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The effect of date palm extract and katuk leaves (*sauropus androgynus*) on breast milk production among breastfeeding mothers in the working area of midwife n's private practice

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Abstract

Background: One of the common problems experienced by postpartum mothers is low breast milk production. *Sauropus androgynus* (katuk leaves) and *Phoenix dactylifera* (dates) are known to contain galactagogue compounds that can stimulate prolactin and oxytocin hormones to enhance breast milk production.

Purpose: To determine the effect of date extract and katuk leaves on increasing breast milk production among postpartum mothers in the working area of Midwife N Private Practice, Bandung Regency.

Method: This research employed a quasi-experimental design with a two-group pretest-posttest approach. The sample consisted of two treatment groups, each comprising 10 respondents. The first group consumed 45 grams (3 tablespoons) of date extract once daily for seven days, while the second group consumed 100 grams of katuk leaves daily for seven days. Data was analyzed using paired sample t-tests and independent t-tests.

Results: The results showed that the mean breast milk volume before consuming date extract was 4.3 ml and increased to 57 ml after the intervention, with a mean difference of 52.7 ml ($p = 0.000$). In the katuk leaf group, the average milk production increased from 4.9 ml to 68 ml, with a mean difference of 63.1 ml ($p = 0.000$). There was a significant difference between the two interventions ($p = 0.000$), indicating that katuk leaves had a greater effect on increasing breast milk production compared to date extract.

Conclusion: There is a difference of date palm extract and katuk leaves in increasing breast milk production in postpartum mothers.

Suggestion: It is recommended that postpartum mothers consume katuk leaves and date extract as natural alternatives to enhance breast milk production.

Keywords: Breast Milk Production; Date Extract; Katuk Leaves; Postpartum Mothers.

INTRODUCTION

The 2023 Indonesia Health Survey (SKI) reported that the national coverage of exclusive breastfeeding among infants aged 0–5 months was 68.6%, surpassing the 2020 Strategic Plan target of 40%. The highest exclusive breastfeeding coverage was recorded in West Nusa Tenggara Province (87.9%), while the lowest was in North Sulawesi Province (52%). West Java Province demonstrated a relatively high rate of exclusive breastfeeding at 65.3%. According Dinas Kesehatan Provinsi Jawa (2024),

exclusive breastfeeding coverage for infants under six months in Bandung Regency reached 77.6% (Ministry of Health of the Republic of Indonesia, 2022).

Exclusive breastfeeding provides significant benefits for a child's growth, development, and immune function. Numerous studies have demonstrated that breastfeeding reduces the risk of infant infections, particularly respiratory and gastrointestinal infections (Duijts, Jaddoe, Hofman, &

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Moll, 2010). improves cognitive development (Kim & Choi, 2020), and optimizes overall growth (Rukanah, 2021). Furthermore, breastfeeding also benefits mothers by reducing postpartum hemorrhage, accelerating uterine involution and recovery, delaying subsequent pregnancies, and lowering the risk of breast cancer (Oriza, 2019).

Low rates of exclusive breastfeeding directly affect infant health quality. When fewer infants are exclusively breastfed, morbidity and malnutrition rates among infants and toddlers tend to increase. Mothers who fail to breastfeed exclusively often face negative consequences regarding infant nutritional status and developmental outcomes. Infants who were not exclusively breastfed had a 3.94-fold higher risk of death from diarrhea compared to exclusively breastfed infants (Salamah & Prasetya, 2019).

Several factors contribute to the failure of exclusive breastfeeding for the recommended six months. The primary barrier is the mother's lack of awareness about the importance of breastfeeding for the infant's growth and development. Socio-demographic factors such as maternal age, occupation, education, knowledge, socioeconomic status, and place of residence influence breastfeeding practices. In addition, prenatal and postnatal factors such as parity, mode of delivery, and lack of early initiation of breastfeeding (IMD) play roles, as well as psychosocial aspects including family and health worker support, exposure to formula milk, and maternal attitudes (Faizzah, Kurniawati, & Juliningrum, 2022).

Efforts to increase breast milk production can be achieved through pharmacological and non-pharmacological methods. Pharmacological interventions often use galactagogues medications such as metoclopramide or domperidone to stimulate or maintain milk production, with domperidone being the most commonly used. However, these drugs may cause adverse effects, such as dry mouth, headache, abdominal pain, galactorrhea, gynecomastia, breast tenderness, and menstrual irregularities, which may interfere with maternal comfort and daily activities (Ene, Hadi, & Kusumawardani, 2022).

