



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 438-442
© 2022 TPI
www.thepharmajournal.com
Received: 21-03-2022
Accepted: 31-04-2022

Pragya Mishra
Student, Department of
Agriculture, Invertis University,
Bareilly, Uttar Pradesh, India

Akshita Banga
Assistant Professor, Department
of Agriculture, Invertis
University, Bareilly, Uttar
Pradesh, India

Abhirup Mitra
Assistant Professor, Department
of Agriculture, Invertis
University, Bareilly, Uttar
Pradesh, India

Advancement of herbal skimmed milk powder by fusing different medicinal herbs and its proximate composition

Pragya Mishra, Akshita Banga and Abhirup Mitra

Abstract

Herbs have multifarious role such as food flavourings, preservative and as medicinal ingredient. Various herbs are documented for their therapeutic properties viz., antioxidative, antihypertensive, anti-inflammatory, antidiabetic, antimicrobial, etc. Some of the important herbs dealt in this review include Ashwagandha, Turmeric etc. The examples of some spice and herbs containing antioxidants include basil, ginger, etc., while herbs showing hypotensive properties include Ashwagandha, brahmi, shankphuspi, ginger, basil, etc. Few herbs can help in extending the shelf life of dairy products (especially fermented dairy products) especially through their suppressing effect on fungi and bacteria. Hence, judicious use of herb application in dairy products may result in raising their nutritional and medicinal values and enable development of value-added dairy products. Fortification of herbs in dairy products could help in providing value-added, functional dairy foods at the same time boost the sale of important herbs.

Milk as a source of infant food, occupies a pivotal position being a unique fluid having the necessary nutrients in 'all in one' package. Large numbers of people depend upon milk as the most important source of nourishment next only to staple food grains. Today, the production of dried milks products has become an increasingly important segment of the dairy industry. There are indications of greater future production of dried milk and milk products due to their better and milk definite keeping quality, requiring less storage space and lower shipping costs all of which are economically attractive. More non-fat dry milk production takes place than whole milk powder production due to the high keeping quality.

Keywords: Tulsi, turmeric, ginger, Ashwagandha, Brahmi, Shankphushi, skimmed milk powder

1. Introduction

Milk is a complete food that provides a high level of essential nutrients. Today Indian consumer is more conscious towards health and balanced nutrition and has desire for better quality and convenient food products. Milk promotes good health and protect us against various diseases. Medicinal plants are very rich sources of essential oils which possess therapeutic importance. In India use of plants as a medicine appeared in Rigveda which has been written 3500 - 1600 B.C. Properties of plants as a source of medicine were studied in detailed in Ayurveda which is considered as the foundation of all the medical sciences.

1.1 Tulsi: (*Ocimum sanctum*) is an aromatic plant which has many medicinal properties (Singh *et al.*, 2012). It contains several phyto-constituents such as cardinene, cubenol, borneol, linoleic acid, orientin, linolenic acid, steric acid, oleic acid, palmitric acid, eugenol, vallinin, vicienin, vitexin, vllinin acid, circineol, gallic Acid, vitamin A, vitamin C, phosphorus and iron (Kadian and Parle, 2012) due to which it possess multifarious medicinal properties.



Fig 1: Tulsi

Corresponding Author:
Abhirup Mitra
Assistant Professor, Department
of Agriculture, Invertis
University, Bareilly, Uttar
Pradesh, India

1.2 Turmeric: (*Curcuma longa*) is a very important spice in India, which is obtained from rhizomes of plant *Curcuma longa*, a member of the Zingiberaceae (ginger) family. More than 100 components have been isolated from turmeric. The main component of the root is a volatile oil, containing turmerone, and there are other coloring agents called curcuminoids in turmeric (Lal, 2012).



Fig 2: Turmeric

1.3 Ginger: *Zingiber officinale* being a major spice, has many uses in food as a flavoring and medicinal product. The aroma of ginger is pleasant with flavor, slightly biting due to antiseptic or pungent compounds present in it, which make it indispensable in the manufacture of number of food products. This rhizome can be processed into a powder, syrup, volatile oil, and oleoresin. Among all spices, it exhibits one of the greatest diversity of uses, such as in dietary supplements, beverages (such as ginger ales), and food products (such as in curry powder, confectionaries, soups, jams, and baked goods).



