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## Research Article

### RECENT ADVANCES IN THE DEVELOPMENT OF HERBAL BASED DAIRY FOODS

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#### ABSTRACT

Herbs and their extracts have long been used for curing health related complications and metabolic disorders as natural remedies. Functional components present in them aids in performing a wide range of biological functionalities. A considerable portion of today's functional food market consists of herbal supplemented functional foods. Dairy products, popular throughout the country, can be used effectively as carriers for herbs to satisfy the needs of health conscious consumers. However, depending upon the concentration and type, the incorporation of herbs into food products may have certain undesirable effects on their sensory, physico-chemical and textural properties which in turn could affect their overall acceptability. Presently, the herbal ghee being marketed globally is mostly sold as medicinal ghee, which is associated with typical flavour, bitter or pungent taste and a dark colour. Such therapeutic preparations are therefore not acceptable for routine use. Incorporation of these nutraceuticals into food systems may therefore call for technological modifications so that the sensory quality of the final product remains unaltered. Further, limited information is available for ascertaining the residual levels of these functional components in herbal food preparations. Effect of herbal and food constituents interactions on human health have to be studied thoroughly.

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#### INTRODUCTION

Rapid urbanisation and industrialisation have produced advancement on the social and economic fronts in developing countries such as India which has resulted in dramatic lifestyle changes leading to lifestyle related diseases. Due to the appearance of several lifestyle related health disorders, there has been increasing interest in the study of functional foods supplemented with functional components or substances. Functional foods provide some health benefit beyond their nutritional value. Functional foods contain bioactive compounds which offer the health and wellness benefits that have been linked to functional foods. By 2024, the international functional food market is expected to reach a value of about \$255.10 billion. Herbs have been used as food and medicine for centuries. A wide variety of active phytochemicals including the flavonoids, terpenoids, lignans, sulfides, polyphenols, carotenoids, coumarins, saponins, plant sterols, curcumins and phthalides have been identified in herbs. In the recent past, research interest has been focused on various herbs that possess hypolipidemic, antiplatelet, antitumor or immune stimulating

properties that may be useful adjuncts in reducing the risk of cardiovascular diseases (CVD) and cancer (Hussain *et al.*, 2015). Today, industry is showing a great deal of interest in utilising these herbal bioactives for functional foods manufacture. Ayurveda has mentioned several ways in which the medicinal benefits of herbs could be conveyed via certain foods as carriers. Milk is one of the most important of such carriers (Sawale *et al.*, 2013b). In India, a significant amount of milk produced is utilised for traditional dairy products. Conversion of liquid milk into traditional dairy products not only preserves milk solids for longer time but also adds value to milk. Indian traditional dairy products have a huge demand and their domestic markets are well established. Incorporation of herbal bioactives into traditional Indian dairy products not only helps the industry to meet the growing consumer demand for these foods but also facilitates in competing with ever increasing world functional food market (Sawale *et al.*, 2013a).

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**Table 1** Common herbs with potential for incorporation into foods

Herb	Biologically Active Constituents
Satavari ( <i>Asparagus Racemosus</i> )	Steroidal saponins
Ashwagandha ( <i>Withania somnifera</i> )	Steroidal lactone withaferin A
Brahmi ( <i>Bacopa Monniera</i> )	Alkaloids, saponins and sterols
Vidharikand ( <i>Pueraria tuberosa</i> )	Coumarin, alkaloids and isoflavanoids
Triphala:	
i) Amalaki ( <i>Embllica officinalis</i> )	Zeatin and phyllembin
ii) Haritaki ( <i>Terminalia chebula</i> )	Tannins
iii) Bibhitaki ( <i>Terminalia bellerica</i> )	Ethyl gallate
Arjuna ( <i>Arjuna terminalia</i> )	Catechins
Aloe Vera	More than 200 that include antibiotics, pain inhibitors, burn healers

(Hussain et al., 2009)