Non-pharmacological approaches are safer and more natural alternatives to enhance lactation. One effective strategy is improving dietary intake with foods rich in galactagogues. Lactagogues found in

certain foods work by inhibiting dopamine receptor antagonists, thereby promoting prolactin secretion and enhancing milk production (Ryan, Hepworth, Lyndon, & Bihuniak, 2023).

Among traditional galactagogue foods, katuk leaves (*Sauropus androgynus*) are widely believed to stimulate breast milk production. This plant is easily found in household gardens and has long been consumed by Indonesian communities. Katuk leaves contain polyphenols and steroids that activate the prolactin reflex, stimulate alveoli for milk synthesis, and trigger oxytocin release to aid milk ejection (Nova & Rahmanisa, 2016). They are also rich in vitamins A, B1, and C, tannins, saponins, and alkaloids particularly papaverine-like compounds that help improve milk flow (Suryawan & Lazarosony, 2021).

Empirical studies support the positive effects of katuk leaves on lactation (Sutomo, Garantjang, Natsir, & Ako, 2019). It is reported that consuming up to 170 grams of katuk leaves per day increased breast milk production by 45%. It is found that consuming 150 mL of katuk leaf decoction three times daily enhanced milk output significantly (Situmorang, 2019). It is demonstrated that katuk leaf biscuits increased breast milk volume by 79.6% on the 10th postpartum day (Handayani, Setyawati, Ariendha, Pratiwi, Idyawati, & Fatmawati, 2020).

Another food traditionally associated with improved lactation is date fruit (*Phoenix dactylifera*). Dates act as containing galactagogues pharmaceutical, food-based, or herbal agents that facilitate milk secretion (El Sakka, Salama, & Salama, 2014). It is noted that dates contain a hormone called "potuchin," which helps stimulate uterine muscle contraction, reduce postpartum bleeding, and promote venous contractions around the mammary glands, thereby stimulating milk flow identified (Fungtamasan & Phupong, 2021).

RESEARCH METHOD

This research employed a quantitative quasi-experimental design using a two-group pretest-posttest approach. The study aimed to determine the effect of date palm extract and katuk leaves on increasing breast milk production among postpartum mothers. The study population consisted of all postpartum or breastfeeding mothers who delivered at Midwife N's Private Practice in Bandung Regency

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between July and August 2025. The total sampling technique was used, where all eligible participants from the population were included as research subjects, resulting in 20 respondents divided equally into two treatment groups (10 respondents per group). Sampling was conducted using consecutive sampling, and respondents were included based on the following inclusion criteria: 1) Postpartum mothers on days 3–7 after delivery; 2) Mothers exclusively breastfeeding their infants; 3) Mothers not taking medications or herbal supplements to stimulate lactation.

The dependent variable in this study was breast milk production (volume in ml). The independent variables were date palm extract and katuk leaves. The research utilized both tools and materials, including : 1) Date palm extract (Al-Jazirah brand) containing 52.49% pure date extract; 2) Fresh katuk leaves prepared by boiling 100 grams in 100 mL of water; 3) Breast milk pumping device (electric breast pump) and sterile storage bottles; 4) Observation sheets to record milk production volumes; 5) Standard Operating Procedures (SOPs) for administering the interventions.

Intervention procedure in group 1 (Date Palm Extract Group), namely respondents consumed 45

grams (equivalent to 3 tablespoons) of date palm extract once daily for seven consecutive days. In group 2 (Katuk Leaf Group), naemlty respondents consumed 100 grams of boiled katuk leaves (prepared as vegetable soup) once daily for seven consecutive days. Observations were conducted twice for each respondent before the intervention (pre-test) and after seven days (post-test) to measure the volume of expressed breast milk (in mL) using the same standardized breast pump and measurement protocol.

Data analysis was performed using SPSS version 26.0. Univariate analysis was used to describe the respondents' characteristics (education, age, parity, occupation). Bivariate analysis was conducted using the *Paired Sample t-test* to assess the difference in breast milk volume before and after intervention within each group. The *Independent Sample t-test* was used to compare the mean increase in breast milk volume between the two groups. A p-value < 0.05 was considered statistically significant at a 95% confidence interval (CI 95%).

This study received ethical approval from the Research Ethics Committee of Universitas Indonesia Maju, under approval number 254u/Sket/Ka-Dept/RE/UIMA/VII/2025.

