

Proceeding Paper

# Ayurvedic Milk Powder as Health Drink – An Innovative Approach in Antenatal Health Care – A Research Proposal †

Anuja Ar \*, Vineeth P K, Arun Mohanan and Ramesh N V \*

Department of Rasashastra and Bhaishajya Kalpana (Medicinal Chemistry and Pharmacy), Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Vallikavu, Clappana (P O), Kollam, Kerala, India; vinubrocha@gmail.com (V.P.K.); drarunmohanan@gmail.com (A.M.)

\* Correspondence: anuja.a.r.1993@gmail.com (A.A.); drramesh.adiga@gmail.com (R.N.V.)

† Presented at the 2nd International Electronic Conference on Foods, 15–30 October 2021; Available online: <https://foods2021.sciforum.net/>.

**Abstract:** Ayurvedic preceptors place much emphasis on nutrition, especially during antenatal and postnatal periods, which may reduce the likelihood of medical complications both during and after pregnancy. Classic Ayurvedic texts mention medicated milk as an important part of prenatal care for pregnant women. By evaluating the effects of the herbal drugs contained in these formulations, one can understand the pharmacodynamics of these products. The medicated milk, when converted into milk powder, represents a healthier alternative to malted milk powder.

**Keywords:** antenatal care; Ayurveda; medicated milk; ayurvedic milk powder

## 1. Introduction

A healthy diet plays a significant role in pregnancy and lactation. An adequate and balanced diet can help prevent prenatal complications and aid in the proper development of the fetus. The food taken by the mother is responsible for providing both the fetus and the mother with nutrition. In Ayurveda, antenatal as well as postnatal care are of paramount importance. Ayurveda emphasizes certain monthwise diet patterns, and daily regimens for pregnant lady which is known as Māsānumāsika paricarya. Many ayurvedic scholars provide detailed explanations regarding the month-by-month diet and regimen. These unique diet patterns cut the risk of abortion early in a pregnancy, improve fetal nutrition during the second trimester, and improve maternal health during the third trimester [1]. Sahasrayogam, a book about Ayurvedic treatment, mentions a particular drug used to prepare medicated milk every month [2]. To start from the first month, medicated milk prepared with *Sida cordifolia*, *Ipomea sepiaria*, *Solanum indicum*, *Desmodium gangeticum*, *Tinospora cordifolia*, *Solanum xanthocarpum*, *Hordeum vulgare*, *Chonemorpha macrophylla*, *Asparagus racemosus* in the next months.

## 2. Methodology

Review of literature using authentic Ayurvedic textbooks and scientific articles in PubMed, Google Scholar. Databases searched with keywords *Sida cordifolia*, *Ipomea sepiaria*, *Solanum indicum*, *Desmodium gangeticum*, *Tinospora cordifolia*, *Solanum xanthocarpum*, *Hordeum vulgare*, *Chonemorpha macrophylla*, *Asparagus racemosus* separately and these drugs AND Ayurveda, Ayurveda AND antenatal care. We selected articles based on both their title and content for relevance. While several review articles discuss the use of ayurvedic milk during pregnancy, no clinical trials are looking directly at this issue. The effect of specific drugs on pregnancy has been studied in many preclinical and clinical trials.

**Citation:** Ar, A.; P K, V.; Mohanan, A.; N V, R. Ayurvedic Milk Powder as Health Drink – An Innovative Approach in Antenatal Health Care – A Research Proposal. *Biol. Life Sci. Forum* **2021**, *68*, x. <https://doi.org/10.3390/xxxxx>

Published: date

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2021 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

### 3. Medicated Milk

Medicated milk, or Kṣīrapākā, is a unique ayurvedic formulation in which milk is the basic component. Astringent or pungent drugs usually benefit from this method. It masks the bitter taste of drugs and reduces the intensity of pungent drugs. The therapy enhances the patient's strength and endurance when they are fatigued from illness or other treatments. The preparation method of this medicine is more suitable for conditions requiring the use of fat-soluble ingredients [3]. Milk is often described as the best rejuvenator and is a commonly used drink from birth to death. Milk adds nutritional value along with the therapeutical effects of added drugs.

