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NATURAL GALACTOGOGUES USED IN INDIA AND ACROSS THE WORLD

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ABSTRACT

Ancient Sanskrit saying "matureva pibyatstanynam"(recommending breast feeding as the first choice) signifies the importance of Brest milk.[1] It contains all the nutrients required to serve the nutritional and developmental needs of the infant for its optimal growth. In Ayurveda, 'kashyapa' define pure breast milk as that which the baby thrives well and beneficial to both mother and baby. WHO recommends exclusive breastfeeding starting within 1 hr. after birth until a baby is 6 months old.[2] According to ancient text duration of breastfeeding should last until the eruption of teeth, for atleast 6 months.[3] However insufficient milk production is one of the most common reasons given for discontinuing breastfeeding. Ancient literature is a treasure house of knowledge about stanya formation (breast milk), causes of stanya pravarti (milk ejection), stanya-nasha hetu (causes of cessation of milk formation), stanya vridhi dravyas (galactogogues). This dissertation is an effort to share the galactogogues present in India and the world.

INTRODUCTION

Rigveda has advocated breast feeding after birth with recitation of Mantras. Skanda mentioned in Dharama Granthas became popular as 'Kartikeya' only because of being breast fed by six 'Krttikas'[4] this reference reflects the importance of breast milk.

Under-nutrition is responsible for more than one third of the global disease burden for child

under 5 years. Proper breastfeeding is so critical that it could save more than 220000 life's per year. It is such serious issue that UNICEF has declared it as one of the most important sustainable development goals for countries. Breastfeeding is considered the optimal source of nutrition for infants from birth to 1 year and is supported by the World Health Organization.[5] The Sushruta samhita also recommended that breastfeeding continued until the mother became pregnant again.

The 2012 AAP (American Academy of Paediatrics) Policy on Breast-feeding recommends exclusive breast-feeding for 6 months, with continuation up to 1 year or longer.[6,7]

Minimum time of brestfeeding	Reduced risk of disease
minimum of 3 months	acute otitis me- dia and/or atopic dermatitis
greater than 4 months	decrease in hospitalizations secondary to lower respiratory tract infection
greater than 6 months	acute lymphocytic leukemia and acute myeloid leukemia

[8]It has numerous benefits for mother as well as baby.

Benefits for baby

It contains all the nutrients required for optimum growth and development of the baby it is recommended to continue breastfeeding even if the child is sick.

The breast milk contains lactose which helps in absorption of calcium and enhance growth of lactobacilli in intestine.

As the breast milk contain 88% of water there is no need for additional water even in the summers. The osmolity of breast milk is low thus it prevents load to the neonatal kidney. Enhance maturation of intestinal cell this reducing the risk of allergy in later parts of life. Helps to promote bonding between mother and the baby.[9]

Benefits for mother

Breastfeeding soon after the birth helps in reducing the problem of uterine involution. It reduces the possibility of postpartum hemorrhage.

It provides protection against pregnancy due to its contraceptive effect on mother. Helps in reducing the extra weight gained during pregnancy period.

It also reduces the risk of diabetes mellitus type-2, breast and ovary cancer.[10]

Despite the recommendations and perceived benefits, breastfeeding rates in the US continue to be low.[11]

This pattern can be obereved repeatedly all over the world across all the countries.

Time	Percentage of lactating mothers
At birth	75%
At 6 months	44.6%
At 12 months	23.8%

Lactogenesis according to Ayurveda

Ayurveda physicians mentions the formation of aahar rasa after proper digestion of the food. Vyana vata(type of vata dosha) helps to circulate aahar rasa in the whole body. Finally it gets converted to breast milk after it reaches to the memory glands. Hence it can be infered that quantity and quality of breast milk depends upon Aahar Rasa, which is a factor of adequate food and proper metabolism (Sushruta Samhita Nidanasthana 10/18). As it is formed from Prasad Bhaga of Aahara Rasa it contains best of all nutrients needed for the child. Therefore breast milk (Stanya) is considered as subsidiary tissue (Upadhatu) of Rasa Dhatu (plasma of blood) (Charak Samhita Chikitsasthana 15/15).

