FORMULATION OF TURMERIC BASED FLEVORED MILK: A REVIEW

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Abstract: The main objective of the current study is to formulate a ready to serve beverage incorporate with milk and turmeric powder. Milk is a complex mixture of specific bioactive protein, saccharides and lipids and contains numerous biologically active substances such as immunoglobulin, antimicrobial peptides, enzymes, oligosaccharides, hormones and growth factors. To reduce the spoilage of the milk aromatic supplements can be added. The plant materials like turmeric, galingale, zingiber (roots), wild ginger, nutmeg, pepper (seeds), garlic, clove contain aromatic compounds inhibits the growth and enzymatic activities of the bacteria within the stored milk. Turmeric has a wide range of health benefits and medicinal uses. Main compound in turmeric is curcumin which acts as anti-oxidant and anti-inflammatory, making it a promising complementary therapy for cancer-prevention. Flavored milk are ready to drink products made from unfermented milk of different fats contents mixed with ingredients like sweeteners, cocoa powder, seeds, fruit juice, coffee, emulsifier, aromatic compounds or other ingredients. Turmeric based flavored milk enhances flavor, medicinal properties and nutritional value of milk.

***Index Terms*-Milk, Turmeric, Dairy products, Milk beverages, flavored milk and spices.**

I.INTRODUCTION

India is the world's largest producer of milk. China and Russia are the world's largest importers of milk and milk products. The ever increasing rise in domestic demand for dairy products and a large demand-supply gap could lead to India being a net importer of dairy products in the future. According to Sudhanshu *et al*.,(2012) milk is a complex mixture of specific bioactive protein, lipids and saccharides and contains numerous biologically active substances such as immunoglobulin, antimicrobial peptides, oligosaccharides, hormones. Fresh buffalo or cow milk contains more than 60 different enzymes including proteinases, lipases, amylases and phosphatases and enzymes with antimicrobial characteristics that are important in terms of milk stability and in terms of protection of mammals against pathogenic agents.

The term was coined by Khusniati and Widyastuti (2008) discussed milk of different species contains the same kind of constituents but varying in amount. Within a given species, genetic factors, environmental conditions Milk adding antibacterial and aromatic supplements to reduce the spoilage. It is widely known that there are a lot of commercial antibacterial and aromatic plant materials produced in India. plant materials contain antibacterial and aromatic compounds, which may inhibit the growth and enzymatic activities of the psychrotrophic bacteria within the stored milk: honey, cinnamon, ginger, turmeric, galingale, zingier, nutmeg, pepper (seeds), garlic, clove, betel vine, celery, garlic leaf, aloe vera (fresh leaves).

According to Palthur *et al*, (2014) had studied physico- chemical properties for the herbal milk analysis. Laboratory analysis was carried out to study the variation in moisture, protein, fat and ash content also pH, acidity and specific gravity were slightly changed when compared to normal milk. The organoleptic study has been conducted where appearance, colour, flavor and taste were studied and overall acceptability was good for herbal milk. Microbial studies like total plate count (TPC), yeast and mould count and e-coli count were carried out to evaluate the safety and keeping quality of the products. Antioxidant and iron chelating activity of the herbal milk was determined. Herbal milk product was the most preferred and recommended for market exploration.

Many “Ayurvedic” traditional herbs as medicine used in milk which have potential to be incorporated in processed food produces for improving the various functions and also prevent diseases like cancer, coronary heart diseases, diabetes and hypertension in addition to delaying the ageing process. Dairy product like flavored milk could potentially used to improve the temporary state of mind or freshness of mind, including antimicrobial function, cardiovascular system, gastro-intestines, growth, defense against free radical oxidation and to enhance psychological functions.

Dairy Council Digest (2008) discussed the flavored milk is white cow’s milk (whole, low-fat, fat-free milk) with added flavorings (chocolate, strawberry, etc.) and sweetener. This highly preferred, nutrient-rich beverage is just as nutritious as unflavored (white) milk. Flavored and white milk provide several nutrients (i.e., calcium, potassium, and magnesium) that are low in children’s and adults’ diets and not to limit children’s and adolescents’ access to flavored milk due to its sugar content. Doing so may have the undesirable effect of further reducing intakes of many essential nutrients provided by milk. Children’s consumption of flavored milk has been shown to increase their total milk and nutrient intakes and reduce their intake of soft drinks and other energy-dense and nutrient-poor beverages. A recent study has shown that drinking flavored or white milk was not associated with adverse effects on children’s and adolescents’ body mass index.

DEFINITION

As per FSSAI, (2011) flavored milk, may contain nuts (whole, fragmented or ground) chocolate, coffee or any other edible flavour, food colours and cane sugar also flavoured milk shall be pasteurised, sterilised or boiled. According to Bisig,(2011) flavored milk is defined as ready to drink product made from unfermented milk of different fats contents mixed with ingredients like sugar or other sweetener, fruit juice, cocoa powder, coffee, aroma agents, and other ingredients and additives. Palthur *et al.*, (2014) had described the flavored milk is a delicious, nutritious, healthy and relatively inexpensive thirst quenching drink consumed by all categories of people.

De, (2005) Flavored milk is milk to which some flavours have been added. When the milk is used, the product should contain a milk fat percentage at least equal to minimum legal requirements. The main types of flavored milks are fruits flavored milks, chocolate milks as compared to Sangeeta et al (2010) Chocolate milk with different carrageenans (jappa and lambda) and sugar concentration was heat treated indirectly at 145°C for 6 s using a bench-top UHT plant.

