

Lactogenic Foods

Can you really eat your way to making more milk?



Lactogenic Foods for Milk Production

~No disclosures of financial or conflicts of interest to make~

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Nutrition: a historical approach



Most traditional societies view foods as part of their health strategy
 Cultures have always had traditional foods for milk production
 Experience based- less research
 Foods vs Herbs

Wisdom of the ages...

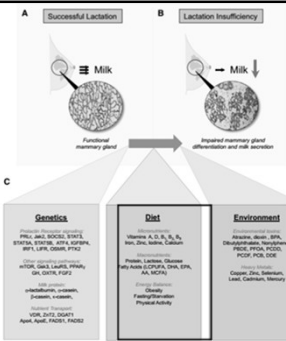


"It is well known that diet has a profound effect on lactation and that the satisfactory secretion of milk is only possible in the presence of certain known dietary factors in adequate quantities." - Folley, 1938

"The only way to improve lactation in postpartum women is measures aimed at improving maternal nutrition. Diet therapy is the main method for maintaining maternal health, prevention of lactation insufficiency..." - Kuznetsov 2017

"Insufficiency of food must produce insufficiency of milk." -Routh, 1879

Parental Factors that can lead to Lactation Insufficiency



Lee & Kelleher 2016

Fig. 1. Maternal factors that can lead to lactation insufficiency. Lactation insufficiency is a condition in which lactation is insufficient or unresponsive due to

"It has long been assumed that once lactation is successfully initiated, the primary factor regulating milk production is infant demand. Thus, most interventions have focused on improving breastfeeding education and early lactation support. However, in addition to infant demand, increasing evidence from studies conducted in experimental animal models, production animals, and [breastfeeding women] suggests that a diverse array of [maternal] factors may also affect milk production and composition... modifiable factors, such as diet...on reproductive endocrinology, lactation physiology, and the ability to successfully produce milk."

Hue-Beauvais 2021:

"Accumulating evidence in both humans and animals demonstrates that nutritional influences encountered during early life have a lasting impact on both health and performance, including milk quantity and quality."

Hue-Beauvais et al. (2021). Nutritional Regulation of Mammary Gland Development and Milk Synthesis in Animal Models and Dairy Species. *Genes (Basel)*

Lactogenic Foods

Functional Foods



Foods that have a potentially positive effect on health..... are generally considered to offer additional benefits that may reduce the risk of disease or promote optimal health...

-MayoClinic.com

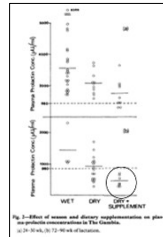
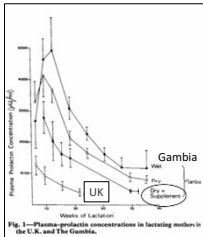
Front door vs Back door evidence

Some diagnoses are made by exclusion:

What happens if nutrient X is missing?



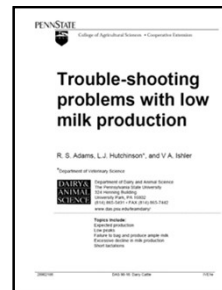
Lactation Under conditions of good vs poor nutrition



"The better the nutritional status, the lower the prolactin levels..."

Lunn, Austin, Prentice & Whitehead. (1980). Influence of maternal diet on plasma prolactin levels during lactation. *The Lancet*

Nutrition: Wisdom from the dairy



Mastitis Recommendation: "Nutritional parameters to check are current levels of protein, zinc, selenium, and vitamins A and E. Examine and screen the ration or individual feeds for molds and mycotoxins."

Adams, R. S., Hutchinson, L.J. and Ishler, V.A. . (1998). Trouble shooting problems with low milk production. *Penn State Dairy and Animal Science Fact Sheet 98-16.*

Wisdom: Trouble shooting problems



Governing Rationales

- Poor diet affects gut health → nutrient uptake → inadequate substrates → decreased production
- Poor diet affects gut health → immune system → infections/mastitis → decreased production

Adams et al. (1998). Trouble shooting problems with low milk production. *Penn State Dairy and Animal Science Fact Sheet 98-16.*

Supportive research

Gbadamosi and Okolosi (2013) analyzed ten botanical galactagogues for their chemical constituents and antimicrobial activities finding that they had high protein, fiber, iron and calcium content, and antibacterial activity.

Gbadamosi & Okolosi. (2013). Botanical galactagogues: nutritional values and therapeutic potentials. Monteban, M. (2017). Maternal Knowledge and Use of Galactagogues in Andean Communities of Cusco, Peru.

Lactogenic Foods

Nutrients associated w/ good milk production & composition



Protein
Iron
Iodine
Omega-3 fatty acids
B-vitamins
Calcium
Zinc



Proteins

ESSENTIAL BUILDING BLOCKS

A “weak but significant” association between the intake of protein and “shorter lactation” has been observed

Torris et al. Duration of lactation, maternal metabolic profile, and body composition in the Norwegian EBBA I-study. *Breastfeed Med.* 2013;8(1):8-15.

Protein deficiency to sufficiency

“...Supplement was fed to lactating women to raise the protein content of their energy adequate diet from 25 or 50m to 100mg/d.... Amount of milk secreted... increased significantly.”

Edozien JC, Khan MAR, Waslien CI. Human Protein Deficiency: Results of a Nigerian Village Study. *J Nutr.* 1976

Proteins

Buntuchai, et al. JHL 2017. Traditional Galactagogue Foods and Their Connection to Human Milk Volume in Thai Breastfeeding Mothers. *The present study found significant correlations between galactagogue foods and human milk volume when controlling for infants’ birth weight, weight-for-age, maternal energy, and carbohydrate intake. The foods included ... some protein-rich foods*



Proteins

| Achalapong | Breast milk volume at 48 hours postpartum (mL) | 95% CI | P | Breast milk volume at 72 hours postpartum (mL) | 95% CI | P |
|---|--|------------|-------|--|-------------|--------|
| Regular diet (meansSD) | 5.2±6.7 | | | 19.6±18.7 | | |
| Egg supplement (mean difference) | +3.8 | -6.8, 14.5 | 0.477 | +19.6 | -2.5, 41.7 | 0.082 |
| Milk supplement (mean difference) | +7.5 | -3.1, 18.1 | 0.163 | +4.1 | -17.9, 26.0 | 0.715 |
| Egg and milk supplement (mean difference) | +14.6 | 3.8, 25.4 | 0.008 | +41.1 | 18.8, 63.5 | <0.001 |

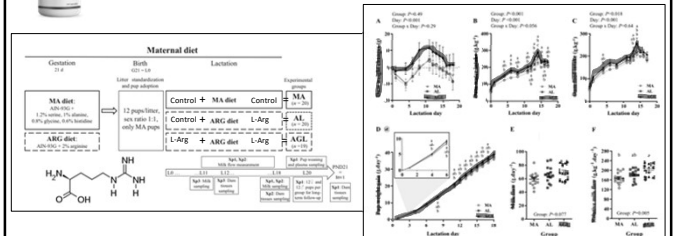


Laosirirat, T. (2012). Effect of egg supplementation for breast milk production at 48 hour postpartum. *Thai Journal of Obstetrics and Gynaecology*, 19(2), 45-50
Achalapong, J. (2016). Effect of Egg and Milk Supplement on Breast Milk Volume at 48 and 72 Hours Postpartum: A Randomized-Controlled Trial. *Thai Journal of Obstetrics and Gynaecology*, 24(1), 20-25.
Buntuchai (2017)— “Some kinds of protein... including egg tofu, chicken, fish, and seafood”

L-Arginine to promote milk production (rats)



Serini, ... Alexandro-Goullas (2021). Dietary Arginine Supplementation during Gestation and Lactation Increases Milk Yield and Maternal Lipogenesis in Rats. *J Nutr.* 151(8), 2188-2198.



- ✓ Essential amino acid found in meat, poultry, fish, dairy
- ✓ Best results when started in early gestation thru lactation

Lactogenic Foods

Iron: Anemia, low iron a risk factor for IMS

Henly et al, Birth, 1995. "study results suggest that anemia is associated with the development of insufficient milk...."

Toppare 1994: Birth parents with poor milk production could have low iron even though their hemoglobin was normal.

Rioux 2006: Birth parents with hemoglobin levels below 9.5 g/dL did not breastfeed as long as those who had higher levels.

Salahudeen 2013: Low hemoglobin was identified as a risk factor for slow onset of milk production after birth

Clues from rat research



Lower fat content of milk →
needed more milk to compensate

O'Connor 1988. Impact of maternal iron deficiency on quality and quantity of milk ingested by neonatal rats.