Fig 3: Ginger

1.4 Ashwagandha: *Withania somnifera* Ashwagandha is referred to as Indian ginseng or winter cherry. One of the most esteemed medicinal plant used in Indian Ayurveda since centuries. It hails from Solanaceae family, grown in Africa, the Mediterranean, and India. Ashwagandha is considered to be a vitalizer, adaptogen, facilitating the ability to withstand stressors, and has antioxidant properties. Saponins and acylsterylglucosides in Ashwagandha are antistress agents. Ashwagandha is characterised by the presence of steroidal lactones, alkaloids and flavonoids. Their root contains maximum amount of alkaloids- nicotine, somniferin, somniferinine, withanine, withanonine, withanolides, etc. Roots of the plant shows hypotensive, bradycardiac, antitumor, respiratory stimulant activities and immunostimulating effect.



Fig 4: Ashwagandha

1.5 Brahmi: *Bacopa monnieri* (water hyssop, brahmi, thyme-leaved gratiola, water hyssop, herb of grace, Indian pennywort) is a perennial, creeping herb has been praised in Ayurvedic and traditional medicines across the world for generations (Khare, 2003). It's difficult to pinpoint an exact native for this wetland-growing herb and most experts agree that it has been growing in the wetlands of southern and Eastern India, Australia, Europe, Africa, Asia, and North and South America for hundreds of thousands of years (Warrier *et al.*, 1996).



Fig 5: Brahmi

1.6 Shankpushpi: *Convolvulus pluricaulis* is known as a Medhya (brain tonic) Rasayana in the Indian traditional system. The medicinal herb is considered to enhance certain aspects related to intellect and memory improvement. Shankpushpi is a Sanskrit word that means "the plant with flowers shaped like a conch. It is a perennial herb which seems like morning glory. The shankha is one of Lord Shiva's sacred instruments. It consists of various phytochemical constituents mainly in the form of proteins, amino acids and the alkaloids convolvine. Many types of research have been done on the *Convolvulus pluricaulis* plant and showed various therapeutic and pharmacological activities.



Fig 6: Shankpushpi

2. Ingredients and Method

2.1 Ingredients

Skim milk powder, Tulsi powder, Tumeric, Ginger powder, Brahmi powder, Shankphuspi powder, Ashwagandha powder and Sugar. Proportion of different herbs are given in Table.1.

Table 1: Proportion of Different Ingredients

Ingredients	Proportion (g)
Skim milk powder	50
Tulsi powder	113.4
Tumeric	113.4
Ginger powder	113.4
Brahmi powder	14.3
Shankphuspi powder	14.3
Ashwagandha powder	28.3

2.2 Method

2.2.1 Making powdered using a gas oven

Place a container in the gas oven and pour one - two cup of milk into container. Set the dehydrator and dehydrate. It will take roughly 1-2 hours for the milk to dry. After the milk is completely dry and flaky, crumble it into pieces and blend in a mixer until it forms a powder. Store the powdered milk in a vacuum seal jar for longer shelf life.

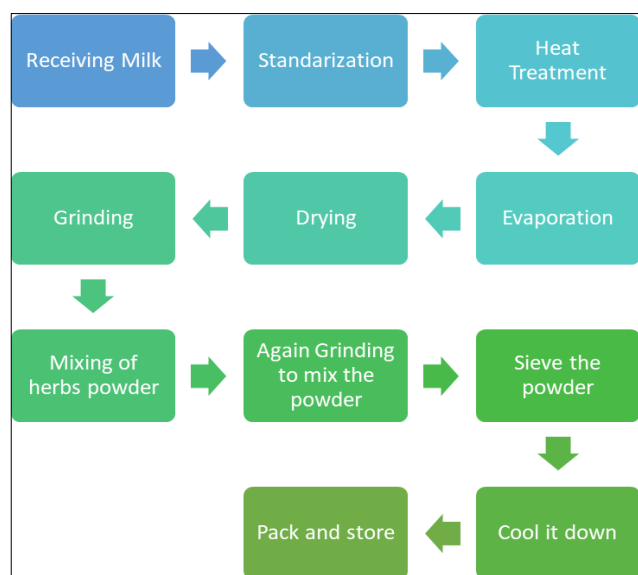


Fig 7: Flow chart of manufacturing of herbal skim milk powder

2.3 Process of Manufacture of Different Types of Herbs

2.3.1 Making herb powder using a gas oven

Place the container into the gas oven and put the herbs for drying. Stir the herbs continuously until it was completely dry. After the herbs is completely dry and flaky, crumble it into pieces and blend in a mixer until it forms a powder. Sieve and Store the powdered herbs in a vacuum seal jar for longer shelf life

2.3.2 Specifications necessary to Drying milk

- Acidity should be less than 0.15%.
- Increased acidity for simple varying reduce the solubility of milk powder.
- The significant increase in the acidity of the milk lead to clotting of Casein.