Physiciology of lactation

Many factors play a role in the development of breast milk. During early pregnancy, estrogen and progesterone develop key components of the breast tissue for lactation; estrogen stimulates milk duct development and progesterone forms lobules that are responsible for milk production. Prolactin is the predominant hormone that stimulates mammary glands; however, high progesterone and estrogen progesterone levels during pregnancy suppress prolactin's action on milk production during pregnancy. Additionally, prolactin and human chorionic somatomammotropin stimulate the production of enzymes required for milk production. After delivery, estrogen and progesterone levels significantly decrease, allowing prolactin to fully stimulate the alveoli for milk production. Cortisol, insulin, vasoactive intestinal peptide, growth hormone, and thyroid-releasing hormone stimulate prolactin and influence the composition of milk, whereas dopamine inhibits prolactin, suppressing its action. Milk secretion is primarily controlled by oxytocin, which stimulates the myoepithelial cells to contract and release stored milk into the ducts (ie, letdown). Milk must be ejected from the lumen of the alveoli into the milk ducts to reach the infant. Infant suckling

stimulates production of prolactin as well as oxytocin. Milk secretion continues until suckling ends. Interestingly, even if the alveoli still contain milk, once suckling stops, no more milk can be released. It is important to allow plenty of time for feeding or breast pumping to empty the breasts. When all of the milk is released, the breast stimulates additional milk production for the next feeding. This feedback mechanism leads to an overall increase in supply over time.[12,13]

After delivery the Dhamnis or Siras of precordium get dialated and initiate milk ejection on the 3rd and 4th day. Amount of milk is two Anjali (per day). Approximately 600 to 800 ml of milk is secreted per day. It is especially interesting that fondling of the baby by the mother or hearing the baby crying often gives enough of an emotional signal to the hypothalamus to cause milk ejection. Many psychogenic factors can inhibit oxytocin secretion and consequently depress milk ejection.

Prolactine reflex

As the baby sucks nipple, the nerve endings on nipple carry massage to the anterior pituitary and prolactine is released which act on alveolar glands in breast and thus the milk secretion starts.

Thus more and earlier baby sucks breast, greater and sooner this reflex initiated. Hence it is important for mother to feed early (as soon as baby needs), frequently and completely empty the breast. Hindering factors includes incorrect position, painful breast, prelacteal feeds, top feeding.[14]

Oxytocine reflex

Thought, sight, sound of baby or sucking, stimulates the nerve endings in the nipple which carry message to the posterior pituitary, as a reaction of which produce oxytocine hormone, which initiate the contraction of lactiferous glands and stimulate the ejection of milk into lactiferous sinuses through which it goes to lactiferous duct and finally milk is secreted. So relax and confident attitude of mother helps in proper milk ejection. Hindering factors are worry, stress, pain, doubt.[15]

Stanyakshaya: a major problem

Stanyakshaya is a vital problem with increasing prevalence, ranging from 23-63% in western countries and 45-53% in some part of India. The overall scenario of this problem can be

assessed by previous reports above cited. It is a great irony that such an important problem that is directly associated with the health of the mother and child is largely neglected.

According to Sushruta, Stanyaksaya occurs due to psychological condition of mother (Krodha, Shoka, Bhaya, and Irsha & Avatsalyatwa), Diet regime of mother and physiological condition.[16]

In Ayurveda causes for the Stanyanasha and Stanyaksaya are explained in detail by Sushruta, Kashyapa, Vagbhata 1 & 2 and Bhavaprakasha. Main causes are Langhana, Rukshannapana Sevana, Karshana, Atyanta Apatarpana, Shodhana Atiyoga, Krodha, Bhaya, Shoka, Kama and Avatsalyatwa, etc. psychosomatic causes.[16] Hence Stanyaksaya occurs due to psychological condition and faulty diet regime of mother. Intake if sheet, ruksha aahar during the period of lactation.[17,18] This disease is common in Vata-Kapha Prakriti patients.