**Herbal based dairy foods****Butter and ghee**

In India, about 39 per cent of the total milk produced is converted into ghee and butter. The clarified milk fat, particularly ghee, has the characteristics to absorb all the medicinal properties of the herbs with which it is fortified, without losing its own qualities. Exploiting this concept several medicated ghee preparations have been developed and about 5560 medicated ghee types are reported in Ayurvedic literatures and they have also been used in the treatment of various diseases. Herbs contain high amounts of phenolic compounds which possess great antioxidant properties. The natural antioxidant properties of herbs have made their use in the formulation of functional foods specifically targeted for the people suffering from CVD (Najgebauer Lejko et al., 2009). Presently, the herbal ghee being marketed in the global market is mostly sold as medicine (medicinal ghee). These products possess a typical flavour, a bitter or pungent taste and a dark colour. Such therapeutic preparations are therefore not acceptable for regular consumption. At NDRI, Karnal, herbal ghee incorporating the functional attributes of Arjuna ghee has been developed for providing beneficial effects against CVD, and the product was more stable to oxidative deterioration as compared to conventional ghee. The consumer acceptability of this product was also very good (Rajanikant and Patil, 2005). Unlike in case of medicated ghee preparations, Arjuna ghee can be replaced with normal ghee in the daily diet. Also the antioxidant properties of herbs led their use into fat rich dairy products for retarding auto-oxidation there by prolonging the shelf-life. Moreover, increasing sensitivity of consumers to synthetic ingredients as well as the increasing awareness about the effect of diet on their health contributed to the increasing trend to use natural additives like herbal extracts for the stabilisation of fat rich dairy foods like ghee, butter oil, butter etc.

Sage (*Salvia officinalis*) and Rosemary (*Rosmarinus officinalis*) extracts are the most widely used for this purpose (Ozcan, 2003). These extracts have antioxidant activity many times stronger than synthetic antioxidants like BHA or BHT (Estévez et al., 2007). Some of the reported study's related to herbal ghee where the herb fortified ghee has shown good antioxidant activity as compared to ghee supplemented with synthetic antioxidant is depicted in Table 2.

**Shrikhand**

Shrikhand being a semisoft, sweetish-sour, whole milk product prepared from lactic fermented curd can easily harbour herbs/herbal extracts without undergoing significant changes in sensory quality. A study conducted by Landge et al. (2011) reported that addition of 0.5 per cent Ashwagandha powder to shrikhand has improved the organoleptic quality and the product was remained acceptable up to 52 days at refrigeration temperature.

**Sandesh**

Sandesh is a very popular heat desiccated product of coagulated milk protein mass called chhana. Incorporation of herbs such as turmeric (*Curcuma longa L.*), coriander (*Coriandrum sativum L.*), curry leaf (*Murraya koenigii L.*), spinach (*Spinacia oleracea*) and aonla (*Embllica officinalis*), separately as a paste, at the 10 per cent level into Sandesh improved its antioxidant properties. Herb coriander incorporation resulted in increased shelf-life of herbal sandesh up to eight days and 30 days when stored at 30±1°C and 7±1°C, respectively (Bandyopadhyay et al., 2007).

**Aloe vera based dairy/food products**

The aloe vera juice finds wide application in dairy/food products like production of ready to serve drink, health drink, soft drink, laxative drink, aloe vera lemon juice, sherbet, aloe sports drink with electrolyte, diet drink with soluble fibre, hangover drink with B vitamin, amino acids, healthy vegetable juice mix, tropical fruit juice with aloe vera, aloe vera yoghurts, aloe vera mix for whiskey and white bread, cucumber juice with aloe vera (Ahlawat and Khatkar, 2011). Aloe vera products are available in various forms like capsules, gel and juice. It has cooling effect and bitter in taste, it contains aloin that is responsible for its purgative action and well known for its therapeutic properties. It regulates the peristaltic movements of intestines and promotes digestion. Regular consumption of aloe vera juice on a daily basis brings about gradual and gentle health benefits, without irritant or harmful side effects. It also improves blood circulation due to its ability to detoxify. Some notable food products available in the markets are as under.

**Table 2** Studies related to antioxidant effect of herbal supplemented ghee

Type of Ghee	Herbs used	Synthetic antioxidant compared with herb	References
Sheep Ghee	Rosemary ( <i>Rosmarinus officinalis</i> )	Mixture BHA and BHT(1:1)	Amr, 1990
Cow ghee	Shatavari ( <i>Asparagus racemosus</i> ) Vidarikand ( <i>Pueraria tuberosa</i> ), Shatavari ( <i>Asparagus racemosus</i> )	BHT	Pawar et al., 2012
Cow ghee	Shatavari ( <i>Asparagus racemosus</i> ) and Ashwagandha ( <i>Withania somnifera</i> )	BHA	Pawar et al., 2014

### **Aloe vera herbal ice creams**

Aloe vera ice cream prepared with various ingredients to have the final ice cream should contain 10 % fat, 0.5 % stabilizer and emulsifiers, 36 % total solids and 15 % sugar. Various ingredients Viz. milk (buffalo milk), skim milk powder, butter and aloe vera added in such a way to obtain the final ice cream should contains minimum of 10 % milk fat and 36 % total solids. The inclusion of Aloe vera pulp at 20 % level had maximum score of 92.89. The bitter taste of the Aloe vera pulp had masked by the addition of the vanilla flavour and sugar. The production of this dairy herbal ice cream product is beneficial for diabetic patients with natural ingredients (Manoharan *et al.*, 2012).