3. Nutritional Aspects

Nutritional value or nutritive value as part of food quality is the measure of a well-balanced ratio of the essential nutrients carbohydrates, fat, protein, minerals, and vitamins in items of food or diet concerning the nutrient requirements of their consumer.

Data received from lab after chemical analysis of below mentioned parameters is as follows;

4. Result

4.1 Determination of total Ash Content

Find out the weight of a clean dry crucible. Place about 2 g of sample and weigh this to find out accurate weight of the sample taken. Carefully place the weighed crucible over electric burner. The crucible should be partially opened. The sample will get charred with initial expulsion of smoke. Place the crucible in a muffle furnace and heat to 600°C. Keep it for 2 hours. At this temperature all organic matter will be burnt leaving behind minerals. Remove the crucible from the furnace carefully and cool it in a dessicator to room temperature and weight again.

4.2 Determination of total Moisture Content

Dry weighing dish with open lid in the oven, and cool it in desiccator. Weigh the empty dish (a), add approx. 3 g of powder and weigh again (b). Place the loaded dish with open lid in the oven at 102 °C ± 2 °C for 2 hours. Cool closed dish to room temperature in desiccator, and weigh (c). Continue drying the loaded dish with open lid in the oven at 102°C ± 2 °C for 1 hour. Repeat the cooling 6.4 and weigh again (c). Repeat 6.5 until weight (c) is constant (i.e. until two successive weighings differ less than 0.5 mg).

4.3 Determination of titrable acidity as lactic acidity test

Fill the burette with N/10 NaOH solution. Mix the milk sample thoroughly by avoiding incorporation of air. Transfer 10 ml milk with the pipette in conical flask. Add equal quantity of glass distilled water. Add 3-4 drops of phenolphthalein indicator solution* and stir with glass rod. Take the initially reading of the alkali in the burette at the lowest point meniscus. Rapidly titrate the contents with N/10 NaOH solution continue to add alkali drop by the drop and stirring the content with glass rod till first definite change to pink colour which remains constant for 10 to 15 seconds. Complete the titration within 20 seconds. Note down the final burette reading.

* Phenolphthalein Indicator Solution - Dissolve one gram of phenolphthalein in 100 ml of 95% ethyl alcohol. Add 0.1 N sodium hydroxide solution until one drop gives a faint pink colouration. Dilute with distilled water 200 ml.

4.4. Determination of fat in milk

Fat is the most important component of milk. It provides more energy than the energy provided by carbohydrate (lactose) and proteins taken together. It imparts soft texture and creamy taste to milk products. It is the source of essential fatty acids and carrier for fat-soluble vitamins. Due to these reasons the producers and/ or sellers of milk and milk products are paid for their product on the fat basis. Therefore, determination of fat in milk and its products is an important exercise. The result has been shown in Table.2.

Table 2: Nutritional properties of Prepared Herbal Milk Powder (per 100g of sample)

Nutritional Value	Proportion
Milk Fat	26-40%
Ash	5-7%
Moisture	1.5%
Titration acidity as Lactic acidity	0.10 - 0.15
Calcium	1.3%

**Fig 8:** Prepared Herbal Milk Powder

5. Conclusion

Since pre historical times, herbs have been used not just as food flavouring but also for its medicinal properties. The antimicrobial and antioxidant constituents present in herbs enables them to be used as effective preservatives. Incorporation of herbs in dairy product may results improvement the health and medical condition of human being. Herbal products with promising health benefit, should comply with the regulatory requirements with respect to safety, efficacy, quality testing and marketing authorization procedures. It should be devoid of any side effect. There is a need of systematic scientific studies and documentation.

To provide support to the dairy food industry, FSSAI has created many guidelines and regulations for different milk products and milk. Furthermore, studies suggest that milk production in India will reach 300 million tons by the year 2022. It's mandatory to obtain the FSSAI license for milk and milk products, or you may apply for FSSAI registration depending on the turnover of your business.