In the cases of stansysahsya due to non- initiation by early suckling, then it can be restored by counselling, good nutrition, rest and frequent suckling in 70% of the cases. However in the condition of agalactia or very less breast milk, there is a need of galactogogues.

Galactogogues are medications or other substances believed to assist initiation, maintenance, or augmentation of the rate of maternal milk synthesis. they include food, herbal medicines and pharmaceutical drugs.

Currently available pharmaceutical galactogogues are metoclopramide, domperidone and sulpiride to name a few of many but they show some side effects, also FDA has warned against the use of domperidone as a galactagogue because it may cause cardiac arrhythmia, cardiac arrest, and death reported after intravenous administration of domperidone.[19,20] Use of sulpiride has resulted in sedation, depression, sleep disturbances, restlessness, impaired concentration, extrapyramidal reactions, weight gain, xerostomia, and neuroleptic malignant syndrome.[21,22]

Side effects reported by nursing mothers receiving metoclopramide include tiredness, nausea, headache, vertigo, hair loss, and anxiety.[23,24]

Keeping in mind the side effects of the systhetic galactogogues, there is a need to explore safe and effective source of milk enhancing herbal drugs.

Herbal galactogogues

The use of plants as medicine is widespread throughout the world. It is estimated that more than 35,000 plant species are being used around the world for medicinal purposes. India is endowed with rich wealth of medicinal plants which are widely usedby all sections of people either directly as folk remedies or in different indigenous systems of medicine or indirectly in the pharmaceutical preparations of modern medicines. More than 8, 000 plants are used in our country especially for their medicinal values by the rural people. The traditional wisdom is based on the intrinsic realization that man and nature form part of an indivisible partner and should live in partnership with each other.

Many traditional societies have accumulated a whole lot of empirical knowledge on the basis of their experience dealing with nature and natural resources, local utilization and conservation of food and medicinal plants. The knowledge ofmedicinal has been accumulated in the course of many centuries based on different Indian systems of medicines such as Ayurveda, Unani and Siddha. These systems of medicine play a very important role in healthcare system of rural people covering all types of ailments and developed over years of observation, trial and error, inference and inheritance has largely remained with the aboriginal people. Traditional medicinal practices and ethnobotanical information play an important role in the scientific research, particularly when the literature and field work data have been properly evaluated. The documentation of indigenous knowledge on the utilization of local plant resources by different ethnic groups or communities is one of the main objectives of ethnobotanical research. In a global scale review, Bingel and Farnsworth documented over400 plant species that have been used to facilitate lactation, most of which were galactagogues.

Ayurveda describes many galactogogues of which 32 plants reffered as Stanyajanan and Kseerjanana are botanically reported (table below).[25]

Sanskrit name	Botanical name and family	Ayurvedic terminology
Nala	Arundo donax L. (Poaceae)	Stanyajanan
Rohisha	Cymbopogon martini (Roxb.)Wats (Poaceae)	Stanyajanan
Veerana	Vetiveria zizaniodes (L.) Nash (Poaceae)	Stanyajanan Kseerjanana
Shali	Oryza sativa L. (Poaceae)	Stanyajanan Kseerjanana