Kuznetsov 2017 (First Kyiv Medical College):

- ✓ Only 30 % of women with iron deficiency anemia (IDA) had normal supply vs 78% of controls.
- ✓ Women who had both Hypothyroidism & IDA during pregnancy very frequently had II and III degree hypogalactia (production deficit 26-75%).

Kuznetsov, V. (2017). Clinical and pathogenetic aspects of hypogalactia in post-parturient women.

Fat, Calories and Dieting



We need at least 1500-1800 calories on a regular basis

Observations:

The most "successful" nursing parents were eating 50% more than normal... one who was eating 1950 calories/day had to double their intake before they could eliminate supplementation...
Whichelow 1975, 1979

Thai study found a relationship between caloric intake and milk volume in Thai nursing parents...
Buntuchai 2017

Buntuchai. (2017). Traditional Galactagogue Foods and Their Connection to Human Milk Volume in Thai Breastfeeding Mothers. *JHL* Whichelow, M. J. (1975). Letter: Calorie requirements for successful breast feeding. *Arch Dis Child*, 50(8), 669. Whichelow, M. J. (1979). Breast feeding in Cambridge, England: factors affecting the mother's milk supply. *J Adv Nurs*,

"Milk volume is increased 5-15% in women with very little body fat who secrete milk with a lower lipid content, resulting in a decrease in caloric density of as much as 15%."


Neville, M. C. (2001). Anatomy and physiology of lactation. *Pediatr Clin North Am*, 48(1), 13-34. (p. 24)

Low body fat = lower fat milk if not enough in diet & *require higher milk volume to compensate*


Lactogenic Foods

High Carbohydrate vs High Fat diet

60% carb, 25% fat, 15% protein =1780 kcal




Milk fat concentration & content less



Greater infant weight gain

30% carb, 55% fat, 15% protein =1780 kcal



Milk fat conc ↑13%
Milk fat content ↑15%
Higher calorie milk

Mohammad, Sunehag, & Haymond, (2009). Effect of dietary macronutrient composition under moderate hypocaloric intake on maternal adaptation during lactation.

Calories


- ✓ Mean energy intake 72% of dietary reference intake
- ✓ 56% carb 27% fat 17% protein (=higher carb)
- ✓ Maternal energy & carb intake were related to milk volume

| | Median (Q1-Q3) | r | p |
|----------------------------|---|------|------|
| Energy (kcal) ^a | 1,638.6 (1,457.4-1,799.2) [72.8 (64.8-80.0)] | .319 | .029 |
| Carbohydrate (g) | 239.1 (205.3-260.8) | .327 | .026 |
| Fat (g) | 49.0 (36.6-60.4) | .105 | .271 |
| Protein (g) ^a | 67.8 (57.1-77.8) [88.1 (74.2-101.0)] | .229 | .089 |

Note. The mean (standard deviation) milk volume was 598.7 (182.4) mL/day, which was tested for the correlation with energy. ^aExpressed as % of dietary reference intake by using Pearson product-moment correlation. ^bData in brackets are expressed as median (Q1-Q3) of % Thai dietary reference intake.

Buntuchai, et al. (2017). Traditional Galactagogue Foods and Their Connection to Human Milk Volume in Thai Breastfeeding Mothers.

B-Complex: building blocks of milk synthesis



Dangat 2011 Rat study: "However, there was a reduction in total gastric milk volume in both vitamin B12-deficient groups as compared w/ control."

Grace 2012 Dairy: "Unlikely to improve the milk production of grazing cows when concentrations of vitamin B₁₂ in serum are >128 pmol/L."

B-12



Russian mothers given B₁₂ injections for the first 2 weeks after birth had higher milk volumes the first week than those who didn't get them.

Chubukov AS, Belentseva PN, Makarov EI. [Effect of vitamin B12 on lactation]. *Akush Ginekol (Mosk)*. 1973;49(8):61-62.

Who's at risk?




GO VEGAN

Sebastiani. (2019). The Effects of Vegetarian and Vegan Diet during Pregnancy on the Health of Mothers and Offspring.

Calcium

"The evidence that Ca²⁺ has an important role in PRL release is impressive... in normal anterior pituitary cells, decreasing Ca²⁺ or exposing the cells to Ca²⁺ channel blockers decreases PRL release in a manner similar to that caused by exposure to dopamine..."




Lamberts, S. W., & Macleod, R. M. (1990). Regulation of prolactin secretion at the level of the lactotroph. *Physiol Rev*, 70(2), 279-318.

"Calcium is an important mineral essential for milk production, increased prolactin secretion ..."

Chandama, Hiremath & Shweatha . (2022). Quality evaluation of galactagogue concoction. *Asian Jr. of Microbiol. Biotech. Env. Sc*

Lactogenic Foods

Low calcium diet?



Rats: Lower milk volumes in those fed low-calcium diets


Weisstaub et al. Influence of maternal dietary calcium levels on milk zinc, calcium and phosphorus contents and milk production in rats. *Journal of trace elements in medicine and biology : organ of the Society for Minerals and Trace Elements (GMS)*. 2006;20(1):41-47.

Calcium


Calcium/Magnesium

- ✓ When supply seems to dip around time of period
- ✓ May be related to lower calcium levels
- ✓ 1500mgCa/750mgMg daily
- ✓ Start mid-cycle, continue through period

Anecdotal- ~Patricia Gima IBCLC



Zinc



Plays a role in regulating lactocyte renewal

Regulates functional differentiation of alveoli into secreting cells

Is critical for activities that are required for milk synthesis and secretion.

...a key modulator of mammary gland biology, critical for successful lactation- Lee & Kelleher 2016

Zinc

Study of 514 pregnant parents in Central Russia

Zinc deficiency defined as $<13\mu\text{mol/L}$

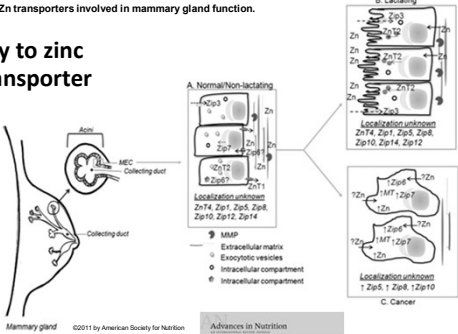
77% had reduced zinc levels, 21% on "critical edge"

"In women with zinc deficiency, early post-natal hypogalactia developed 1.4 times more often."

Scheplyagina, (2005). Impact of the mother's zinc deficiency on the woman's and newborn's health status.

Alternate way to zinc deficiency: transporter

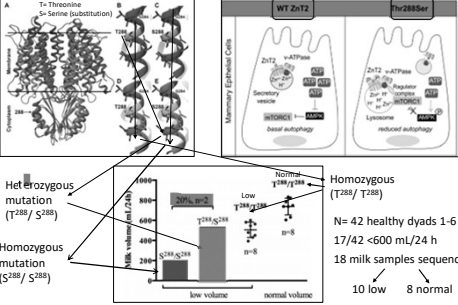
Zn and Zn transporters involved in mammary gland function.



Shannon L. Kelleher et al. *Adv Nutr* 2011;2:101-111

©2011 by American Society for Nutrition

ZnT2 Variant drives lysosome formation and impairs lactation



Heterozygous mutation (T²⁸⁸/S²⁸⁸)

Homozygous mutation (S²⁸⁸/S²⁸⁸)

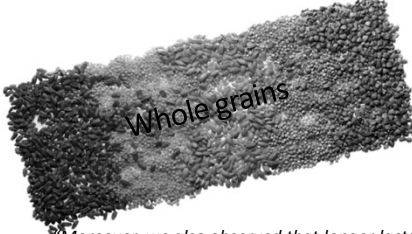
Normal (T²⁸⁸/T²⁸⁸)

Homozygous (T²⁸⁸/T²⁸⁸)

N= 42 healthy dyads 1-6 mo
17/42 <600 mL/24 h
18 milk samples sequenced

10 low 8 normal

Lactogenic Foods



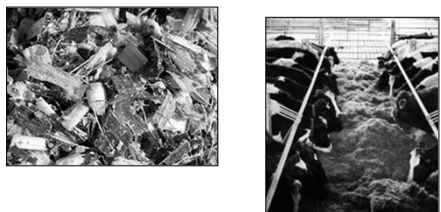
Whole grains

Provide iron, vitamins, fiber

Moreover, we also observed that longer lactation was associated with slightly higher energy intake, a significantly higher intake of protein and fiber, and a higher level of physical activity.