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RESEARCH RESULT

Table 1. Characteristics of Respondents (N=20)

Variabel	Results
Age (Mean±SD) (Range) (Year)	(27.85±6.840) (18-40)
Non-Risk (20-35)	16/80
At Risk (<20 dan >35)	4/20
Maternal Education (n/%)	
Junior High School	3/15
Senior High School	12/60
Bachelor	5/25
Parity (n/%)	
Multiparous	13/65
Primiparous	7/35
Occupation (n/%)	
Housewife (IRT)	13/65
Private Employee	3/15
Entrepreneur	4/20

Table 1. shows that the majority of respondents had a Senior High School/Vocational School education (60%), were within the non-risk reproductive age range of 20–35 years (80%), were multiparous (65%), and worked as housewives (65%). These findings suggest that most participants were in the ideal reproductive stage and had previous breastfeeding experience, potentially contributing to good breastfeeding outcomes.

Table 2. Paired T-test

Variabel	Mean ± SD (ml)	Min-Max	P-value
Increased breast milk in the date palm extract group (<i>Pre-test</i>)	4.3 ± 1.251 ml	3 - 7	0.000
Increase in breast milk in the date palm extract group (<i>Post-test</i>)	57 ± 7.888 ml	50 - 75	
Increased breast milk in the Katuk Leaves group (<i>Pre-test</i>)	4.9 ± 1.100 ml	4 - 7	0.000
Increase in breast milk in the Katuk Leaves group (<i>Post-test</i>)	68 ± 6.325 ml	60 - 80	

Based on Tabel 2. the mean breast milk volume before intervention was 4.3 ± 1.25 mL, which increased to 57 ± 7.89 mL after consuming date palm extract for seven days. The mean difference was 52.7 mL, and the *Paired Sample t-test* result indicated a statistically significant increase in milk production ($p = 0.000$, $p < 0.05$). Thus, date palm extract effectively increased milk production among postpartum mothe.

In the katuk leaf group, the mean breast milk volume increased from 4.9 ± 1.10 mL before intervention to 68 ± 6.33 mL after seven days of consumption. The mean difference was 63.1 mL, with a *Paired Sample t-test* result showing $p = 0.000$ ($p < 0.05$), indicating a significant increase in milk production following katuk leaf consumption.

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Table 3. Independent Sampel T-test

Variabel	Mean $\pm$ SD (ml)	P-value
Date Palm Extract vs. Katuk Leaves	62.5 $\pm$ 1.8.958 ml	0.000

Based on Table 3. the average milk volume after seven days of intervention was 62.5 $\pm$ 8.96 mL across both groups. The Independent Sample T-test showed a significant difference ($p = 0.000$, $p < 0.05$) between the two interventions. This finding indicates that katuk leaves were more effective than date palm extract in increasing breast milk production among postpartum mothers.

DISCUSSION

The majority of respondents in this study had a senior high school or vocational education (60%), belonged to the healthy reproductive age group (20–35 years, 80%), were multiparous (65%), and worked as housewives (65%). Education plays an important role in shaping maternal knowledge and attitudes toward breastfeeding and the consumption of galactagogue-rich foods. Higher educational attainment is often associated with better health literacy, allowing mothers to understand the nutritional and physiological benefits of breastfeeding. Maternal education strongly correlates with exclusive breastfeeding practices, as educated mothers are more likely to adopt evidence-based feeding behaviors and accept natural interventions such as katuk leaves and date extract (Ampu, 2021).

In terms of maternal age, the predominance of mothers within the reproductive age range (20–35 years) suggests optimal physiological readiness for breastfeeding. Age range represents the ideal reproductive period, characterized by stable hormonal balance and efficient secretion of prolactin and oxytocin two hormones essential for lactation. Younger (<20 years) or older (>35 years) mothers may experience hormonal or psychological challenges that hinder milk production. Therefore, the dominance of mothers within the ideal reproductive age may have positively influenced the overall breastfeeding outcomes (Manuaba, 1998).

Parity also played an important role. Multiparous

mothers, who had previous breastfeeding experience, exhibited better confidence, breast care techniques, and milk flow compared to primiparous mothers. Demonstrated that multiparous mothers have more efficient lactation processes due to prior stimulation of mammary glands, resulting in better elasticity and milk ejection reflexes (Diana, Yulifah, Yuliani, & Setyarini, 2024; Rahmawati, & Saidah, 2021).