Darbha	imperata cylindrical (L.) Beauv. (Poaceae)	Stanyajanan Kseerjanana
Kusha	Desmostachya bipinnata (L.) Stapf. (Poaceae)	Stanyajanan Kseerjanana
Kasha	Saccharum spontaneum L. (Poaceae)	Stanyajanan Kseerjanana
Gundra	Typha australis Schum & Thonn. (Typhaceae)	Stanyajanan Kseerjanana
Itkata	Sesbania bispinosa (Jacq.) W.Wight.	Stanyajanan Kseerjanana
Kattrina-mula	Cymbopogon citrates (DC.) Stapf. (Poaceae)	Stanyajanan
Ksheer Kakoli	Lilium polyphyllum D.Don (Liliaceae)	Stanyakara
Kakoli	Fritillaria roylei Hook. Liliaceae	Stanyakara
Jeevaka	Malaxis acuminata D. Don. (Orchidaceae)	Stanyakara
Mudgapa-rni	Vigna trilobata (L.) Verdc.(Fabaceae)	Stanyakara
Mashapa-rni	Teramnus labialis (L.f.) Spreng.(Fabaceae)	Stanyakara
Meda	Litsea glutinosa(Lour.) C.B.Rob (Lauraceae)	Stanyakara
Mahameda	Polygonatum cirrhifolium Royle, (Liliaceae)	Stanyakara
Guduchi	Tinospora cordifolia(willd.) Miers. (Menispermaceae)	Stanyakara
Kakata-shringi	Pistacia chinensis Bunge (Anacardiaceae)	Stanyakara
Tuga	Bambusa arundinacea Willd. (Poaceae)	Stanyakara
Padmaka	Prunus cerasoides Buch.-Ham. ex D.Don. (Rosaceae)	Stanyakara
Riddhi	Habenaria intermedia D. Don, (Orchidaceae)	Stanyakara
Mridveeka	Vitis vinifera L. (Vitaceae)	Stanyakara
Jeevanti	Leptadenia reticulate W.&A. (Asclepiadaceae)	Stanyakara
Yashti-madhu	Glycyrrhiza glabra L. (Leguminosae)	Stanyakara Ksheerajana-na
Yava	Hordeum vulgare L. (Poaceae)	Ksheerajana-na
Lashuna	Allium sativum L. (Liliaceae)	Ksheerajanana

Kasheruka	Scirpus kysoor Roxb. (Cyperaceae)	Ksheerajanana
Shringataka	Trapa natans L. (Trapaceae)	Ksheerajanana
Bisa	Nelumbo nucifera	Ksheerajanana
Vidarikanda	Pueraria tuberosa (Willd.) DC. (Fabaceae)	Ksheerajanana
Shatavari	Asparagus racemosus Willd. (Liliaceae)	Ksheerajanana

Anacdotal drugs in India according to the region it is popular.[26]

Galactagogues	Family	State
Asparagusrecemosus	Liliaceae	Sikkim, Bihar, Assam, Chhattisgarh, Maharashtra, Rajasthan, Madhya Pradesh
Arundinella setosa	Poaceae	Tamilnadu, Kerala
Alternanthira sessllis	Amranthaceae	Karnataka
Alstonia scholaris	Apocynaceae	Andhra Pradesh, Gujrat
Curculigo orchioides	Amarylidaceae	Maharashtra
Euphorbia hirta Euphorbia fusiformis	Euphorbiaceae	Uttar Pradesh, MadhyaPradesh, Maharashtra, West Bengal, Chhattisgarh
Ichnocarpus frutescens	Apocynaceae	Andhra Pradesh, Karnataka
Madhuca longifolia	Sapotaceae	Chhattisgarh, Gujrat
Nigella sativa	Ranunculaceae	Assam, Arunachal Pradesh, Meghalaya
Pheretima posthuma	Megascolecidae	Chhattisgarh, Jharkhand,Madhya Pradesh West Bengal, Orissa
Piper nigrum	Piperaceae	Tamilnadu
Pouzolzia zeylanica	Urticaeae	Chhattisgarh, Jharkhand,
Ricinus communis	Euphorbiaceae	Rajasthan
Tinospora cordifolia	Menispermaceae	Gujrat, Rajasthan
Vitex negundo	Verbenaceae	Maharashtra

Anecdotal tribal formulation in India are as follows

Bhil tribe uses dried powder of Roots of Shatavari (Asparagus recemosus) 2-5 gm given to lactating mother with milk daily. Baiga tribe, Fresh juice of Dudhai (Euphorbia hirta) 10-15 ml given to lactating mother with honey. it is also induce the lactation. Sahariya tribe, Dried earthworm as powder or fresh as paste 3-6 earthworms with milk. Decoction of kenchua (dried earthworms, Pheretima posthuma) is also in tradition. It is very effective, a single does can induce the lactation. Decoction of fresh leaves of Anddi, Arand (Ricinus communis) and seed oil for massage of breasts.[26]

Unani

Literature was searched in the Unani texts like Khazainul Advia, Bustanul Mufredat,

Makhzinul Mufredat, Kanzul Advia, Kitabu al Advia wa Aghazia, Ilmul Advia Nafeesi to collect the information.