Torris, C., Thune, I., Emaus, A., Finstad, S. E., Bye, A., Furberg, A. S., . . . Hjartaker, A. (2013). Duration of lactation, maternal metabolic profile, and body composition in the Norwegian EBBA I-study. *Breastfeed Med*, 8(1), 8-15.

Nutrition: More Wisdom from the dairy




Roughage

-Manipulated for milk volume, cream content

Barley *Hordeum vulgare*

Galactagogue property found in polysaccharide* in barley plant, appears to increase prolactin

Koltezko 2000; Bingel, 1994



Also: sitosterol (phytoestrogen) increases uterine contractions in rats—oxytocic? *Javan 2017*


*Nguyen, US patent 4948785, 3/14/90. Plant polysaccharide fractions inducing prolactin in mammals

Cultural mentions of Barley Leaf

GALACTOOGUE PLANTS IN TRADITIONAL MEDICINE

TABLE 1. MEDICINAL PLANTS USED FOR THE ENHANCEMENT OF LACTATION

| Scientific name ²⁶ | Common name | Arabic/ETH name | Family | Part used | Administration route | Reference |
|---------------------------------|-------------|-----------------|----------------|-----------|----------------------|-----------|
| <i>Foeniculum vulgare</i> L. | Fennel | | Rosaceae | Seed | Oral | 71 |
| <i>Asarum graveolens</i> L. | Asarum | | Menispermaceae | Root | Oral | 71 |
| <i>Psoralea corymbosa</i> L. | Psoralea | | Leguminosae | Root | Oral | 71 |
| <i>Nigella arvensis</i> L. | Nigella | | Ranunculaceae | Seed | Oral | 71 |
| <i>Medicago sativa</i> L. | Medicago | | Fabaceae | Seed | Oral | 71 |
| <i>Vicia sativa</i> L. | Vicia | | Fabaceae | Seed | Oral | 71 |
| <i>Melilotus alba</i> L. | Melilotus | | Fabaceae | Seed | Oral | 71 |
| <i>Trigonotis foeniculis</i> L. | Trigonotis | | Fabaceae | Seed | Oral | 71 |
| <i>Cicer arietinum</i> L. | Cicer | | Fabaceae | Seed | Oral | 71 |
| <i>Hordeum vulgare</i> L. | Hordeum | | Gramineae | Leaf | Oral | 71 |



Breastfeeding: A Review of Its Physiology and Galactagogue Plants in View of Traditional Persian Medicine. Javan, Javadi & Feyzabadi (2017). *Breastfeeding Medicine*.

Barley leaf extract research




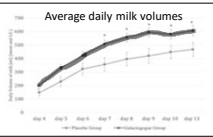
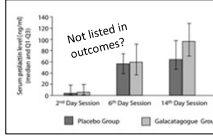
Vitamin E analog (*α-tocopherol succinate*) from the extract stimulated release of Prolactin and/or Growth Hormone in rat pituitary cells

Badamchiane et al. (1994). Isolation of a vitamin E analog from a green barley leaf extract that stimulates release of prolactin and growth hormone from rat anterior pituitary cells in vitro.

alibaba.com/product-detail/low-price-pure-leaf-extract-green_6092544045.html

Commercial blend of Barley malt + lemon balm (Poland)

- N=80 Mothers/parents of infants <37 weeks,
- Excluded hypothyroid or diabetes
- Enrolled first 2 days postpartum
- Pumping 6x/24 hrs
- 1 packet BID x 14 days
- Primary outcome: total expressed milk volume day 2→14
- Secondary outcome: safety

| The values of expressed breastmilk (mL) | Placebo group (n = 40) | | Galactagogue group (n = 40) | | t | p |
|---|------------------------|-----------|-----------------------------|-----------|------|------|
| | M ± SD | 95% CI | M ± SD | 95% CI | | |
| Total expression time (min) | 2211 ± 114 | 1980-2442 | 2280 ± 123 | 2051-2510 | 0.41 | 0.68 |
| Number of expression sessions (n) | 102 ± 7 | 78-98 | 105 ± 7 | 81-90 | 1.11 | 0.27 |
| Duration of the study (days) | 12 ± 0.2 | 11.3-12.2 | 12 ± 0.2 | 11.6-12.3 | 0.84 | 0.40 |

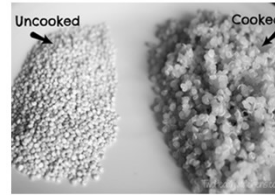
Wesolowska et al. (2021). Barley malt-based composition as a galactagogue - a randomized, controlled trial in preterm mothers. *Ginekol Pol*,

Lactogenic Foods



Found largely in the Andean regions of Peru, Bolivia, Ecuador and Colombia

Contains isoflavones
genistein and daidzein



- Per 1 cup or 185g:
- ✓ Complete protein (8g)
 - ✓ Fiber (5g)
 - ✓ Magnesium (30% RDA)
 - ✓ Folate (19% RDA)
 - ✓ Copper (18% RDA)
 - ✓ Iron (15% RDA)
 - ✓ Zinc (13% RDA)

Lutz et al. (2013). Daidzein and Genistein contents in seeds of quinoa (*Chenopodium quinoa* Willd.) from local ecotypes grown in arid Chile. *Industrial Crops and Products*, 49, 117-121.
Zhang et al. (1995). Daidzein diet promotes mammary gland development and lactation in pregnant rat. *Dong wu xue bao. [Acta zoologica Sinica]*

Quinoa

“Eaten by 10% of nursing mothers in Peru for milk production” - Ayala 2003

“Special soaked grain preparations of high mineral content-- particularly millet and quinoa--were fed to lactating women to increase milk supply.”
-Fallon, 1999

| Quinoa, uncooked | | | | |
|---|-----------|------|------------------|---------------------------------|
| 0.25 cup 185.00 grams 222.00 calories | | | | |
| Nutrient | Amount | DV | Nutrient Density | World's Healthiest Foods Rating |
| manganese | 1.17 mg | 58.5 | 4.7 | very good |
| tryptophan | 0.10 g | 31.2 | 2.5 | good |
| magnesium | 118.40 mg | 29.6 | 2.4 | good |
| phosphorus | 281.20 mg | 28.1 | 2.3 | good |
| fiber | 5.18 g | 20.7 | 1.7 | good |
| folate | 77.70 mcg | 19.4 | 1.6 | good |
| copper | 0.36 mg | 18.0 | 1.5 | good |

| World's Healthiest Foods Rating | Rule |
|---------------------------------|---|
| excellent | DV ₁ >=75% OR Density >=7.0 AND DV ₂ >=10% |
| very good | DV ₁ >=50% OR Density >=3.4 AND DV ₂ >=5% |
| good | DV ₁ >=25% OR Density >=1.5 AND DV ₂ >=2.5% |

<http://www.whfoods.com/genpage.php?tid=142&name=foods&nutrition=profile>

Traditionally consumed in soup

“The most frequently mentioned item (67%) was quinoa soup” and HCPs most often recommend quinoa when milk production is not sufficient – Monteban 2017

“Women who have just given birth are served a broth of quinoa if they have problems with their milk.” - Froemming, 2006

Suggested dosage: 45g daily (Nice 2015)