### **Aloe vera juice enriched lassi and dahi**

Lassi, a ready to serve traditional fermented milk beverage has got wide popularity in India as well as in overseas markets. Sweet lassi with its characteristic sweet and slightly sour taste can be used as a food carrier for herbal bioactives like Aloe vera juice etc. At NDRI a functional lassi and dahi were developed by supplementing the herb Aloe vera (*Aloe barbadensis* Miller) and probiotics. Animal study of functional lassi revealed that it has better immunoprotective effects compared to control lassi. The authors have reported that Aloe vera supplementation has supported the growth of probiotic strain. The probiotic viability was more than 7 log cfu/ml during 12 days storage period (Hussain *et al.*, In Press).

### **Aloe vera chocolate**

The cocoa powder is mixed with skim milk powder. Sugar is dissolved in water till complete saturation in a boiling pan and the mixture is heated with occasional stirring. Aloe vera juice is then added to the mixture. Once the mixture attains 110 °C, the cocoa powder and skimmed milk powder are added after then, butter and flavour are added. After 20 minutes the whole mass is poured into a frame on an oiled slab, and then it is cut into appropriate size and wrapped in waxed paper. Maximum sensory analysis of colour, taste, aroma and texture in the aloe vera chocolate production is obtained from ingredients at the optimized process conditions. The optimum condition for taste is sugar 1000 g, skim milk powder 1019 g, cocoa powder 252.5 g and aloe vera juice 82.5 ml. (Jayabalan and Karthikeyan, 2012).

### **Low-fat set aloe vera fortified probiotic yoghurt**

The reconstituted skim milk for low-fat aloe vera fortified set yoghurt was prepared by using 16.57g skim milk powder in aloe vera juice and water blend, 25 and 75 ml respectively. The prepared reconstituted skim milk was heated or pasteurized properly at 82-85°C for 12-15 min. The reconstituted skim milk was cooled to 45°C. Inoculation was done using 3.46% (v/v) of *Streptococcus salivarius ssp. thermophilus* and *Lactobacillus delbrueckii ssp. Bulgaricus*, *Lactobacillus acidophilus* and *Bifidobacterium bifidum* cultures, then kept for incubation at 37°C for 8 h. After incubation the samples were kept under refrigerated condition at 4 °C (Panesar *et al.*, 2011)

### **Aloe vera enriched flavour milk**

Flavoured milk is a beverage in which sugar, flavouring and colouring agents are added and it contains all the constituents of milk. It is a good source of protein, carbohydrate and

minerals. It provides energy and water to digest the food, regulate body temperature and prevent dehydration. Jothylingam and Pugazhenth (2013) prepared the herbal aloe vera enriched flavour milk by incorporating aloe vera pulp extract at 5 % levels to flavoured milk. Further, dietetic herbal (Aloe vera enriched) flavoured milk up to 75 % replacement of sugar with aspartame and 100 % replacement of sugar with sucralose are concluded as the best based on the sensory evaluation.

### **Aloe vera gel enriched dahi**

The milk (fat 3.6%, protein 3.2% and carbohydrate 4.6%) used for preparation of aloe vera enriched dahi. The homogenized milk was heated at 85-90°C for 5 minutes and cooled to 45 °C. Spray dried aloe vera gel powder was added at 0.15% level and then inoculated with 10% standard dahi starter (Hatsun brand, fat 3.1%, protein 3.3% and carbohydrate 4.4%). The inoculated milk was incubated at 45 °C till the dahi was set (Ramachandran and Srividya, 2014). Aloe gel supplementation in the form of curd to be helpful in lowering the glycemic response to wheat based meal. It further indicates the potential of using Aloe gel as a hypoglycaemic ingredient in dairy products. Low glycemic foods incorporated Aloe gel nutraceuticals could also result in additional functional benefits.

## **CONCLUSION**

Herbal nutraceuticals are natural substances with wide range of health attributes. In India, most of milk is converted into traditional dairy products which are consumed by people of all age groups. Traditional dairy products can act as potent carrier for the herbs which can add functional attributes to the product thereby improving consumers well being. However, several technological challenges have to be overcome to develop milk products enriched with herbs. Process modifications are needed to reduce the undesirable effects of herbs incorporation on palatability of foods. Research should be focussed to find out the effect of processing conditions on the bioavailability of functional components present in herbs. Knowledge of interactions of herbal and food constituents and their effect on human health has to be studied thoroughly. Scientific community must apply modern techniques to assure the efficacy and safety of herbs and their bioactive components for their safe use in food formulations.