List of plants found in Unani texts having Galactogogue property[27,28,29,30,31,32]

Unani Name	Botanical Name	Parts Used
Kalonji[10]	Nigella sativa	seeds
Satawar	Asparagus recemosus	root
Hulba	Trigonella foenum	seeds
Panba dana	Gossypium arborenum	seeds
Aspand	Peganum hermala	seeds
Sambhaloo	Vitex nigundu	seeds
Anisoon	Pimpinella anisum	seeds
Saunf	Foeniculum vulgare	seeds
Tudri surkh	Lepidium iberis	seeds
Asgandh	Withania somnifera	root
Musli siyah	Curculigo orchioides	root
Musli safaid	Chlorophytum arundinacecum	root
Shiqaqul misri	Pustinaca secacul	root
Zeera safaid	Cuminum cyminum	seeds
Zeera siyah	Carum cavri	seeds
Maghaze narjeel	Lodoicea maldivica	fruit
Maghaze pista	Pistachia vera	fruit
Maghaze akhrot	Jugulans regia	fruit
Maghaze badam	Prunus amygdalus	fruit
Ajwain desi	Carum copticum	seeds
Alsi	Linum usitatissimum	seeds
Otangan	Blepharis edulis	seeds
Nagar motha	Cyperus rotundus	root
Singhada	Trapa spinosa	fruit
maghaze tukhm-e-kadu	Laginaria siceraria	seed kernels
maghze tukhm-e-tarbuz	Citrullus vulgsis	seed kernels
maghze tukhm-e kharpaza	Cucumis melo	seed kernels
Bozidan	Pyrethrum indicum	root
Badari kund	Pueraria tuberosa	root
Sualab misri	Orchis latifolia	root
Jirjeer	Erusa sativa	seeds

Many cultures have special foods that are thought to enhance milk production. Batrisu Vasanu[33] is widely consumed ethanomedicinal galactogogues as well as supplementary food used in Gujarat region, which is consumed only during the first 3 months of lactation period. After botanical validation, the market sample of Batrisu Vasanu found to contain total of 69 drugs.[34,35]

Batrisu Vasanu

Botanical name	Family	API name
Abutilon indicum (L.) Sw.	Malvaceae	Atibalaa
Acacia nilotica L.	Mimosaceae	Babbuula
Acorus calamus L.	Araceae	Vacha
Alpinia galanga Willd.	Zingiberaceae	Kulanjana
Amomum subulatum Roxb.	Zingiberaceae	Sthulaila
Anacyclus pyrethrum DC.	Asteraceae	Akarakarabha
Anethum sowa Roxb. ex Flem.	Apiaceae	Satahva
Asparagus racemosus Willd.	Liliaceae	Satavari
steracantha longifolia Nees.	Acanthaceae	Kokilaksha
Bambusa bambos Druce.	Poaceae	Tugaksiri
Buchnania lanzan Spreng.	Anacardiaceae	Priyala
Butea monosperma (Lam) Kuntze	Fabaceae	Palasa
Careya arborea Roxb.	Lecythidaceae	Kumbhika
Cassia absus L.	Fabaceae	Chakshushyaa
Cinnamomum tamala(Buch. Ham.) Nees & Eberm.	Lauraceae	Tvakapatra
Cinnamomum zeylanicum Blume.	Lauraceae	Tvak
Corchorus depressus L.	Malvaceae	Chanchuka
Coriandrum sativum L.	Umbelliferae	Dhanyaka
Curculigo orchioides Gaertn.	Amaryllidaceae	Talamuli
Curcuma anguistifolia Roxb.	Zingiberaceae	Tavkshir
Curcuma longa L.	Zingiberaceae	Haridra
Cydonia oblonga Mill.	Rosaceae	Amritaphala
Dactylorhiza hatagirea (D. Doon) Soo	Orchidaceae	Hattajari
Eletteria cardamomum (L.) Maton	Zingiberaceae	Sukshmaila
Embelia ribes Burm. F.	Myrsinaceae	Vidanga
Foeniculum vulgare Mill	Umbelliferae	Mishreya
Glycyrrhiza glabra L.	Fabaceae	Yashtimadhu
Hedychium spicatum Ham. ex Smith	Zingiberaceae	Shati
Illicium verum Hook. F.	Magnoliaceae	Takkola
Indigofera glandulosa Wendl.	Fabaceae	-
Ipomoea hederacea (L.) Jacq.	Convolvulaceae	Krishna bij
Lepidium sativum L.	Cruciferae	Chandrasura
Mesua ferrea L.	Guttifereae	Nagakesara
Mucuna pruriens Baker.	Fabaceae	Atmagupta
Mucuna pruriens Baker	Fabaceae	Atmagupta
Myristica fragrans Houtt.	Myristicaceae	Jatiphala
Myristica fragrans Houtt.	Myristicaceae	Jatipatri
Nelumbo nucifera Gaertn.	Nymphaeaceae	Kamala