Chickpeas (garbanzo beans)

| GALACTOOGUE PLANTS IN TRADITIONAL MEDICINE | | | | | |
|---|--------------|--------------|--------------|------------|----------------|
| TABLE 1. MEDICINAL PLANTS USED FOR THE ENHANCEMENT OF LACTATION | | | | | |
| Scientific name ^a | Common name | APIC name | Family | Parts used | Administration |
| <i>Fenugreek</i> | Trigonon | Rubiac | Leguminosae | Seeds | Oral |
| <i>Asparagus officinalis</i> L. | Asparagus | Asparagaceae | Asparagaceae | Seeds | Oral |
| <i>Psoralea corylifolia</i> L. | Asafoetida | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Medicago sativa</i> L. | Alfalfa | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Melilotus alba</i> L. | Black clover | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Medicago sativa</i> L. | Alfalfa | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Trigonon</i> | Fenugreek | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Psoralea corylifolia</i> L. | Asafoetida | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Chickpea</i> | Garbanzo | Leguminosae | Leguminosae | Seeds | Oral |
| <i>Cicer arietinum</i> L. | Chickpea | Leguminosae | Leguminosae | Seeds | Oral |

| TABLE 2. CLINICAL TRIALS | | | | | |
|--------------------------|--|--------------|--|--|-----------|
| Plant | Recommended dosage | Study design | Extract | Findings | Reference |
| <i>Melilotus alba</i> L. | A total of 100g of extract from <i>Medicago sativa</i> L. (10g) and <i>Trigonon</i> (90g) was administered 3 times a day for 4 weeks | In vivo | Extract from <i>C. corylifolia</i> L. and <i>M. sativa</i> | Increase of daily milk production and milk lactin levels in control cows had a 20% daily, 12-25% and 3-15% increase respectively | 72 |
| <i>F. officinalis</i> L. | A total of 20 to 30g/day | In vitro | Chickpea extract | Enhancing milk synthesis by proliferation of MCF-7 cells, and by binding to ER and to an agent for ER | 73 |
| <i>Chickpea</i> | The dose of chickpea, 1 and 10g/100g of milk, was administered 3 times a day for 4 weeks | In vivo | Chickpea extract | Plasma prolactin concentrations during and after suckling were similar | 74 |
| <i>Chickpea</i> | 100g of chickpea extract was administered 3 times a day for 4 weeks | In vitro | Chickpea extract | Enhancing milk synthesis by proliferation of MCF-7 cells, and by binding to ER and to an agent for ER | 75 |

- ✓ Same family as fenugreek
- ✓ Estrogenic activity in rats
- ✓ Mentioned in Javan 2017, Nice 2015

Lentils

Alp Yilmaz & Polat. (2018). Individual Applications of Turkish Lactating Women to Increase their Breastmilk Production. *Journal of Current Researches on Health Sector*.
Bnouham, M. (2010). Medicinal Plants with Potential Galactagogue Activity Used in the Moroccan Pharmacopoeia. *Journal of Complementary and Integrative Medicine*.
Aldana, Engelsmann & Hasan. (1999). Dietary management during pregnancy, lactation and common childhood illnesses in rural Bangladesh. *Southeast Asian J Trop Med Public Health*



High in fiber, protein, iron, B-1, folate, magnesium

Lactogenic Foods

Mung Beans

Ososki 2003- Coumestans are found in legumes, particularly food plants such as sprouts of alfalfa and mung bean

Mentioned for lactation in Sojaii 2013 (Iran) Nice 2015



Oats

- High in iron, fiber
- Listed as a galactagogue in botanical surveys

Properties:

- Antidepressant
- Antianxiety
- Diuretic
- Thyroid/pituitary supportive

Abu-Rabia, 2005: Herbs as a Food and Medicine Source in Palestine

Acharya 2010: Traditional Knowledge on medicinal plants used for the treatment of livestock diseases in Sarkikhola VDC, Kaski, Nepal

Monteban 2017: Maternal Knowledge and Use of Galactagogues in Andean Communities of Cusco, Peru. *Ethnobiology Letters*, 8(1), 81-89.

Yashmin 2017: Islamic and cultural practices in breastfeeding. *Australian Midwifery News*, 17(1), 49.

Cultural Favorites



Oats/Oatmeal (proteins, vitamins, minerals and trace elements)



Brewer's Yeast New Review Jia 2021

- ✓ *Saccharomyces cerevisiae* yeast= (SCY) used for brewing ale versus
- ✓ *Saccharomyces cerevisiae* yeast supplement= (SCYS) inactive form of SCY, typically used as human dietary supplement
- ✓ Reportedly high in protein, B vitamins, minerals, beta-glucan (immune system modulation), mannan oligosaccharides, organic chromium (better digestibility)

[What Is the Difference Between Baker's Yeast and Nutritional Yeast? | CulinaryLore.com](https://culinarylore.com/what-is-the-difference-between-baker-s-yeast-and-nutritional-yeast/)



Jia, Brough, & Weber (2021). *Saccharomyces cerevisiae* Yeast-Based Supplementation as a Galactagogue in Breastfeeding Women? A Review of Evidence from Animal and Human Studies. *Nutrients*, 13(3).

Sources of SCYS:



Marketed as "nutritional brewer's yeast" or "brewer's yeast"

- Spent yeast from brewing
- Yeast from fermentation with malted barley

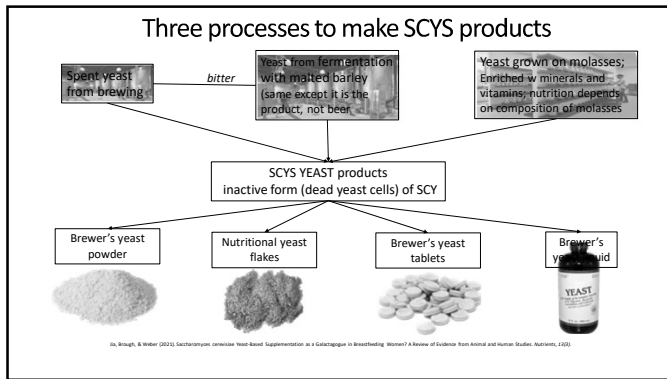
Sources of SCYS:



"nutritional yeast" or "brewer's type yeast"

- Yeast grown on molasses

Lactogenic Foods



Nutritional content of selected products

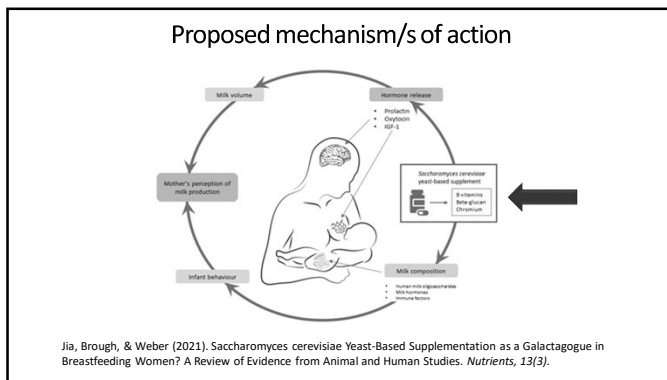
Differences in nutritional content vary by:

- ✓ Different strains
- ✓ Fermentation process
- ✓ Growing medium
- ✓ Any enrichment

| Nutrients | Content* µg/g Dry Yeast | | | | |
|------------------|----------------------------------|----------------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| | Product 1* Brewer's Yeast Powder | Product 2* Brewer's Yeast Powder | Product 3* Brewer's Yeast Powder | Product 4* Nutritional Yeast Flakes | Product 5* Nutritional Yeast Flakes |
| Thiamin | 10 | 30 | 20 | 666.7 | 1500 |
| Riboflavin | 30 | 60 | 60 | 666.7 | 5 |
| Niacin | 190 | 333.3 | 300 | 3555.6 | 1500 |
| Vitamin B6 | 5 | 30 | 30 | 666.7 | 666.7 |
| Vitamin B12 | 11.4** | 14.2 | 13.3 | 1.6 | - |
| Folate (DFE) | - | 100 | - | - | 2333.3 |
| Pantothenic acid | - | 0.3 | 0.3 | - | 1 |
| Calcium | - | 1500 | 753.3 | 666.7 | 1733.3 |
| Iron | 20 | 40 | 40 | 55.6 | 466.7 |
| Zinc | - | 166.7 | - | - | 2000 |
| Selenium | - | 2.2 | - | - | 1.4 |
| Chromium | - | 0.43 | - | - | 0.3 |

DFE, dietary folate equivalent. * Product numbers match the numbers in Table 1. Nutrition information was accessed on 4 June 2020. ** On websites, the values were provided as folic acid; we calculated DFE = 1 µg DFE = 0.4 µg folic acid [19].

Jia, Brough, & Weber (2021). Saccharomyces cerevisiae Yeast-Based Supplementation as a Galactagogue in Breastfeeding Women? A Review of Evidence from Animal and Human Studies. *Nutrients*, 13(3).