From an occupational perspective, most respondents were housewives, which likely provided them with more time to breastfeed and comply with the intervention schedule. Mothers are more consistent in practicing exclusive breastfeeding compared to working mothers who may face workplace constraints limiting their breastfeeding opportunities (Olya, Ningsih, & Ovany, 2023).

This study found a significant increase in breast milk volume after seven days of consuming date extract from 4.3 mL to 57 mL ($p = 0.000$). This finding is consistent with previous research that observed that consuming approximately 10 dates per day increased breast milk volume by 11% in the second week and 23% in the fourth week postpartum, compared to baseline levels ($p < 0.05$). The underlying mechanism is believed to be related to the nutritional and bioactive components of data, including simple carbohydrates, vitamins, minerals, and polyphenolic compounds, which act as antioxidants and metabolic regulators (Modepeng, Pavadhgul, Bumrungpert, & Kitipichai, 2021).

Date fruit consumption increases serum prolactin and insulin-like growth factor-1 (IGF-1) levels, enhancing mammary gland activity and promoting milk synthesis (Ebrahimi, Hemmati, & Malekaneh, 2017). Explained that dates contain galactagogue compounds natural substances that support milk ejection through the stimulation of prolactin and oxytocin pathways. The increase in breast milk production observed in this study suggests that date extract functions primarily as a nutritional-metabolic

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galactagogue, providing energy and micronutrients that facilitate lactation. While effective, its influence appears to be less direct hormonally compared to other botanical galactagogues such as katuk leaves (El Sakka et al, 2014).

Consumption of katuk leaves significantly increased milk production from 4.9 mL to 68 mL after seven days ($p = 0.000$). This finding corroborates previous studies, all of which confirmed the efficacy of katuk leaves as a potent natural galactagogue (Sutomo, Garantjang, Natsir, & Ako, 2019; Situmorang, 2019; Dolang, Wattimena, Kiriweno, Cahyawati, & Sillehu, 2021). Consuming 330 mL of katuk leaf decoction twice daily for one week significantly improved milk secretion among postpartum mothers ($p < 0.05$) (Dolang et al., 2021). The mechanism of action of *Sauropus androgynus* is attributed to its rich content of flavonoids, polyphenols, sterols, and alkaloids, which have estrogenic and dopaminergic properties that enhance prolactin and oxytocin secretion (Zhang, Cheng, Zhang, Bai, Liu, Li, & Zhang, 2020). further explained that katuk leaves stimulate the upregulation of α -lactalbumin and aquaporin gene expression, facilitating milk synthesis and ejection (Mustofa, Yuliani, Purwono, Sadewa, Damayanti, & Heriyanto, 2020).

Preclinical studies on lactating mice demonstrated that katuk leaf extract increased prolactin and oxytocin gene expression in the hypothalamus and mammary glands, supporting the biological plausibility of its galactagogue effect (Soka, Alam, Boenjamin, Agustina, & Suhartono, 2010).

From a socio-cultural perspective, the use of katuk leaves as a natural lactation enhancer has deep roots in Indonesian tradition. For generations, katuk has been used in postpartum dietary practices and family care rituals to promote milk flow. Beyond its physiological benefits, the cultural acceptance and local availability of katuk make it a sustainable, community-based approach to improving maternal and infant health outcomes.

The comparative analysis using the Independent Sample t-test showed a statistically significant difference ($p = 0.000$) between the effects of date palm extract and katuk leaves, with katuk demonstrating a higher mean increase in milk volume (63.1 mL vs. 52.7 mL). This suggests that while both

interventions were effective, katuk leaves had a stronger and more direct physiological impact on lactation.

The findings of this study are consistent with previous studies that reported that consuming up to 170 grams of katuk leaves per day can increase breast milk production by up to 45% (Sutomo et al., 2019). In line with this, another finding that giving 150 mL of boiled katuk leaves three times a day to breastfeeding mothers significantly increased breast milk production (Situmorang, 2019). Furthermore, other preclinical studies have shown in lactation animal models (mice) that supplementation with katuk leaf extract increases the regulation of prolactin and oxytocin gene expression and the expression of lactogenesis-related proteins in hypothalamic and mammary tissues. Immunohistochemical and qRT-PCR analyses from this study provide molecular evidence that the bioactive components of katuk leaves can activate the lactation neuroendocrine axis, thereby increasing breast milk synthesis and secretion (Soka et al., 2010).