Papaver somniferum L.	Papavaraceae	Khaskhasa
Piper chaba Hunter non-Blume.	Piperaceae	Gajapippali
Piper longum L.	Piperaceae	Pippali
Piper longum L.	Piperaceae	Pippalimula
Piper nigrum L.	Piperaceae	Maricha
Piper nigrum L	Piperaceae	Maricha
Piper retrofractum Vahl.	Piperaceae	Chavya
Pistachia vera L.	Anacardiaceae	Mukuulaka
Plantago ovate Forssk.	Plantaginaceae	Snigdhajeerak
Plumbago zeylanica L.	Plumbaginaceae	Chitraka
Polygonatum verticillatum (L.) All.	Liliaceae	Meda
Prunus amygdalus Batsch	Rosaceae	Vaataama
Pterocarpus marsupium Roxb.	Leguminoseae	Asana
Pueraria tuberosa DC.	Fabaceae	Vidarikanda
Quercus infectoria Olivo	Fagaceae	Mayyaku
Salmalia malabarica (DC) Schott & Endl.	Bombacaceae	Mocarasa
Sida cordifolia L.	Malvaceae	Bala
Smilax china L.	Liliaceae	Madhusnuhi
Sphaeranthus indicus L.	Asteraceae	Mahamundi
Symplocos racemosa Roxb.	Symplocaceae	Lodhra
Syzygium aromaticum (L.) Merr. And L.M. Perry	Myrtaceae	Lavanga
Trachyspermum ammi (L.) Sprague ex Turril	Umbelliferae	Yavani
Tribulus terrestris L.	Zygophyllaceae	Gokshura
Trigonella foenum-graecum L.	Fabaceae	Methi
Vitex negundo L.	Verbenaceae	Renuka
Vitis vinifera L.	Vitaceae	Draksha
Withania somnifera Dunal.	Solanaceae	Asvagandha
Zanthoxylum armatum DC.	Rutaceae	Tumburu
Zanthoxylum armatum DC	Rutaceae	Tejohva
Zingiber officinale Roxb	Zingiberaceae	Shunthi

Other Ayurvedic formulation used for stanayajanana

Haridradi Kwath:- The ingredients are-Haridra (Curcuma longa), Daruharidra (Berberis aristata), Prishniparni (Uraria picta), Indrayava (Holarrhene antidycentrica), Yashtimadhu (Glycorriza glabra). This preparation is used as galactogogues.[36]

According to Properties of drugs Pippal yadi Choorna is having Katu, Madhur rasa, Madhur vipaka, Sheet veerya and Laghu, Snighdha guna. Katu Rasa of the drugs will act on the vitiated Rasadahtu and corrects jatharagnimandya. Madhur Rasa does tarpan of rasa dhatu and helps in Stanyajanan and vardhan.