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## **References**

- Ahlawat K S and Khatkar B S (2011). Processing, food applications and safety of aloe vera products: a review. *J Food Sci Technol.*, 48(5):525-533.
- Amr, A.S. (1990). Role of some aromatic herbs in extending the stability of sheep ghee during accelerated storage. *Egypt J Dairy Sci*, 18(2): 335-344.
- Bandyopadhyay, M., Chakraborty, R. and Raychaudhuri, U. (2007). Incorporation of herbs into sandesh, an Indian

- sweet dairy product, as a source of natural antioxidants. *Int J Dairy Tech*, 60(3): 228-233.
- Estévez, M., Ramirez, R., Ventanas, S. and Cava, R. (2007). Sage and rosemary essential oils versus BHT for the inhibition of lipid oxidative reactions in liver pâté. *LWT Food Sci Tech*, 40(1): 58-65.
- Hussain, S.A., Rani, R. and Singh, R.R.B. (2009). Potential herbs for incorporation into dairy foods, *Functional dairy foods: Concepts and Applications*, 42(1): 471-495.
- Hussain, S.A., Patil, G.R., Yadav, V. and Singh, R.R.B. (In Press). Effect of storage on sensory quality, pH, wheying off and probiotic count of lassi supplemented with Aloe barbadensis Miller. *Indian J Dairy Sci*, (In Press).
- Hussain, S.A., Raju, P.N., Singh, R.R.B. and Patil, G.R. (2015). Potential herbs and herbal nutraceuticals: Food applications and interactions with food components. *Crit Rev Food Sci Nutr*, 55(1): 94122. DOI: 10.1080/10408398.2011.649148.
- Jayabalan K and Karthikeyan C (2012). Statistical Optimization of Processing Variables using Response Surface Methodology (RSM) for Sensory Evaluation of Aloe Vera Chocolate Preparation. *Research Journal of Pharmaceutical, Biological and Chemical Sciences* 2(3):446-455.
- Jothilingam S and Pugazhenthii T R (2013). Evaluation of dietetic aloe vera enriched flavoured milk for its microbial quality. *CIB Tech Journal of Microbiology* 3(1):24-27.
- Landge, U.B., Pawar, B.K. and Choudhari, D.M. (2011). Preparation of Shrikhand using Ashwagandha powder as additive. *J Dairying Foods Home Sci*, 30(2): 79-84.
- Manoharan A, Ramasamy D, Naresh Kumar C, Dhanalashmi B and Balakrishnan V (2012). Organoleptic evaluation of herbal ice creams prepared with different inclusion levels of Aloe vera pulp. *Indian Journal of Medicine and Healthcare* 1(2):25-28.
- NajgebauerLejko, D., Grega, T., Sady, M. and Domagala, J. (2009). The quality and storage stability of butter made from sour cream with addition of dried sage and rosemary. *Biotech Anim Husbandry*, 25(56):753-761.
- Özcan, M. (2003). Antioxidant activity of rosemary, sage and sumac extracts and their combinations on stability of natural peanut oil. *J Med Food*, 6(3): 267-270.
- Panesar P S and Shinde C (2011). Effect of storage on syneresis, pH, Lactobacillus acidophilus count, Bifidobacterium bifidum count of Aloe vera fortified probiotic Yogurt. *Current Research in Dairy Sciences*. ISSN 1994-5434/ DOI: 10.3923/crds.
- Pawar, N., Arora, S., Bijoy, R.R. and Wadhwa, B.K. (2012). The effects of Asparagus racemosus (Shatavari) extract on oxidative stability of ghee, in relation to added natural and synthetic antioxidants. *Int J Dairy Tech*, 65(2): 293-299.
- Pawar, N., Gandhi, K., Purohit, A., Arora, S. and Singh, R.R.B. (2014). Effect of added herb extracts on oxidative stability of ghee (butter oil) during accelerated oxidation condition. *J Food Sci Tech*, 51(10): 2727-2733.
- Rajanikant and Patil, G.R. (2005). Development of process for herbal ghee. *NDRI News*, 10(2): July-September.
- Ramachandran P and Srividya N (2014). In vitro antidiabetic activity and in vivo post prandial glycemic response of aloe gel enriched curd. *Int. J. of Food and Nutri. Sci*. 3(1):38-46.
- Sawale, P.D., Singh, R.R.B. and Arora, S. (2013a). Stability and quality of Herb (Pueraria tuberosa) milk model system. *J Food Sci Tech*, DOI: 10.1007/s131970131067y.
- Sawale, P.D., Singh, R.R.B., Kapila, S., Arora, S., Rastogi, S. and Rawat, A.K.S. (2013b) Immunomodulatory and antioxidative potential of herb (Pueraria tuberosa) in mice using milk as the carrier. *Int J Dairy Tech*, 66 (2): 202-206.

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