Selected dosages found on internet

| Author or Source | Product Information | Dose (g/Day) | Format of the Supplement | Ingestion Method | Claimed Benefits |
|--|---|---|--------------------------|--|--|
| Amye Smith, BCLC 1 | Brewer's yeast | 2.7 (3000 mg tablets) or 4.5 (500 mg tablets) | Tablets | 3 tablets taken with meals, 3 times per day | Increase milk production, contains B vitamins |
| Diana Murray RN, Reviewed by Mowell (Ohio, MS) | Brewer's yeast | No information | Tablets or powder | No information | Increase milk supply, improve mood and baby sleep |
| Robin Carter, BCLC, Reviewed by Britta Viskard, BCLC 7 | Brewer's yeast used in brewing and making bread, but different from baker's yeast | 30 g** | Unlabeled powder | Add to cookies or water, 3 tablespoons per day, can increase the quantity by half an teaspoon a day if not working any improvement | Anecdotally increases milk supply, improves glucose tolerance in diabetics, considered as a nutritional supplement for B vitamins and selenium |
| Kelly Winkler, BCLC 4 | Brewer's yeast Great substitute with baker's yeast or nutritional yeast | Unclear*** | Powder or flake | As an ingredient in lactation cookie recipe, 1-2 tablespoons per recipe, 2 cookies per day | Boost breast milk supply |
| Madeira, breast pump manufacturers? | Brewer's yeast | Unclear*** | Powder | As an ingredient in lactation cookie recipe, 5-6 tablespoons per recipe, one substitution of low sugar cookies to take per day | Increase breast milk supply |
| Cristal Karpis, BCLC, BCLC 2 | Brewer's yeast (can be substituted by nutritional yeast) | Unclear*** | Powder | As an ingredient in lactation cookie, 6-8 tablespoons per recipe, 2 cookies per day | Naturally help support milk supply, offer a source of B vitamins, iron and other nutrients |

Jia, Brough, & Weber (2021). Saccharomyces cerevisiae Yeast-Based Supplementation as a Galactagogue in Breastfeeding Women? A Review of Evidence from Animal and Human Studies. *Nutrients*, 13(3).

- ### Theoretical safety issues
- ❑ Nutrient variations- too much of a high nicotinic or folic acid product could be problematic
 - ❑ Possible contamination with mycotoxins
 - ❑ May contain large amounts of tyramine- interact with monoamine oxidate inhibitors (MAOIs)
 - ❑ Could aggravate inflammatory bowel diseases like Crohns
 - ❑ Occasional minor complaints like skin rash, constipation, decreased appetite
- Jia, Brough, & Weber (2021). Saccharomyces cerevisiae Yeast-Based Supplementation as a Galactagogue in Breastfeeding Women? A Review of Evidence from Animal and Human Studies. *Nutrients*, 13(3).

14 LACTATION COOKIE RECIPES


a biscuit to help boost and maintain a breastfeeding mothers milk supply

theorganicdoughwife.com.au/recipes/lactation-cookies/

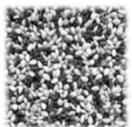
SOPHIE'S REALITY'S MILK & COOKIES, @SOPHIE24


Lactogenic Foods

Cultural Favorite Foods




Sesame seed
(ajonjolli)






Halva
Ergol 2016



Source of
calcium

Ginger

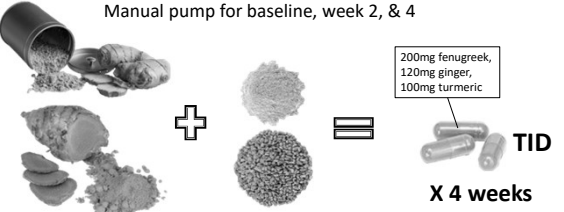


- N=63, 30 ginger, 30 placebo
- 500mg BID x 7 from day 3.
- Used "1 hr production"
- Checked prolactin
- Higher day 3 milk volume but not day 7

Paritakul et al. (2016). The Effect of Ginger on Breast Milk Volume in the Early Postpartum Period: A Randomized, Double-Blind Controlled Trial. *Breastfeed Med.*

Fenugreek, Ginger & Turmeric

N=50 healthy exclusively bfg parents 1 mo pp, age 20-40
Manual pump for baseline, week 2, & 4



200mg fenugreek,
120mg ginger,
100mg turmeric

TID

X 4 weeks

Bumrungpert et al. (2018). Effects of Fenugreek, Ginger, and Turmeric Supplementation on Human Milk Volume and Nutrient Content in Breastfeeding Mothers: A Randomized Double-Blind Controlled Trial. *Breastfeed Med*, 13(10).

Fenugreek, Ginger & Turmeric

| Time | Milk volume (ml/day) | | p | Milk volume (% change) | | p |
|--------|--------------------------|----------------|--------|--------------------------|----------------|--------|
| | Herbal supplement (n=25) | Placebo (n=25) | | Herbal supplement (n=25) | Placebo (n=25) | |
| Week 0 | 710±216 | 736±179 | 0.425 | — | — | — |
| Week 2 | 1030±204* | 805±181 | 0.003 | 49±12* | 11±20 | <0.001 |
| Week 4 | 1279±212* | 896±185 | <0.001 | 103±38* | 24±22 | <0.001 |

*Significant differences at p < 0.05.

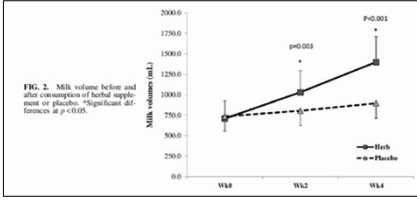




FIG. 2. Milk volume before and after consumption of herbal supplement or placebo. *Significant differences at p < 0.05.

Basils



Lemon Basil




Thai Basil

Buntuchai 2017: The results revealed that consumption of some traditional galactagogues was significantly correlated to human milk volume, including **banana flower, lemon basil, Thai basil, bottle gourd, and pumpkin** (p < .05).

Photo by zoyachubby/Courtesy Flickr
<http://www.flickr.com/photos/zoyachubby/>

Pumpkin

Buntuchai 2017: The results revealed that consumption of some traditional galactagogues was significantly correlated to human milk volume, including **banana flower, lemon basil, Thai basil, bottle gourd, and pumpkin** (p < .05).



http://www.buonissimo.org/rubriche/13175_Zucca_caratteristiche_e_ricette

Lactogenic Foods

Bottle Gourd



Buntuchai 2017: (JHL) The results revealed that consumption of some traditional galactagogues was significantly correlated to human milk volume, including **banana flower, lemon basil, Thai basil, bottle gourd, and pumpkin** ($p < .05$).

etsy.com/sg-en/listing/723867297/bottle-gourd-nam-tao-yao-asian-vegetable



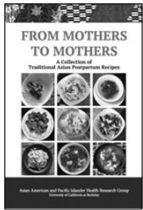
Chocolate

Positive Reputation:
Grivetti, LE. (2005). A Cultural History of Chocolate. *Karger Gazette*(68), 1-4.

Negative Reputation: "Large amounts of caffeinated soda, coffee, tea, and chocolate results in low production of milk".
Zaidi, Z. (2021). Use of a classical Unani formulation in Qillat-e Laban (Hypogalactorrhoea) *World Journal of Pharmaceutical Research*

Reported problems in lactation:
"Maternal chocolate and coffee consumption was associated with increased infant colic, and severe to moderate exacerbation of infant atopic dermatitis."
McCreeley et al. (2018). Effects of maternal caffeine consumption on the breastfed child: a systematic review. *Swiss Med Wkly*

Cultural Foods: Soup!



Postpartum traditions



Seaweed soup
(iodine, iron)



Torbangun Leaf soup
Coleus amboinicus Lour
(Bataknese traditional soup)

Torbangun research (*Coleus amboinicus* Lour)

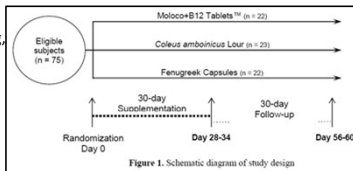
Three randomized groups of 25 each

Moloco+B-12 (placental extract 15mg, B-12 20µg) 1 TID

Torbangun soup- 150g leaves/day of soup

Fenugreek capsules – 1 x 600mg cap TID

30 day supplement started day 2, 60 day tracking

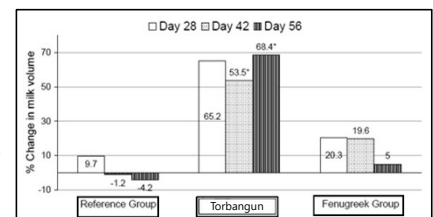


Damanik, R. (2006). Lactagogue effects of Torbangun, a Bataknese traditional cuisine.

Torbangun

"Since Fenugreek seems to have no effect on breast milk quantity, the effect on quality has not been further studied."

600 mg TID ?!



At day 28:
Moloco group up ↑ 10%
Torbangun ↑ 65%
Fenugreek group ↑ 20%

Lactogenic Foods

Chicken soup!

Egol et al. (2016). A review of traditional knowledge on foods and plants supposed to increase lactation in pregnant women; a descriptive study. *African Journal of Traditional, Complementary & Alternative Medicines*, 13(3), 27-32.