Herbs are natural ingredients that have been widely used not just as food flavouring but also for its health attributes. The antioxidant, antimicrobial and anticancer components present in herbs could enable them to enhance the health and medical status of human being. Dairy products have always been a choice for food investigators to test the consumer's preferences for novelty in the products. Combination of herbs in dairy products with gifted health benefit should conform to the requirements to avoid any side effects with respect to quality testing, safety, efficiency, price and marketing approval procedures. However, there are numerous technological challenges that have to be carried out to develop dairy products enriched with herbs like using Nano-form to increase their availability and efficiency. Moreover, more research is needed to improve the existing method and to develop new procedures for optimized extraction and refining separation methods of active components from herbs.

6. Declarations

6.1 Author contribution statement

All authors listed have significantly contributed to the development and the writing of this article.

7. Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

8. Competing interest statement

The authors declare no conflict of interest. Additional information No additional information is available for this paper.

9. References

1. Ansari MM, Kumar DS. Fortification of food and beverages with phytonutrients. *Food Pub Health*. 2012;2(6):241-253.
2. Al-Mariri A, Safi M. *In vitro* antibacterial activity of several plant extracts and oils against some Gram negative bacteria. *Iran J Med Sci*. 2014;39(1):36-43.
3. Borek C. Antioxidant health effects of aged garlic extract. *J Nutr*. 2001;131(3):1010-1015.
4. Basu KT, Srichamroen A. Health benefits of fenugreek. In: Watson RS, Preedy VR, editors. *Bioactive Foods in Promoting Health: Fruits and Vegetables*. 1st ed. USA: Academic Press, 2010, 425-435pp.
5. Blumenthal M, Goldberg A, Brinckmann J. *Herbal medicine. Expanded Commission E Monographs*. Integrative Medicine Communications, USA, 2000, 297-303pp.
6. Balakrishnan A. Therapeutic uses of peppermint-A review. *J Pharm Sci & Res*. 2015;7(7):474-476.
7. Carlsen MH, Halvorsen BL, Holte K, *et al*. The total antioxidant content of more than 3100 foods, beverages, spices, herbs and supplements used worldwide. *Nutr J*. 2010;9(1):1-11
8. Chan K. Some aspects of toxic contaminants in herbal medicines. *Chemosphere*. 2003;52(9):1361-1371.
9. Cuvelier M, Berset C, Richard H. Antioxidant constituents in sage (*Salvia officinalis*). *J Agric & Food Chem*. 1994;42(3):665-669.
10. Dua A, Garg G, Balkar S, *et al*. Antimicrobial properties of methanolic extract of cumin (*Cuminum cyminum*). *Int J Res in Ayurveda & Pharm*. 2013;4(1):104-107.
11. Derakhshan S, Sattari M, Bigdeli M. Effect of sub-inhibitory concentrations of cumin (*Cuminum cyminum* L) seed essential oil and alcoholic extract on the morphology, capsule expression and urease activity of *Klebsiella pneumoniae*. *Int J Antimicrob Agents*. 2008;32(5):432-436.
12. Ellmore GS, Feldberg RS. Allin lyase localization in bundle sheaths of the garlic glove (*Allium sativum*). *Am J Botany*. 1994;81(1):89094.
13. Hossein N, Zahra Z, Abolfazl M, *et al*. Effect of Cinnamon zeylanicum essence and distillate on the clotting time. *J Medicinal Plants Res*. 2013;7(19):1339-1343.
14. Hajlaoui H, Mighri H, Noumi E, *et al*. Chemical composition and biological activities of Tunisian *Cuminum cyminum* L. essential oil: A high effectiveness against *Vibrio* spp. strains. *Food Chem Toxicol*. 2010;48(8-9):2186-2192.
15. Hoquea MM, Barib ML, Juneja VK, *et al*. Antimicrobial activity of cloves and cinnamon extracts against food borne pathogens and spoilage bacteria, and inactivation of *Listeria monocytogenes* in ground chicken meat with their essential oils. *Report Nat'l Food Res Inst*.