Drugs, milk, and water are boiled together in a specific ratio to prepare medicated milk. These are boiled in a mild fire until only the milk part remains. Different ayurvedic preceptors have given different ratio of drugs, milk and, water for the preparation of the formulation. According to Śārangadhara samhita, the proportion of drugs, milk, and water is 1:8:32, and according to Yadavji Trikamji, the author of Dravyagūṇa, the ratio is 1:15:15. While explaining about laśuna Kṣīrapākā (medicated milk prepared with garlic), the author of Bhaiṣajya ratnāvali mentions the ratio as 1:8:8 [4].

**Table 1.** Ratio of ingredients.

SL.NO	Classical Reference	Ratio of Drugs:Milk:Water
1	Śārangadhara samhita	1:8:32
2	Dravyagūṇa	1:15:15
3	Bhaiṣajya ratnāvali	1:8:8

### 4. Month Wise Drugs for Medicated Milk

The drug mentioned in the first month of pregnancy is *Sida cordifolia*, which belongs to the Malvaceae family. As per Ayurveda, the drug has sweet taste, cold potency, and is classified as part of the madhura skandha (group of drugs with a sweet taste) and garbhashthāpana gaṇa (antiabortifacient drug). Pregnant women may experience tender swollen breasts, nausea with or without vomiting, and increased urination during the first month of pregnancy. The flavonoids found in *Sida cordifolia* support the anti-oxidant activity of this plant [5]. The antioxidant property prevents conditions like spontaneous abortion, pre-eclampsia, fetal growth restriction, etc. [6]. A number of alkaloids present in *Sida cordifolia* have anti-inflammatory and analgesic properties [7]. It prevents backache and leg cramps. Pregnant women can also benefit from taking the herb to relieve frequent urination and high blood pressure during the first month of pregnancy.

The drug of choice for the second month of pregnancy is *Ipomea sepiaria*, a member of the Convolvulaceae family. Ayurvedic preceptors list the drug under garbhashthapāna gaṇa, and mentioned as the most appropriate drug for the procedure of pumsavana (one of the 16 rituals in the ancient Indian concept). Antioxidant, analgesic and anti-inflammatory properties of *Ipomea sepiaria* make it useful in a variety of gynecological conditions

During the fourth month of pregnancy, the most recommended drug is *Desmodium gangeticum*, belonging to the family Fabaceae. Herbs possess properties such as bitter astringent taste, hot potency, and heavy digestion. It is indicated in a variety of conditions such as fever, vomiting, respiratory conditions, etc. The pterocarpanoid, gangetin, possesses anti-inflammatory and analgesic properties [8]. Flavonoids and isoflavanoids glycosides in the drug provide the drug with significant antioxidant activity [9]. The nervous system of the fetus begins to develop during the fourth month and the drug *Desmodium gangeticum* is found to have immense action in the central nervous system. The chemical components in *Desmodium gangeticum* can reduce constipation and emesis gravidarum symptoms.

In the third month of pregnancy, *Solanum indicum*, and in sixth month *Solanum xanthocarpum*, both belonging to the solanaceae family, are the preferred drug. The most im-

portant chemicals in it are saponins, glycosides, sesquiterpenoids, coumarins, etc. *Solanum* species repute for being potent antioxidants. It also prevents pregnancy-related hypertension and pedal edema

During the fifth month of pregnancy, *Tinospora cordifolia* belonging to the Menispermaceae family is the drug of choice. This drug is included under garbhasthāpana gaṇa. It is a drug rich in alkaloids, glycosides, steroids, polysaccharides etc. It possesses bitter astringent taste, cold potency, is unctuous and light to digest. There are a wide range of conditions for which it is indicated, including diabetes, cardiovascular conditions, skin disorders, and rheumatic diseases. The effects of *Tinospora cordifolia* on oxidative stress in prenatal conditions have been studied extensively [10]. The antidiabetic effect is contributed mainly by the tannins, alkaloids, flavonoids and saponins present in it. It also modulate the immunity of pregnant woman.