With help of all these properties, Pippalyadi Yog helps in Agnideepana, Aampachana & Stan yajanana. Hence it is found to be good Galactagogue.

Vajrakanjika

Powdered pippali, pippalimula, cavya, śunthi, yawanikā, both jirakas, both haridrās, wid and sauwarcala salts should be cooked with kanji and given to the woman according to her digestive power. This preparation known as vajrakāñjika cures āmavāta, is vṛsya (aphrodisiac), suppressess kapha and vata, increases appetite, cures makkalla sula and increases quantity of milk.

Herbal tea as galactogogues

Commercially available herbal tea mixture (Natal, Hipp) contain 1.0% of stinging nettle and six other herbs (melissa, caraway, anise, fennel, goat's rue, and lemon grass). It is sold at pharmacies with the permission of Ministry of Agriculture. This Herbal tea containing stinging nettle, caraway, anise, fennel, goat's rue, and lemon grass increased the daily milk production of mother.[37,38,39]

Some other examples of herbal galactogogues and their corresponding mechanism of action

Herb common with latin name	Mechanism proposed
Shatavari i.e. Asparagus racemosus	Estrogenic effect on mammary glands; steroidal action of saponins in plant
Torbangun i.e. Coleus amboinicus Lour	Proliferation of secretory mammary cells
Fenugreek i.e. Trigonella foenumgraecum	Possibly estrogenic; stimulate sweat production
Fennel i.e. Foeniculum vulgare	Possibly estrogenic
Milk thistle i.e. Silybum marianum	Unknown, possibly estrogenic
Chaste berry i.e. Vitex agnus castus	Estrogenic (as a hormone modulator)
Goat's rue i.e. Galega officinalis	Unknown
Blessed thistle i.e. Cnicus Benedictus	Unknown

Fenugreek (Trigonella foenumgraecum):- It is the most commonly used herbal galactogogue in published literature. It is thought that fenugreek stimulates sweat production, and since the breast is a modified sweat gland, fenugreek may affect breast milk production in this manner.[40,41,42] Food and Drug administration (FDA) lists fenugreek as generally regarded as safe (GRAS).

It is an important medicine in India's Ayurvedic tradition, where it is used to treat a variety of digestive and mucosal conditions. And in India, once the child has been born, women are

encouraged to eat a sweetened paste or halva made from the seeds to increase the flow of milk.[43,44]

Milk thistle (Silybum marianum) The lactogenic activity of milk thistle (Silybum marianum) remains largely anecdotal, although its use as a galactogogue is increasing. 24 Animal studies suggest milk thistle has promising lactogenic properties. In 1 study, cows given silymarin (an extract of Silybum marianum) were observed to have increased milk production of 5-6 L per day per cow.[45,46]

Respberry Leaf:- some herbalists believe that it stimulates lactation and enriches brest milkby providing vitamins and minerals.

Goat's rue herb -the renowned phytotherapist and M.D., Rudolf Weiss, considered goat's rue to be an "effective and safe lactagogue, increasing not only the volume of milk, but also the proportion of milk solids, so that it is not a matter of diluting the milk, but a genuine increase in production."[47]

Other

Some herbs mentioned as galactogogues include oats, dandelion, millet, seaweed, anise,basil, blessed thistle, marshmallow, and black seed are believed to be galactogogues.[48]

Epilobium spp. (fireweed) herb, Pimpinella anisum (anise) seed, Urtica dioica (stingingnettle) herb, Gossypiumspp. (cotton) root. alfalfa (M. sativa) and brewer's yeast.