- 2008;72(1):9-21.
16. Ismail A, Marjan ZM, Foong CW. Total antioxidant activity and phenolic content in selected vegetables. *Food Chem.* 2004;87(4):581-586.
 17. Modak M, Dixit P, Londhe J, *et al.* Indian herbs and herbal drugs used for the treatment of diabetes *J Clin Biochem Nutr.* 2007;40(3):163-173.
 18. Kumar Prevesh, Kumar Nirdesh, Omer Tushar. A review on nutraceutical Critical supplement for building a healthy world. *World J Pharmacy & Pharmaceutical Sci.* 2016;5(3):579-594.
 19. Korhonen H, Pihlanto A. Bioactive peptides from food proteins. In: Hui YH, editor. USA: John Wiley & Sons, 2007, 5-37pp.
 20. Kaur D, Sharma R. An update on pharmacological properties of cumin. *Int J Res Pharmacy & Sci.* 2012;2(4):14-27.
 21. Kumar M, Berwal JS. Sensitivity of food pathogens to garlic (*Allium sativum*). *J Appl Microb.* 1998;84(2):213-215.
 22. Kim SH, Hyun SH, Choung SY. Anti-diabetic effect of cinnamon extract on blood glucose in db/db mice. *J Ethnopharm.* 2006;104(1-2):119-123.
 23. Lu YR, Foo YL. Antioxidant activities of polyphenols from sage (*Salvia officinalis*). *Food Chem.* 2001;75(2):197-202. Jakheta V, Patel R, Khatri P. Cinnamon: a pharmacological review.
 24. Iacobellis NS, Lo-Cantore P, Capasso F, *et al.* Antibacterial activity of *Cuminum cyminum* L. and *Carum carvi* L. essential oils. *J Agric Food Chem.* 2005;53(1):57-61.
 25. Maidment DCF, Dembny Z, Harding. A study into the antibiotic effect of garlic *Allium sativum* on *Escherichia coli* and *Staphylococcus albus*. *Nutr& Food Sci.* 1999;4:170-172.
 26. Madsen HL, Bertelsen G. Spices as antioxidants. *Trends Food Sci Technol.* 1995;6:271-277.
 27. Matsui T, Matsumoto K. Antihypertensive peptides from natural resources. In: Khan Math, editor. *Advances in Phytomedicine.* 1st ed. USA: Elsevier Publisher, 2006. 273-299pp.
 28. Mishra LC, Singh RRB, Dagenais S. Scientific basis for the therapeutic use of *Withania somnifera* (Ashwagandha): A Review. *Altern Med Rev.* 2000;5(4):334-346.
 29. Naveed R, Hussain I, Tawab A, *et al.* Antimicrobial activity of the bioactive components of essential oils from Pakistani spices against *Salmonella* and other multi-drug resistant bacteria. *BMC Complementary & Alternative Med.* 2013;13:265.
 30. Namiki M. Antioxidant/antimutagens in food. *Crit Rev Food Sci Nutr.* 1990;29(4):273-300.
 31. Niranjana A, Prakash D. Chemical constituents and biological activities of turmeric (*Curcuma longa* L.)-a review. *J Food Sci Technol.* 2008;45(2):109-116.
 32. Parmar P, Khamrui K, Devaraja HC, *et al.* The effects of alcoholic extract of Arjuna (*Terminalia arjuna* Wight & Arn.) bark on stability of clarified butterfat. *J Med Plant Res.* 2013;7(35):2545-2550.
 33. Shrestha PM, Dhillon SS. Medicinal plant diversity and use in the highlands of Dolakha district, Nepal. *J Ethnopharmacol.* 2003;86(1):81-96.
 34. Singh C, Saini NK, Manda H, *et al.* Evaluation of antioxidant activity of *Terminalia arjuna* leaves extract. *Pharmacology online.* 2011;1:998-1006.
 35. Shahid CSA, Hussain AI, Asad R, *et al.* Bioactive components and antioxidant properties of *Terminalia arjuna* L. extracts. *J Food Process Technol.* 2014;5(1):298.
 36. Verma KC. Ashwagandha (*Withania somnifera* dunal): wonder medicinal plant. *Agric Rev.* 2010;31(4):292-297.
 37. Wondrak GT, Villeneuve NF, Lamore SD, *et al.* The cinnamon-derived dietary factor cinnamic aldehyde activates the Nrf2-dependent antioxidant response in human epithelial colon cells. *Molecules.* 2010;15(5):3338-3355.
 38. Zhang W, Xiao S, Samaraweera H, *et al.* Improving functional value of meat products. *Meat Sci.* 2010;86(1):15-31.