Pregnant women should consume milk prepared with *Hordeum vulgare*, a plant belonging to the Poaceae family, during the seventh month of pregnancy. It possesses sweet astringent and bitter taste, and hot potency. It is a good source of micronutrients as well as macronutrients. Ayurvedic preceptors mentioned it as a drug of choice in diabetes. Different pharmacological actions are possessed by it, such as antihypercholesterolemic activity, diuretic activity, fatty acid synthase inhibition, laxative effect, and lipid metabolism. A study of a foetus affected by maternal diabetes found that *Hordeum vulgare* actively stimulated the development of the foetal adrenal cortex [11]. In addition to promoting intestinal mobility, *Hordeum vulgare* is also effective in fostering lung growth in foetuses [12].

In the eighth month of pregnancy, most women use the drug *Chonemorpha macrophylla* which belongs to the Apocynaceae family. It possesses bitter astringent sweet taste, hot potency and is hard to digest. *Chonemorpha macrophylla* possesses skeletal muscle relaxant action on experimental model [13].

*Asperagus racemosus*, belonging to Asperageaceae family is the drug of choice during the ninth month of pregnancy. It possesses sweet bitter taste and cold potency. Researchers have confirmed the galactagogue properties of *Asperagus racemosus* [14]. Furthermore, it increases vaginal dilation, which greatly facilitates vaginal delivery [15].

**Table 2.** Month wise drugs for medicated milk.

SL.NO	Month	Drug	Botanical Name
1	First month	Balā	<i>Sida cordifolia</i>
2	Second month	Lakṣmaṇa	<i>Ipomea sepiaria</i>
3	Third month	Bruhaṭī	<i>Solanum indicum</i>
4	Fourth month	Amśumatī	<i>Desmodium gangeticum</i>
5	Fifth month	Guducī	<i>Tinospora cordifolia</i>
6	Sixth month	Nidigdrikā	<i>Solanum xanthocarpum</i>
7	Seventh month	Yava	<i>Hordeum vulgare</i>
8	Eighth month	Moraṭa	<i>Chonemorpha macrophylla</i>
9	Ninth month	Śatāvārī	<i>Asperagus racemosus</i>

## 5. Medicated Milk Powder

The medicated milk is a type of decoction (kwātha kalpana), the shelf life of which is one day. Procuring small quantities of raw drugs from the market and, preparing the medicated milk each time is a tedious process. It is possible to prepare medicated milk powder without experiencing this problem using a spray dryer. A spray dryer rapidly dries a liquid from a slurry or liquid by adding hot air to the liquid or slurry [16]. Medicated milk powder preparation requires care. The quality of the prepared powder must be assessed before packing.

## 6. Conclusions

Ayurvedic milk powder serves as a healthier alternative to commercial malted milk powder, as it ensures the well-being of mom and baby. Ayurvedic milk powder may help to reduce the risks and complications associated with pregnancy when associated with normal antenatal care. This new dosage form should undergo extensive preclinical and clinical trials before being introduced to the market.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:**