From a pharmacognostic perspective, *Sauropus androgynus* (katuk) contains flavonoids, polyphenols, phytosterols, alkaloids (including compounds reportedly similar to papaverine), and other bioactive components that exert physiological effects on the endocrine system and mammary tissues. These components are believed to act as agonists or co-agonists along the lactation hormone pathways and as agents that enhance the secretory capacity of mammary alveoli (Zhang, Cheng, Zhang, Bai, Liu, Li, & Zhang, 2020).

Reinforced these findings, reporting that katuk leaves stimulate the secretion of prolactin and oxytocin hormones, thereby facilitating the processes of lactogenesis and milk ejection reflex. In addition, the flavonoids and polyphenols contained in katuk leaves serve as antioxidants, improving endocrine function and enhancing the metabolic activity of lactating mothers (Mustofa et al., 2020).

In contrast, the mechanism of date palm extract (*Phoenix dactylifera*) in promoting breast milk production is primarily nutritional–metabolic in nature. Dates are rich in simple carbohydrates, sugars, minerals, and antioxidants. Several international studies have reported an increase in serum prolactin and IGF-1 levels following date consumption among

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breastfeeding mothers, accompanied by a relative increase in milk production (for instance, an 11% increase in the second week and 23% in the fourth week in certain studies). However, the effect of dates tends to be more moderate and is thought to act through enhancing maternal energy metabolism, nutritional status, and antioxidant defenses, rather than directly stimulating the hormonal lactation pathways as strongly as katuk leaves. In other words, date extract provides beneficial metabolic support but does not offer as potent a hormonal stimulus as agents that modulate prolactin and oxytocin expression (Ebrahimi et al., 2017).

The difference in effectiveness between the two interventions can be explained by several biological and methodological factors. Biologically, specific compounds in katuk leaves are capable of modulating lactogenic hormone secretion and increasing receptor sensitivity, resulting in a quantitatively greater milk output as observed in animal models and both in vitro and in vivo studies. Methodologically, variations in dosage form (boiled katuk leaves or standardized extracts versus liquid or syrup-based date extract), effective dose, bioavailability of active compounds, participant adherence, and measurement variability (e.g., timing, duration, and method of milk expression) could all influence the observed differences in outcomes. Therefore, the higher milk volume found in the katuk group likely reflects a combination of more direct pharmacodynamic effects and supportive intervention protocols that optimize the release of bioactive compounds (Soka et al., 2010).

Conclusion, the katuk leaf intervention proved more effective than date palm extract due to its bioactive constituents that act directly on the endocrine system, particularly by stimulating prolactin and oxytocin secretion. Meanwhile, date extract primarily functions as a nutritional and energy supplement, which, although beneficial for maternal well-being, exerts a less pronounced effect on milk volume. Hence, this study reinforces that katuk leaves have strong potential as an effective, affordable, and accessible natural herbal intervention to support the success of exclusive breastfeeding programs.

From the researcher's perspective, the use of katuk leaves is widely trusted among Indonesian communities to enhance maternal health and improve the well-being of breastfeeding mothers. The cultural

tradition of consuming katuk aligns with Indonesia's local wisdom, which emphasizes natural, plant-based health solutions. In a socio-cultural context, the inclusion of katuk leaves in postpartum dietary practices symbolizes community support for exclusive breastfeeding and maternal empowerment.

Beyond biological effects, katuk leaves hold economic and cultural value. They are inexpensive, widely available, and often grown domestically, providing a sustainable option for maternal nutrition. Incorporating katuk consumption into local postpartum diets aligns with community-based health promotion strategies and Indonesia's emphasis on local wisdom in public health.

CONCLUSION

This study demonstrated that both date palm extract (*Phoenix dactylifera*) and katuk leaves (*Sauropus androgynus*) significantly increased breast milk production among postpartum mothers. However, the katuk leaf intervention produced a greater effect on milk volume compared to date extract, as evidenced by the higher mean increase and statistically significant intergroup difference ($p = 0.000$).

SARAN

It is recommended that postpartum mothers incorporate katuk leaves into their daily diet as a natural and safe means to stimulate breast milk production. Consuming date extract may also serve as a supplementary source of energy and micronutrients to support overall lactation performance. Midwives and community health workers are encouraged to educate and promote the use of locally available galactagogues such as katuk leaves as part of postpartum nutritional counseling, particularly for mothers facing lactation difficulties.

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