al., 2021) with 2 groups, namely the experimental group and the control group. The experimental group was given the intervention of consuming Moringa leaf extract in the form of commercial capsules with a dose of 250 mg every 12 hours starting on day 3 after the childbirth. After proper orientation, demonstration and training, respondents were then asked to pump breast milk every 4 hours using a standard breast pump. Breast milk was measured in a container and recorded in a notebook provided by the researcher. The average frequency before giving Moringa leaf capsules to breast milk production was 26.50. Meanwhile, the average frequency of breastfeeding after giving Moringa leaf capsules to breast milk production was 80.50.

Research conducted by (Safaringga, 2021) with 2 groups, namely the experimental group which was given treatment with Moringa leaf extract, and the control group which was not given any treatment. This shows that the average milk production before consumption of Moringa leaf extract was 68.33 ml, after consumption of Moringa leaves was 105.00 ml. In the control group before placebo consumption was 68.67 ml, and after placebo consumption was 80.00 ml.

As mentioned on the research conducted by (Fungtammasan & Phupong, 2021) there was an increase in the volume of breast milk on the third day after being given Moringa leaf extract (Moringa powder) in capsules with a dose of 450 mg. The average volume of breast milk on the third day was 135.0 ± 61.5 ml. It is expected that there will be a 30% increase in breast milk volume.

Moringa leaf contain galactogogues which are additional foods that increase volume and increase breast milk supply. Moringa leaves are able to increase the required lactation effect by increasing maternal serum prolactin levels. Prolactin is the most important hormone in the lactation incision. Moringa leaf extract is an effective laktagogum for increasing volume and increasing breast milk production.

Moringa plants in Indonesia are local plants that have the potential to be developed as functional food ingredients for breastfeeding mothers, since the use of Moringa plants as laktagogums that functioned to increase and facilitate breast milk production (Erlanda et al., 2021). Moringa leaves aside from containing minerals, it is also contained sterols which are considered as compounds that can increase breast milk production.

A research article entitled “Increasing Milk Production and Milk Chemical Composition In Diary Cows by a Supplementation of Moringa Oleifera Leaf (MOL) Powder Block” (Rika et al., 2020). This study used 20 Friesh Holland dairy cows aged 5-7 years, and lactation period 1-4 months. In this study, the results of milk production in the treatment group were significantly (p<0.05) with feed added with Moringa leaf powder as much
as 500 g/head/day (14.25 ± 2.0 vs 11.5 ± 2.9 liters/head/day). Lactagogums and phytosterols including campesterol, stigmaterol and B-systerol can stimulate prolactin and increase milk production. Phytosterols in Moringa leaves can affect the increase in breast milk production for mothers who are breastfeeding (Rika et al., 2020).

C. Soybean Content to Increase Breast Milk Supply

From the articles obtained and review that had been carried out on 3 out of 12 articles which stated that soybeans or edamame can be used as herbal ingredients to help breast milk production.

Research conducted by (Febriani et al., 2020) where in this study there was no comparison group (one group pretest-posttest), and the first observation (pre-test) had been carried out which allowed researchers to examine the changes that occured after the intervention. Prior to the intervention of soy milk, most of the respondents had smooth milk production, namely 14 people (46.7%), slightly smooth breast milk, namely 11 people (36.3%) and very smooth breast milk as many as 6 people (20%). The increase in breast milk production after soy milk intervention was given as many as 24 people (80%) in the very smooth breastfeeding category and 6 people (20%) in the smooth breastfeeding category.

A research conducted by (Safitri, 2018) with a total of 20 primiparous postpartum mothers who were given edamame consumption intervention. Provision of soybeans by boiling and consumed it in the morning at 07.00 as much as 65 grams / day for 5 days. Prior to the intervention, almost all of the 20 respondents (85%) experienced low milk production and a small proportion (15%) experienced moderate milk production. After the intervention, most of the 20 respondents (65%) experienced good breast milk production and 35% experienced moderate milk production.

Mother's milk production in a day is around 550-1000 ml. Nutritious food is very influential on milk production. If the mother's nutritional intake is not met during the breastfeeding process, it will affect the work of the mammary glands. Breast milk-making glands can work well if the nutrient and nutritional needs of the mother can be met (Hayati et al., 2021)

Based on the description above, soybeans can help increase breast milk production because soybeans contain lactagogum effects that can stimulate the hormones oxytocin and prolactin, while the active compounds contained in soybeans such as alkaloids, polyphenols, steroids, flavonoids are effective in boosting and increasing breast milk production. In Indonesia, soybeans have the potential to be a nutrient for breastfeeding mothers, because they contain lactagogum effects (Hayati et al., 2021)

D. Mung Beans Content to Increase Breast Milk Supply

There were 3 out of 12 articles that obtained and reviewed mentioned mung beans can be used as lactagogums to help breast milk production.