**Informed Consent Statement:**

**Data Availability Statement:**

**Conflicts of interest:** The author declares no conflict of interest.

## References

1. Kulkarni, R.; Srilakshmi, C.; Sarada, M. Ayurveda principles of Garbhiniparicharya (prenatal care) and its scientific relevance. *J. Indian Syst. Med.* **2020**, *8*, 5. [https://doi.org/10.4103/jism.jism\\_24\\_20](https://doi.org/10.4103/jism.jism_24_20).
2. Krishnanvaidyan, A.K.V.; Gopalapillai, A.S. *Sahasrayogam*, 35th ed.; Vidyarambham Publications: 2017; p. 104, ISBN 81-85315-10-8.
3. Remadevi, R. *Bhaishajya Kalpana*, 2nd ed.; Perfect Publications: Kottakal, India; Volume 1, p. 182.
4. Angadi, R. *A Textbook of Bhaishajya Kalpana [Pharmaceutical Science]*, 2nd ed.; Chaukhamba Surbharati Prakashan: Uttar Pradesh, India; pp. 104–105, ISBN 978-93-908046-3-9.
5. Dhalwal, K.; Deshpande, Y.; Purohit, A.; Kadam, S. Evaluation of the Antioxidant Activity of *Sida cordifolia*. *Pharm. Biol.* **2005**, *43*, 754–761. <https://doi.org/10.1080/13880200500406438>.
6. Jenkins, C.; Wilson, R.; Roberts, J.; Miller, H.; McKillop, J.H.; Walker, J. Antioxidants: Their Role in Pregnancy and Miscarriage. *Antioxid. Redox Signal.* **2000**, *2*, 623–628. <https://doi.org/10.1089/15230860050192369>.
7. Sutradhar, R.K.; Rahman, A.M.; Ahmad, M.; Bachar, S.C.; Saha, A.; Roy, T.G. Anti-inflammatory and analgesic alkaloid from *Sida cordifolia* linn. *Pak. J. Pharm. Sci.* **2007**, *20*, 185–188.
8. Ghosh, D.; Anandakumar, A. Anti-inflammatory and analgesic activities of gangetin—A pterocarpenoid from *Desmodium gangeticum*. *Indian J. Pharmacol.* **1983**, *15*, 391.
9. Govindarajan, R.; Rastogi, S.; Vijayakumar, M.; Shirwaikar, A.; Rawat, A.K.S.; Mehrotra, S.; Pushpangadan, P. Studies on the Antioxidant Activities of *Desmodium gangeticum*. *Biol. Pharm. Bull.* **2003**, *26*, 1424–1427. <https://doi.org/10.1248/bpb.26.1424>.
10. Shivananjappa, M. Muralidhara Abrogation of maternal and fetal oxidative stress in the streptozotocin-induced diabetic rat by dietary supplements of *Tinospora cordifolia*. *Nutrients* **2012**, *28*, 581–587. <https://doi.org/10.1016/j.nut.2011.09.015>.
11. Hajarzadeh, A.; Jahromi, H.K.; Mokbber, H.; Jahromi, N.S.; Ghaedi, S.; Sadoughi, M. Studying histopathological effects of barley grain (*Hordeum vulgare* L.) on the evolution of the cortical portion of the adrenal glands in foetuses of diabetic albino rats. *Comp. Haematol. Int.* **2014**, *24*, 893–897. <https://doi.org/10.1007/s00580-014-2004-9>.
12. Arbabi, F.; Minae Zangi, B.; Sadooghi, M. The effect of *Hordeum Vulgare* l. On the Development of Lung Tissues in the Embryo of Diabetic Albino Rats. *J. Comp. Pathobiol. Iran* **2015**, *11*, 1429–1435. Available online: <https://www.sid.ir/en/journal/View-Paper.aspx?id=418542> (accessed on).
13. Roy, R.; Ray, N.; Das, A. Skeletal muscle relaxant effect of *Chonemorpha macrophylla* in experimental animals. *Indian J. Pharmacol.* **2005**, *37*, 116. <https://doi.org/10.4103/0253-7613.15113>.
14. Gupta, M.; Shaw, B. A Double-Blind Randomized Clinical Trial for Evaluation of Galactagogue Activity of *Asparagus racemosus* Willd. *Iran. J. Pharm. Res.* **2011**, *10*, 167–172.
15. Pandey, S.K.; Sahay, A.; Pandey, R.S.; Tripathi, Y.B. Effect of *Asparagus racemosus* rhizome (Shatavari) on mammary gland and genital organs of pregnant rat. *Phytother. Res.* **2005**, *19*, 721–724. <https://doi.org/10.1002/ptr.1590>.
16. Wikipedia Contributors. Spray Drying. In Wikipedia, The Free Encyclopedia. 8 September 2021. Available online: [https://en.wikipedia.org/w/index.php?title=Spray\\_drying&oldid=1043131296](https://en.wikipedia.org/w/index.php?title=Spray_drying&oldid=1043131296) (accessed on 14 September 2021).