Eureka Herba Indonesia
Journal Homepage: https://eurekabiomedical.com/index.php/EHI

How to Increasing Prolactine Levels of Breastfeeding Mother with Consumption Katuk (*Sauropus androgynous*(L)Merr) Leaf

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ARTICLE INFO

Keywords:
Katuk leaf
Sauropus androgynus
Breastmilk
Breastmilk production

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The author has reviewed and approved the final version of the manuscript.

https://doi.org/10.37275/ehi.v2i2.30

A B S T R A C T

Inadequate breast milk production is the most common inhibiting factor causing the cessation of exclusive breastfeeding practices an effort to increase the rate of secretion and production of breast milk is through the use of traditional herbal medicines such as decoction and extraction of katuk leaf (*Sauropus androgynous*). Katuk leaf extract (*Sauropus androgynous*) has been known to have a variety of pharmacological activities. This paper aims to review the botany, phytochemistry, ethnopharmacology, and pharmacological activities of S. androgynous, and discuss the known chemical constituents at work in S. androgynous-induced prolactin levels to increase breast milk in humans. The data presented in this review were collected from published literature as well as the electronic databases of PubMed, CNKI, Web of Science, SCI finder, ACS, Science Direct, Wiley, Springer, Taylor, Google Scholar, and a number of unpublished resources, (ex: books, and Ph.D. and M.Sc. dissertations). Searching for research articles in several databases using certain keywords breast milk human and katuk (*Sauropus Androgynus*) leaf literature. All abstracts retrieved were screened for inclusion. All types of articles, including case series and case reports, were included due to the lack of herbal katuk leaf clinical trials. Exclusion criteria consisted of non - English and nonhuman articles. In conclusion, there was a significant effect of katuk leaf consumption towards increasing breastmilk production volume.

1. Introduction

Breast milk is an extremely complex and highly variable biofluid that has evolved over millennia to nourish infants and protect them from disease whilst their own immune system matures. The composition of human breast milk changes in response to many factors, matching the infant's requirements according to its age and other characteristics.[1,2] Breast milk is the best food for babies. Based on data from the WHO estimated 130 million babies are born worldwide each year and 4 million babies die within the first 28 days of life. United National Children's Fund (UNICEF) and the World Health Organization (WHO) recommend that newborn infants are exclusively breastfed for at least six months. The achievement of exclusive breastfeeding in Indonesia has not reached the expected number which is equal to (80%). Results Indonesian Demographic and Health Survey (IDHS) (2007) show the scope of exclusive breastfeeding of infants 0-6 months (32%) and in 2012 it increased to (42%), whereas according to a report from the Provincial Health Office in 2013, the coverage of breastfeeding only 0-6 months (54.3%)4. Breastfeeding babies in Indonesia has become a culture, but the practice of breastfeeding is still far from the expected. According to the Indonesia Demographic Health Survey (IDHS), 2010 only (10%)

of infants were breastfed on the first day, breastfed for less than 2 months as many (73%), breastfed for 2 to 3 months as many (53%), given breastfeeding (ASI) as much as 4 to 5 months (20%) and exclusive breastfeeding until the age of 6 months as many (49%).[3,4]

The problem of breastfeeding mostly occurs in primiparous, women who give birth to babies for the first time.[5] Inadequate milk production is caused by various factors such as nutritional and non-nutritional factors including hormonal problems, parity, pregnancy, age, and psychological factors. Nutritional factors are required by breastfeeding mothers. Nutrients are required for the synthesis of milk and for stimulating the production of hormones that play a role in the production and secretion of milk. The hormones that play a role in this process are the hormones prolactin and oxytocin.[6,7] One of the main hormones that play a role in the process of lactation is the hormone prolactin. The hormone prolactin is needed to build and maintain lactation. In the mammary gland, the hormone prolactin specifically stimulates DNA synthesis and epithelial cell proliferation as well as the synthesis of milk proteins (casein, lactalbumin), free fatty acids, and lactose. The prolactin hormone specifically stimulates the transcription rate of the milk protein gene.[8] Low levels of the hormone prolactin can inhibit the synthesis and secretion of milk. This has been proven by a study from Hill et al which states that the secretion of milk in mothers stops within three to four days after a decrease in prolactin levels.[9] whereas an increase in the hormone prolactin occurs during the first week of the puerperium that triggers it. increased milk production.[11] Thus, the hormone prolactin is essential for the initiation and secretion of milk at the beginning of lactation and for the maintenance of milk production during lactation. Increased levels of the hormone prolactin are influenced by several factors such as frequency of breastfeeding, previous breastfeeding experience, milk production, and pharmacological drugs including the use of galactagogues.[11] Galactogogue is a synthetic substance or plant molecule that is used to induce, maintain and increase milk production through a complex process involving the interaction of physical and physiological factors. The most important factor in the lactation process is the prolactin hormone.[10,11]