Monteban, M. (2017). Maternal Knowledge and Use of Galactagogues in Andean Communities of Cusco, Peru. *Ethnobiology Letters*, 8(1), 81-89.

Brotto et al. (2015). Use of galactagogues in breastfeeding management: integrative literature review. *Revista de Pesquisa: Cuidado é Fundamental Online*, 7(1), 2169-2180.



Pig's feet



Kim, et al. (2013). The Effects of Pigs' Feet Consumption on Lactation. *Ecol Food Nutr*, 52(3), 223-238.

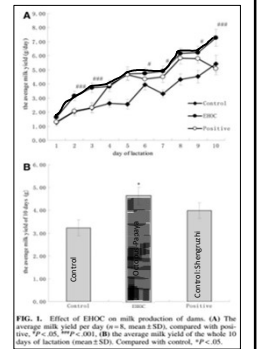
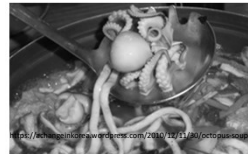
Pork Leg Soup Xu 2000



Pork leg soup
(500g, salt 3g,
spring onion a
little, 3000 water)

Green papaya and Octopus soup Cai 2015

Traditional Chinese Medicine soup
Fed to rats day 10 preg to day 10 lact
"Beneficial effects on milk production"



Cultural Favorite drinks



Green drinks- reputed to increase fat in milk
May include barley-grass, malt, alfalfa leaf, kelp, spirulina, oat-straw




Cultural Favorite drinks



Atole con avena,
arroz, maize
Or how about
sésamo, quinoa

Lactogenic Foods

Beer:
Myth or Fact?



Cultural Favorite drinks

Grossman, E. (1988). Beer, breast-feeding, and the wisdom of old wives. *JAMA*, 259(7), 1016.



Koletzko, B., & Lehner, F. (2000). Beer and breastfeeding. *Adv Exp Med Biol*, 478, 23-28.

Mennella, J. A., & Beauchamp, G. K. (1993). Beer, breast feeding, and folklore. *Dev Psychobiol*, 26(8), 459-466.

Milligan, S. R., Kalita, J. C., Heyerick, A., Rong, H., De Cooman, L., & De Keukeleire, D. (1999). Identification of a Potent Phytoestrogen in Hops (*Humulus lupulus* L.) and Beer. *J Clin Endocrinol Metab*, 84(6), 2249-.

Sawagado, L., & Houdebine, L. M. (1988). Identification of the lactogenic compound present in beer. *Ann Biol Clin (Paris)*, 46(2), 129-134.


Beer:
Barley, Malt, Brewer's yeast, Hops (B-complex)


~NON-ALCOHOLIC ACCEPTABLE~

MOBI favorite: Barley water


½ cup barley in 3 cups water overnight
OR Boil 20 min
Strain
Pour 1 cup over 1 tsp fennel seeds & steep 30 min
Can sweeten with cinnamon



Drink more water...




Ndikom, Fawole & Ilesanmi. (2014). Extra fluids for breastfeeding mothers for increasing milk production. *Cochrane Database Syst Rev*, 6, Cd008758.



Palm Dates
Phoenix dactylifera

Contain

- iron
- protein
- fiber
- glucose
- vitamins
- biotin
- niacin
- folic acid
- calcium
- potassium



Yulinda 2017; Tafriishi 2020

Palm date research

*Halimah, S. W., Kriskiana; Ta'adi. (2022). Drink combination made from Fenugreek seeds and Phoenix dactylifera to increase prolactin hormone levels in postpartum mothers and its impact on baby weight. *Medisains*, 20(2), 43-47.

*Modepeng, T., Pavadhgul, P., Bumrungpert, A., & Kitipichai, W. (2021). The Effects of Date Fruit Consumption on Breast Milk Quantity and Nutritional Status of Infants. *Breastfeed Med*.

Jannah, S. R. W., Melyana Nurul. (2017). Comparing effectiveness of Palm Dates and Oxytocin Massage in stimulating breastmilk production of postpartum mother. Paper presented at the 2nd International Conference on Applied Science and Health.

Suyati, S., Roudhotul J, S., & Fitriani, Y. (2016). The Effect Of Date Palm For The Smoothness Of Breast Milk On Post Partum Maternal. Paper presented at the The Proceeding of 7th International Nursing Conference: Global Nursing Challenges in The Free Trade Era, Surabaya.

*El Sakka, A., Salama, M., & Salama, K. (2014). The Effect of Fenugreek Herbal Tea and Palm Dates on Breast Milk Production and Infant Weight. *Journal of Pediatric Sciences (ISSN: 1309-1247)*, 6(e202).

*Yulinda, D., & Azizah, I. (2017). The effect of date palm juice on prolactin and milk output in postpartum mothers at BPM Pipin Heriyanti Yogyakarta 2017. *Media Ilmu Kesehatan*, 6(3), 195-198.

Lactogenic Foods

El Sakka 2014, Egypt Palm dates vs fenugreek



N=75 recruit @ birth, no prob
 1. Group 1: 1 cup (2g) fenugreek seed tea TID
 2. Group 2: 10 palm dates TID= 30
 3. Control: nothing
 Duration 14d

Compared milk volume day 3, Infant weights day 3, 7, and 14

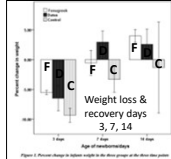
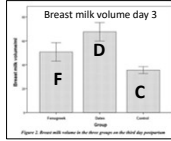
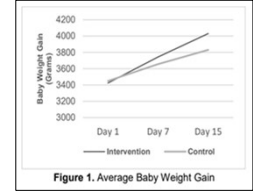


Table 3. Comparison of the change in weight as a percentage from the birth-weight and the amount of breast-milk at the three different time-points in the study groups.

| | Fenugreek | | Dates | | Control | | F value | P |
|--|-----------|------|-------|------|---------|-----|---------|--------|
| | Mean | SD | Mean | SD | Mean | SD | | |
| Percent change of weight after 3 days | -6.5 | 5.3 | 2.9 | 4.5 | -3.3 | 5.2 | 10.00 | <0.001 |
| Percent change in weight after 7 days | 4.0 | 2.3 | 2.9 | 6.2 | -4.9 | 14 | 1.903 | 0.156 |
| Percent change in weight after 14 days | 30.3 | 18.8 | 37.6 | 18.8 | 15.5 | 7.0 | 25.902 | <0.001 |

2022 Date + Fenugreek seed drink product



- ✓ Small increase in prolactin, non-significant
- ✓ Modest increase in infant gain, p<0.001

Halimah, Kristiana & Ta'adi. (2022). Drink combination made from Fenugreek seeds and Phoenix dactylifera to increase prolactin hormone levels in postpartum mothers and its impact on baby weight. *Medisains*.

Modepeng 2021- Just dates



TABLE 4. BREAST MILK QUANTITY AT WEEK 0 AND 4 IN THE TWO GROUPS

Total breast milk quantity (mL/day)

| Group | Baseline (week 0) | | | Week 4 | | | p-Value |
|------------|-------------------|--------------|--------|-----------|--------------|--------|---------|
| | Mean ± SD | Min-Max | Median | Mean ± SD | Min-Max | Median | |
| Date Eater | 282.99 | 120.0-1110.0 | 580.0 | 244.60 | 400.0-1310.0 | 750.0 | 0.001 |
| Control | 234.58 | 225.0-1080.0 | 545.0 | 218.02 | 335.0-1055.0 | 555.0 | 0.059 |

p-Value (Wilcoxon matched pairs signed-ranks test).
 SD, standard deviation.

Modepeng et al. (2021). The Effects of Date Fruit Consumption on Breast Milk Quantity and Nutritional Status of Infants. *Breastfeed Med*.

Green papaya (B) *Carica papaya*

Ethnobotanical:


- ✓ Traditional use across Asia
- ✓ Vitamins & minerals including C, A, B, & E
- ✓ Must be hard, unripe, then cooked
- ✓ Or can be taken as supplement
- ✓ Caution if taking warfarin or allergic to latex



Green papaya salad



Lactogenic Foods



Green Papaya Soup

Chicken Soup

- ✓ Young, green papaya
- ✓ Fresh ginger
- ✓ Black sesame oil
- ✓ Whole chicken

How to Make Postpartum Green Papaya Chicken Soup

How to Make Postpartum Green Papaya Chicken Soup — Stir and Style

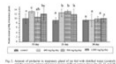
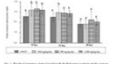
Papaya research- varied

Lubis, K., & Selviarin, S. (2020). Comparison of *Vigna cylindrica* leaves and *Carica papaya* leaves as Indonesian traditional plants to increase breast milk volume. *Blossom: Journal of Midwifery*, 3(3), 1-7. Leaf infusion day 2-9; no difference in output, no control.