Herbal Supplements galactogogues in some other countriesIn Ghana

Special foods and selected herbs are widely used to enhance breastmilk production in Ghana and constitute an important part of the diet of lactating mothers. Abemudro (a polyherbal formulation), Ayoyo/Jute leaves (Corchorus olitorius), Nkontonmire/cocoyam leaves (Colocasia esculenta), Kuuka/ dried baobab leaves (Adansonia digitata) and tiger nuts (Cyperus esculentus). Hot lactogogues included; hot millet porridge, hot black tea, hot salt petre porridge and hot Tuo Zaafi (made from maize flour). Groundnut/peanut related lactogogues consisted of mashed kenkey with groundnut, corn porridge with groundnut, Aleefu (Amaranth sp.) prepared with groundnut, Bra leaves (Hibiscus sabdariffa) soup with groundnut, Werewere (Citrulus colocynthis) soup; and groundnut only soup.

In China

Studies using animal models showed that extracts of herbal galactagogues, such as Silitidil which is a standardized extract of milk thistle and Silymarin BIO-C which is an extract from Silybum marianum fruits, increased serum prolactin levels significantly in female rats. The herbal decoction significantly increased milk production in lactating rats ($P < 0.05$). Both immune histochemical staining and western blot showed that protein levels of AQP-3 and AQP-5 were significantly increased during lactation compared with virgin stage and the herbal decoction further elevated their expression ($P < 0.05$).[49,50]

In Indonesia

Torbangun (Coleus amboinicus Lour) It has been used as a galactogogue by Bataknese people living in Indonesia. It has been hypothesized, based on mouse models, that torbangun has an effect on the proliferation of secretory mammary cells.[51]

Botanical formulations acting as galactogogues used in other parts of the world :-Botanical Galactagogue Formulas

Mother's Milk Blend Tea[52]This consists of

Dried Matricaria recutita (chamomile) lowersDried Nepeta cataria (catnip) herb Foeniculum vulgare (fennel) seeds

Dried Urtica dioica (stinging nettle) herbDried Lavendula spp. (lavender) lowers.

More Milk Plus[53]

This is a tincture blend of:

Trigonella foenum-graecum (fenugreek) seedCnicus benedictus (blessed thistle) herb Urtica dioica (stinging nettle) leaf Foenicuculum vulgare (fennel) seed Mother's Lactalow[54] This is a tincture blend of:

Foeniculum vulgare (fennel) seed Cnicus benedictus (blessed thistle) herb

Galega officinalis (goat's rue) herb Trigonella foenum-graecum (fenugreek) herb

Practice Recommendations

Practice Recommendations other than herbal galactogogues for lactating mothers facing problem of stanyajanana. The following recommendations, based upon current evidence, apply to women experiencing difficulties with a low rate of milk production (e.g., the baby is not gaining weight normally or supplementation is being used because of low milk

production, during either the initiation or maintenance of milk supply).

1. Use non-pharmacologic measures to increase the overall rate of breastmilk synthesis.

a. For women with healthy term infants: Improve breastfeeding practices (Level of EvidenceI).

i. Recommend skin-to-skin contact between mother and baby to facilitate frequent feeding and stimulate oxytocin release (the milk ejection reflex [MER]).

ii. Help the mother–infant dyad to achieve optimal latch-on.

iii. Emphasize unrestricted frequency and duration of breastfeeding (if the infant has been shown to be effectively transferring milk).

b. For women with babies who are ineffective at milk removal or unable to feed at the breast (e.g., premature, hospitalized, hypotonic):

i. Recommend and teach gentle hand expression of colostrum: The volume extracted by handexpression is greater than the volume extracted by full size, automatic cycling breast pumps;

ii. Recommend milk expression with a full-size, automatic cycling breast pump, capable of draining both breasts at the same time ("hospital grade"), if available (Level of Evidence II- 2).[55]

CONCLUSION

Breast milk and Breastfeeding plays a vital role in development of individuals, and have ramifications from cradle till death. Losing any of these is detrimental to the whole world. Considering adverse effect of using synthetic pharmaceutical drugs at the very beginning of life, there is a need to move towards knowledge embedded in classical Ayurvedic texts. They provide herbs and formulations with no side effects. The modern day problems still finding solution in Ayurveda. There is a urgent need to promote these practices which are vital for physical, psychological and emotional development of child into a healthy being. This dissertation is a small effort in exploring the few natural galactogogues across the world.

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