S. androgynous is a shrub grown in some tropical regions, and the leaves of this plant are treated as a common nutritious vegetable in Asia. These leaves are traditionally used by mothers in Indonesia to increase their breast milk production. Katuk (*Sauropus androgynous* (L) Merr) is a shrub that belongs to the Euphorbiaceae family. Katuk contains nutrients and several compounds that are useful for the synthesis and production of breast milk. Katuk contains nutrients and several useful compounds. The nutritional content of katuk leaves can increase milk production by increasing glucose metabolism for lactose synthesis.[12] In addition, the phytosterol levels in katuk leaves are higher than in other types of vegetables.[13] Phytosterols have hormonal effects that are estrogenic so they can increase prolactin and milk production.[14] Another component contained in katuk leaves is papaverine. Papaverine can stimulate the release of prolactin. The papaverine content of old katuk leaves has the effect of relaxing the smooth muscle and widening blood vessels, causing an increase in circulating oxytocin and prolactin hormones in the bloodstream.[14]

2. Methods

A search was conducted for literature through Embase, PubMed, and EBSCO (all databases) from inception to June 2017 using search terms such as “breast-feed,” “Katuk leaf,”“lactation,” “herbal,” and “botanical.” All abstracts retrieved were screened for inclusion. All types of articles, including case series and case reports, were included due to the lack of herbal katuk leaf clinical trials. All herbs identified in this search with relevant data were reviewed. Additional articles were obtained from article reference lists. Herbal katuk leaves were evaluated for historical use, proposed mechanisms of action, effects, usual dosage, and safety and tolerability data. Natural

Standard was used to obtaining supplemental information on the identified herbal Katuk Leaf.

3. Results and Discussion

Others studies about *S. androgynous* are widely believed in most Southeast Asian countries like Indonesia, Thailand, and Malaysia to increase breast milk production during lactation. The two hormones of prolactin and oxytocin are involved in the process of milk synthesis and secretion, acting independently on different cellular receptors, and their combined actions are essential for successful lactation. Supplementation of mature *S. androgynous* leaves extract (173.6 mg/kg) increased the expression of prolactin and oxytocin genes in lactating mice by 15.75- and 25.77-fold, respectively, compared to the control group in a lactating BALB/C mice model. Similar research results also show that S. androgynous leaves extract (6 mg/kg) increases the mother's breast milk production up to 50.7% compared with placebo in lactating woman subjects. However, both studies lack dose dependence, and the effective dosage to be used in this case is an issue that is currently unresolved. S. androgynous may improve breast milk production by exerting as an inducer of the gene expression that is required for good lactation and therefore supports the current practice during lactation.[9,10]

The Effect of Katuk (*Sauropus androgynous* (L) Merr) Leaf Biscuit on Increasing Prolactine Levels of Breastfeeding Mother. The results showed that there was an effect of katuk leaf biscuits on increasing serum prolactin levels in breastfeeding mothers. It is suggested that katuk leaf biscuits be used as an alternative in an effort to increase breast milk production so that it can support the success of exclusive breastfeeding.[11]

The research used a quasi-experimental design with pre-test and post-test design, the sampling technique with purposive sampling of as many as 20 breastfeeding mothers, and the results of the study were analyzed by independent t-test. The results showed that sweet leaf decoction and Sweetleaf extract were effective to fulfill the adequacy of breast milk. The sweet leaf decoction in this study proved to gain infant weight compared to sweet leaf extract with a p-value of 0,000.[12]

The research was RCT post-test only control group design with a double-blind approach with a sample consisting of n1=n2=50 respondents. The conclusion of the research there was a significant effect of katuk leaf biscuit consumption towards increasing breastmilk production volume. So that the biscuit can be used as a supplement to increase the breastmilk volume.[11] Pre-Posttest with Control Group Design. In the research researcher measured influence intervention in the experiment group by comparing group control. Research worked at midwife practice Independent the January to July 2015. The population in the research is all mothers breastfeeding at a midwife practice Independent (BPM) in the Klaten district. The sampling method is quota sampling with inclusive criteria normally newborn and healthy. Research chat January-July 2015. Data analysis is performed to describe the variable that will be studied and performed bivariate analyses to the relationship of independent and dependent variables using the chi-square. Results research is70% intervention group more produced milk than the control group produced milk enough 30%. Result statistic Analise chi square p value =0,002. In Conclusion, there was a significant relationship between consumption of ekstract katuk for sufficient breast milk.[13]

The prospective Cohort Study design approach used with samples was the postpartum mothers who Gave birth to as many as 40 persons. The use of data collected to observe your food recall from the food consumed by the mother for 3 days and gives Breastfeeding product observation sheets. A Results of the study showed that there was an influence of food consumption of postpartum mothers on Breastfeeding production (fluid intake, calories total, sauropus androgynous, and Musa paradisiaca) and fluid intake was the predominant factor that influent to the Breastfeeding production of postpartum mother. Expected for the postpartum mother to consume the

fluids as much as 8 to 12 glasses a day for breastfeeding increasing production and need to be associated with the postpartum mother to consume a sufficient amount of calories, *sauropus androgynous* and Musa paradisiacal.[14]

4. Conclusion

The conclusion of the research there was a significant effect of katuk leaf consumption towards increasing breastmilk production volume. So that the katuk leaf can be used as a supplement to increase the breastmilk volume.

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