Research conducted by (Yuniarti, 2020) stated that the provision of mung bean juice as an intervention was given to postpartum mothers who were breastfeeding on day 7 for 14 days. Consumption of mung bean juice drinks as much as 3 250 ml packaging boxes every day is consumed by mothers in the morning, afternoon, and evening after eating and measuring breast milk performed on days 1, 7 and 15. Prior to the intervention, postpartum mothers had breast milk volume from 30 ml - 90 ml. The average volume of breast milk before the intervention of mung bean juice consumption was 58.62 ml. After the intervention of consuming mung bean juice, the volume of breast milk produced reached 30 ml-130 ml. The average volume of breast milk after the intervention of mung bean juice was 69.55 ml. This shows that the provision of additional nutrition with mung bean raw materials is able to induce an increase in breast milk secretion that has an impact on increasing breast milk production.

Research conducted by (Widia, 2019) with 20 respondents stated that before being given the intervention of giving mung bean juice, most (80%) of respondents experienced low milk supply during breastfeeding. After the intervention of giving mung bean juice, 80% of respondents experienced the increase of breast milk and 20% of respondents experienced low milk supply.

Postpartum mothers who low milk supply is recommended to consume nutritious foods, among them is mung beans, since mung beans are useful for facilitating breast milk production. The content of vitamin B1 contained in mung bean juice
converts carbohydrates into energy because breastfeeding mothers require greater energy. If the mother lacks thiamin, it will result in the mother being irritable and less enthusiastic. Vitamin B1 (Thiamin) that contained in mung bean juice functions to strengthen the nervous system and is responsible for the production of breast milk. Thiamin will stimulate the work of neurotransmitters that will convey messages to the posterior pituitary to secrete the hormone oxytocin. The hormone oxytocin can stimulate the smooth muscle contraction of the mammary muscles in the walls of the alveoli so that milk is pumped out (Widia, 2019).

Mung beans contain 20-25% protein. Protein in raw mung beans has a digestibility of about 77%. The low digestibility is due to the presence of anti-nutritional substances, such as antitrypsin and tannins (polyphenols) in mung beans. In addition, the increase in breast milk production is influenced by the hormone oxytocin and the hormone prolactin (Angrainy, 2020).

The selection of mung beans as lactagogums is based on their nutritional content, namely carbohydrates which are the largest component of mung beans by 62-63%. Mung beans also contain 20-25% protein. High protein is needed by mothers during breastfeeding, especially proteins that contain amino acids. Amino acids in mung beans affect the hormone prolactin to produce breast milk by stimulating the alveoli which work actively in the formation of breast milk. An increase in the hormone oxytocin will make breast milk flow profusely (Handayani & Yulaikah, 2021). Mung beans also contain active compounds, namely polyphenols and flavonoids which function to increase the hormone prolactin. When the hormone prolactin increases, the secretion of breast milk will be maximized so that the amount of breast milk will increase. Mung beans also contain B1 which is very useful for breastfeeding mothers (Angrainy, 2020).

Vitamin B1 (thiamin) that contained in mung beans functions to strengthen the system and is responsible for the production of breast milk. Where thiamin stimulates the work of neurotransmitters that will convey messages to the posterior pituitary to secrete the hormone oxytocin so that it can stimulate contraction of the smooth muscle of the breast in the alveolar walls and walls breasts, so that milk is pumped out. Thiamin also functions to maximize the nervous system so that it is easy to concentrate, enthusiasm and a good mood will trigger brain work to provide information to the nerves in order to stimulate the hypothalamus in the formation of the hormones prolactin and oxytocin so that the process of forming breast milk is smooth (Barus, 2021).

CONCLUSION
Based on the analysis and discussion of 12 journals that had been obtained from the Google Scholar and Proquest databases, there can be several conclusions, including:
1. Local plants as functional food ingredients that can be used to increase breast milk production are Moringa Leaves, Katuk Leaves, Mung Beans, and Soybeans, each of them has a lactagogum effect (increasing breast milk production).
2. Each local plant used as lactagogums has a variety dose and method of consumption, such as Moringa leaf extract, katuk leaf extract and can be consumed in the form of biscuits such as katuk extract biscuit. It can also be consumed in the form of drinks, including mung bean juice and soybean juice.

SUGGESTION
This research can be further developed to examine other herbal ingredients with the aim of comparing the active ingredients in one study as a lactagogum product for breastfeeding mothers, as an effort to fulfill exclusive breastfeeding scope.

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CONFLICTS OF INTEREST
During the research process, there are no obstacles that mean everything goes according to plan, both from funding, consultants, and institutions.

AUTHOR CONTRIBUTIONS
Rike Puspitasari, Rahajeng Siti Nur Rahmawati, and Arika Indah Setyarini contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.
REFFERENCE


Febriani, A., Yulita, N., & Juwita, S. (2020). EFEKTIVITAS PEMBERIAN SOYBEAN (Glycine Max) DALAM PENINGKATAN ASI IBU MENYUSUI DIWILAYAH.