Ikhlasiah, M., Winarni, L. M., Poddar, S., & Bhaumik, A. (2020). The effects of papaya leaf juice for breastfeeding and working mothers on increasing prolactin hormone levels and infant's weight in Tangerang. *Enfermeria Clinica*, 30, 202-205. 10 mothers, 0-6mos, LMS.

Kharisma, Y., Ariyoga, A., & Sastramihardja, H. S. (2011). Effect of Unripe Papaya (*Carica papaya* L.) Aqueous Extract on Histological Feature of Mice Lactating Mammary Glands. *Majalah Kedokteran Bandung*, 43(4), 160-165. 20mg/30gBW/d milk production measured by mammary alveolar amounts and diameter count; 3 group: control + luteotropin (PRL) + papaya; PRL & papaya similar results

Tossawanchuntra, G., & Aritajat, S. (2005). Effect of aqueous extract of *Carica papaya* dry root powder on lactation of albino rats. *Acta Horticulturae(678)*, 85-90. ↑ mammary wt, mammary PRL

Banana Blossom

(*Musa paradisiaca* or *Musa balbisiana* Colla)

Lactogenic components (Kairani 2021)

- Flavonoids
- Tannins
- Alkaloids
- Saponins

Antioxidants
Vasodilatory
Rich in fiber and protein



By Ksoma Loho-unchit. Used with permission.



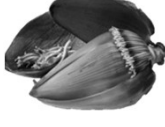
Buntuchai 2017: The results revealed that consumption of some traditional galactagogues was significantly correlated to human milk volume, including banana flower, lemon basil, Thai basil, bottle gourd, and pumpkin (p < .05).

Banana Flower/ Blossom




| Banana blossom research | | | | | |
|----------------------------|----------------------------|---|-----------------------------|--|---|
| Study/date | Subj | Form & dose | Time/duration | outcome | Results |
| Mahmood 2012 Malaysia | Rats N=20 | Alcohol vs petroleum ether vs water extract vs control (water), 500mg/kg <i>Musa paradisiaca</i> (flower) | Day 5-14 of lactation (10d) | % increment production | Aqueous ↑ 25% Petroleum ether ↑ 18% Alcohol ↓ 1% Control -- |
| Wayuningsih 2017 Indonesia | Hum N=16 | <i>Musa balbisiana</i> Colla (flower) extract, 2 capsules/day vs none | Day 5-12 pp | Avg bflg min/day Mean milk volume Prolactin incr bfl/aft | Experimental / Control 235 / 182 470ml ± 66 / 364 ± 114 35ng ± 40 / -38ng ± 61 |
| Nordin 2020 Malaysia | Hum N=58 RCT Babies 2-6 mo | Biscuits (cookies) made from 50/50 wheat and banana blossom (<i>Musa paradisiaca</i>) flour, 3.24g per 2 biscuits per day x 1 month | 1 mo | Expressed milk volume start and end | Placebo: 377 ml ± 13 Experim: 437 ml ± 13 |
| Okinarum 2020 Indonesia | Hum N=60 <6mo | <i>Musa balbisiana</i> Colla tea, 2.5g/bag BID | 7 days | Prolactin before ingestion D1 and after ingestion D7 | Exp up 31% PRL level |
| Yimyam 2022 Thailand | Hum N=60 RCT | Commercial beverage 14mg/BB in 100ml bottle | First 3 days PP | "Milk flow" and milk volume | Volume day 3 Experimental: mean 42ml Placebo: mean 25 ml p<.001 |
| Yimyam 2023 Thailand | Hum pret N=40 RCT | Banana flower beverage | First 3 days PP | Milk volume | "higher milk production" day 2 & 3 |

Banana blossom flour cookies!



Nordin, Bakac, Omar & Mahmood. (2020). Effect of consuming lactogenic biscuits formulated with banana (*Musa paradisiaca*) flower flour on expressed breast milk (EBM) among lactating working women. *Food Research*










Image from: Tassan et al. (2020). Nutritional, textural and sensory quality of plain like enriched with rice bran water treated Banana Blossom Flour. *Journal of Agriculture and Food Research*

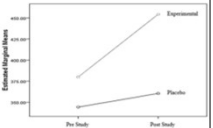
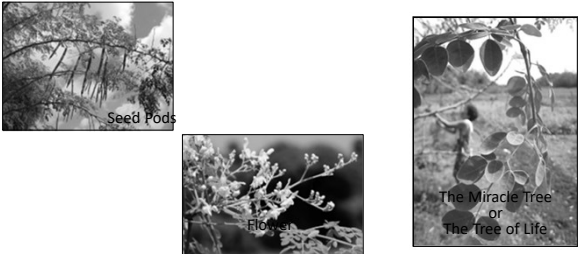


Figure 1. The difference amount of EBM before and after consuming biscuits between the placebo and the experimental groups.

Lactogenic Foods

MALUNGAY/MORINGA *Moringa oleifera*



Seed Pods

Flower

The Miracle Tree or The Tree of Life

Also known as drumstick, horseradish tree, kelor




MORINGA

Ethnobotanical:
Grown and used in the Philippines, Africa, Ghana, Malaysia and elsewhere as a food. Specially valued in the Philippines for lactogenic properties; Filipino families plant in backyards during pregnancy.

MORINGA

Properties:

- ✓ Anti-diabetic
- ✓ Anti-oxidant
- ✓ Anti-inflammatory
- ✓ Anti-cancer
- ✓ Anti-thyroid (rats)
- ✓ Nutritive functional food



Ma et al. (2019). Evaluation of phytochemical and medicinal properties of Moringa (*Moringa oleifera*) as a potential functional food. *South African Journal of Botany*.

Tahiliani, P., & Kar, A. (2000). Role of *Moringa oleifera* leaf extract in the regulation of thyroid hormone status in adult male and female rats. *Pharmacol Research*.

MORINGA NUTRITION



4 X MORE FIBER THAN OATS

4 X MORE POTASSIUM THAN BANANAS

4 X MORE CALCIUM THAN MILK

9 X MORE IRON THAN SPINACH

2 X MORE VITAMIN A THAN CARROTS

Adoption of *Moringa oleifera* to Somalia under nutrition, viewed through the lens of the "Diffusion of Innovations" theory. Thurber, & Fahcy (2009)


Gram per Gram Comparison*

MORINGA

Side-effects:

- ✓ None reported
- ✓ Caution for use of supplement form if hypothyroid
- ✓ Caution if taking warfarin

Safety:
Humphrey A, BSH n/a
Rat study found no overt adverse reactions in acute and subacute studies.



Asiedu-Gyekye et al. (2014). Micro- and Macroelemental Composition and Safety Evaluation of the Nutraceutical *Moringa oleifera* Leaves. *J Toxicol*, 2014, 786979.

MORINGA

Indications

- ✓ Nutritional deficiencies
- ✓ GDM/ Insulin resistance
- ✓ Great general galactagogue!

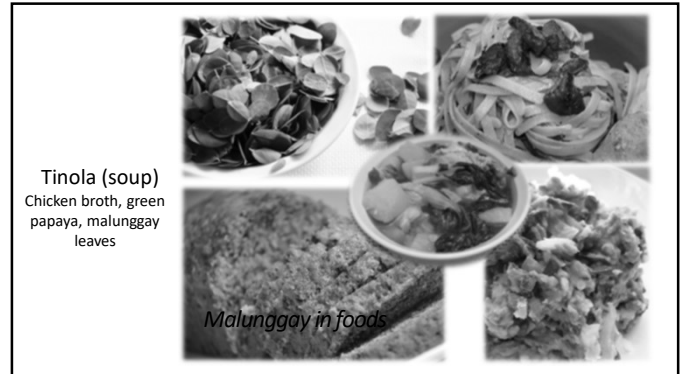


Lactogenic Foods

MORINGA

Forms & Dosages

- ✓ Fresh leaves: 10g per day for pregnancy and lactation
- ✓ Tincture: ML 4-6 caps/d
- ✓ Powder: ¼ tsp = 350mg capsule
¼ - 1 tsp 2-3x/day
- ✓ Capsules: 1-3 350mg caps 2-3x/day
- ✓ Tea: 3-5 cups/day



Tinola (soup)
Chicken broth, green papaya, malunggay leaves

Malunggay in foods

Is there any galactagogue research? Lots of it!



So how come it doesn't show up in any of the galactagogue reviews?

| Study | Subjects | Form & Dose | Start & Duration | Outcomes | Results |
|----------------------------------|---|---|----------------------------|--|---|
| Khairani 2017 Indonesia | N=24 PIMS 4-arm study | 250mg, 350mg, or 450mg TID | Unknown 30 days | Perceived milk volume | All dosages helped, higher helped more |
| By 2012 Philippines | N=17 excl bfg mothers, term infant, 2wks-6mo | 250mg cap moringa powder BID, 10mg domperidone TID | Enrollment 7 days | Change in milk volume- 24 hour extrapolated | Malunggay increased more than with domperidone, but overall change considered nonsignificant |
| Iginosa-Kuo 2005 Philippines | N=82 term healthy mothers | 2 350mg caps moringa powder daily vs placebo | DOL 3 8 days | Change in milk volume, pump 5 ea q4hrs | Malunggay 96>296ml |
| Birton-Medrano 2004 Philippines | N=52 healthy pregnant women | 2 350mg cap moringa powder or placebo TID | 35 wks gest Until delivery | Time to onset of sign. >10mls and adequate >30mls production/ Milk volume DOL 1,2 | Time to >10mls 21hrs mor vs 33 pl Time to >30mls 13hrs mor vs 41 pl Volume moringa 9.2-9.97mls Volume placebo 3.4-9.17mls |
| Co 2002 Philippines | N=40 preterm mothers <37 wks; milk <100mls DOL2 | Moringa 250mg TID Domperidone 10mg TID; metoclopramide 10mg TID | DOL 3 24 days | Milk volume, prolactin DOL 7, 24, Pump q4hrs 10-15 min x 2 wks, Gerber battery | Milk volume: Malunggay 20>180>205 Domperidone 16>335>391 Metoclopramide 43>285>321 |
| Sakhibo 2001 Philippines | N=60 healthy term mothers 4-arm | Moringa 250mg either once or twice daily, placebo same | DOL1 8 weeks | Compare dosages Infant length & weight | Infant weight gain significantly higher in moringa BID group, followed by moringa daily, placebo |
| Enrolla 2009 Philippines | N=68 preterm mothers <37 wks | Moringa 250mg BID Or placebo BID | DOL 3 DOL 3-5 | Milk volume Pump q4hrs | Moringa 11.4mls>100>120 Placebo 87>123>120 |
| Yebes-Almirante 1996 Philippines | N=30 hypertensive mothers | Moringa 250mg BID Or placebo | Delivery 4 mos | Prolactin 6h, 48h, 4mo Infant wt birth, week 1, 2, 4 and 4 mos Milk volume mo 1, 2, 4 | PRL placebo 5804>3478>810 infant wt gain birth to 4 mos: Moringa 114% Placebo 72% Milk vol Moringa 324>485>495 Milk vol placebo 245>335>355 |
| Yebes-Almirante 1996 Philippines | N=136 normal term mothers | Moringa 250mg BID | Delivery 4 mos | Prolactin 6h, 48h, 4mo Infant wt birth, week 1, 2, 4 and 4 mos Time to engorgement 24, 48, >48hrs; time to letdown 48, 72, 86 hrs | Prolactin: moringa 5808>5236>2388; placebo 5134>3398>504 mIU Time to engorgement, letdown, same. Infant wt 234% mor vs 21% pl |

| Study | Subjects | Form & Dose | Start & Duration | Outcomes | Results |
|--------------------------------|---|----------------------------------|--------------------|--|--|
| Fungtammaman 2021 Thailand RCT | N=88 full term, healthy | 450mg capsules 1 cap BID | Birth x 3 days | Milk volume day 3 Br fullness, mat 1 satisfaction, quality of life, side effects, lact bfg @ 6 mo | Amt of bm higher than control Moringa group met 6 mo goal |
| Sumami 2020 | ? | 50g moringa cookies | | Bm quality | Only protein increased significantly |
| Mustafa | | Tincture combo (moringa ~25%) | | | |
| Yullastuti 2018 | N=36 postpartum, no specified criteria or exclusion | Powdered leaf capsules 250mg BID | PP day 4-5 2 weeks | "Breast milk fat" and Infant weight before/after | Small increases |
| Sulistawati 2017 Indonesia | N=30 fully bfg, 20-35 yo, healthy baby | Powdered leaf capsules 250mg BID | Day 1-15 | Production change Baby's weight Baby's sleep | Insignificant impact on wt Significant for PRL, sleep Questionnaire PRL, timing |

Sulistawati, Y., Suwanda, A., Harjanti, T. S., Soejatno, A., Anwar, M. C., & Sutjiatno, K. A. (2017). Effect of Moringa oleifera on level of prolactin and breast milk production in postpartum mothers. *Beltung Nursing Journal*, 3(2), 126-133.

Yullastuti, S. K., Tjahjono, Sumami, Sri, Supriyana, Widayati, Mehyana Nurul, (2018). Keleor (Moringa Oleifera) as an Alternative in Increasing Breast Milk Production. *Journal of Medical Science and Clinical Research*, 6(2), 1192-1196.

Mustafa, Yuliani, F. S., Purwono, S., Sadewa, A. H., Damayanti, E., & Heriyanto, D. S. (2020). Polyherbal formula (ASIRACT™) induces Milk production in lactating rats through Upregulation of α-Lactalbumin and Isoquercetin expression. *BMC Complement Med Ther*, 20(2), 368. doi:10.1186/s12906-020-09152-7

Sumami, Puspasari, I., Mallongi, A., Yane, E., & Sekarani, A. (2020). Effect of moringa oleifera cookies to improve quality of breastmilk. *Enfermeria Clinica*, 30, 99-103. doi:https://doi.org/10.1016/j.enfcli.2019.10.050

Fungtammaman, S., & Phospong, V. (2021). The effect of Moringa oleifera capsule in increasing breastmilk volume in early postpartum patients: A double-blind, randomized controlled trial. *PLoS One*, 16(4), e0248950. doi:10.1371/journal.pone.0248950

Proactive thinking!

Thaweekul P, et al. (2014). The efficacy of hospital-based food program as galactagogues in early period of lactation. *J Med Assoc Thai*, 97(5), 478-482.

Hot basil, lemon basil, sweet basil, banana blossom, garlic, garlic chives, ginger, pepper.

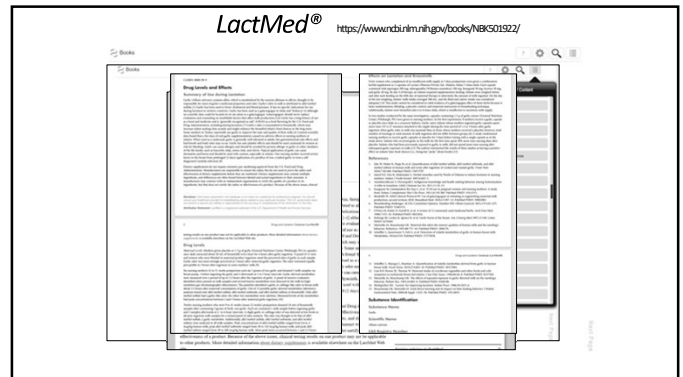
| | Galactagogue | Control |
|----------------------------------|--------------|---------|
| Breast fullness/heaviness @48hrs | 72% | 57% |
| Wt loss >7% within 48hrs | 15% | 24% |

Lactogenic Foods

Someone else tried it, too! Xu 2000

Effect of Galactagogue on the Lactation & Infant Body Weight in Delivery Women

The effects of postoperative diet on lactation and infant body weight were observed. 82 delivery women undergoing cesarean section were randomly divided into two groups: observation group, drinking galactagogue 6 h after cesarean section supplemented with principal food; control group with routine diet and nursing care. The results indicated that the lactation at postoperatively different intervals in the observation group was significantly more than that in the control group (P 0.001) and the recovery of the infant body weight was quick. It was suggested that nutrition up take after cesarean section could increase the lactation of the delivery women, promote the recovery of the gastrointestinal function and elevate the breast feeding rate.



Summary

- ✓ First line of defense is frequent, effective milk removal
- ✓ Lactogenic Foods support milk production in the context of good management
- ✓ *Lactogenic Foods are NOT a substitute for good management*
- ✓ Lactogenic foods can help increase milk supply for some women
- ✓ Lactogenic foods are low risk and nutritively beneficial