The Codex Standard For Fermented Milks flavored Fermented Milks are composite milk products, as defined in Section 2.3 of the Codex General Standard for the Use of Dairy Terms (CODEX STAN 206-1999) which contain a maximum of 50% (m/m) of non-dairy ingredients (such as nutritive and non nutritive sweeteners, fruits and vegetables as well as juices, purees, pulps, preparations and preserves derived the reform, cereals, honey, chocolate, nuts, coffee, spices and other harmless natural flavouring foods) and/or flavours. The non-dairy ingredients can be mixed in prior to/or after fermentation. Schmidt and Bates (1976) showed that the oilseed milks were generally judged inferior to cows' milk, and peanut milks were judged inferior to soy milk preparations. Commercial yogurt fruit flavorings of strawberry, raspberry, blueberry and orange greatly improved sensory acceptance of the milk like beverages and yogurt products.

Pandiyan *et al.,(*2011) showed that the mango flavored sweetened whey drink was prepared by using whey, sugar, and mango pulp. The treatments were divided into control, T1, T2 and T3 using 4%, 5% and 6% mango pulp respectively. The total solids content and the total sugar content of the control and treatments showed no significant difference. Mango pulp added treatments scored a high by the sensory panel and Mango flavored sweetened whey drink can be prepared by using 4, 5 and 6 % of mango pulp with highest consumer acceptability as compared to the control. Whey contains about half of the milk solids and addition of mango pulp in the preparation of whey drink increased the deliciousness and nutritional value.

The new process optimization and retort packaging of rose flavored milk by Anandh *et al.,* (2014) studied flavored milks in a ready –to-drink form are in a great demand in the domestic and international market and it was thermally processed in retort pouches having three layer configurations and standardized the method for rose flavored milk for retort processing. The level of incorporation of rose flavour (0.05%, 0.1% and 0.2%) was optimized. The product which commanded highest sensory acceptance was further subjected to storage study for a period of three months.

Langley (2013) has found that children who drink flavored milk are nearly twice as likely to meet their daily calcium targets as exclusively plain milk drinkers also study found that children who drink plain or flavored milk from a cup or glass are between 4 and 5 times more likely to reach their recommended daily nutrient intake than non-milk drinkers. In addition to calcium, the study found that milk drinking from a glass was associated with higher intake of magnesium another nutrient of concern among susurration children as well as higher intake of phosphorus, potassium and iodine. The study found that exclusively plain milk drinkers are 4:1 times more likely to meet their daily calcium targets than children who do not drink flavored milk were 5 times more likely to meet their daily calcium targets than non - consumers of milk.

Bixler *et al.,*(2001) studied the ultra-high-temperature processing is the preferred way of heat treating chocolate flavored milk as it enhances the flavour of the chocolate without making bitter, provides an overall smoothness and favourable mouth-feel and extends its shelf-life. Practice of converting milk into milk product is developed into ages ago and estimated that about 46 per cent milk is used as fluid milk while 54 per cent of total milk is converted into milk products like cream, butter, ghee, ice-cream, flavored milk etc. Some people do not like the flavour of natural milk but appreciate the nutritional value of milk in the form of flavour milk. It can also encourage children to consume more milk and some milk is used in school milk programmes. Flavored milks provide other option for meeting the recommended intakes of dairy products and originally flavored milk was prepared as milk shake in restaurants, fast food shops and households. According to the market research, the consumption of flavored milk also shows growth rates above those for normal liquid milk. From 2000 to 2002 the growth rate in Europe was 4 per cent and worldwide even 13 %.

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II. INGREDIENTS

Milk Fat

Fat in the milk adds body and mouth feel. Low fat contents are more refreshing and suited to fruit flavors. Chocolate flavour works better in higher fat formulations. A blend of milks is used to give a particular fat content.

Sugar

Various sugars, syrups and artificial sweetener blends are used in flavored milk. Chocolate flavored milks are usually formulated with higher sugar or sweetener content. According to Singh *et al.,*(2012) honey is a natural sweetener, but it is not just a sweetener it's a nature's gift to mankind also boosts its health quotient. It has antimicrobial properties.

Flavor

Many different flavors are used. Most commonly banana, strawberry, mango and chocolate flavours are used. Both natural and synthetic flavors are used in flavoured milk. Other flavors such as vanilla can be added to "round out" the chocolate flavor. Dalim (2012) had studied the chikoo flavored milk based beverage compared to that of banana flavored milk-based beverage.

Color

Color provides a means of presenting a beverage to the consumer and helps to identify the flavour of the product by visual appearance. Liquid colors are added to flavored milk and choice of color is determined by processing conditions, and may be affected by legislation.

Stabilizer

Stabilizers enhance quality as well as viscosity as required and impart stability to natural cloulds. A blend is used to obtain a range of properties. Stabilizers like CMC., xanthan gum, guar, locust bean gum, carrageenan and pectin its improve the quality of product.

Emulsifier

This maintains small fat globules and so reduces the tendency of the fat to rise in long term storage and also affects creamy texture or "mouthfeel". Propylene glycol alginate, Calcium alginate, Sodium alginate, etc. are used as a emulsifier.

Cocoa

It is rich in B-complex vitamins, vitamin E, calcium, iron, copper and zinc. Apart from that, raw cocoa also contains healthy fats and flavonoid antioxidants and also helps to boost up energy levels. Cocoa is insoluble and has to be held in suspension to prevent the drink from separating into dark cocoa sediment under white milk.

Honey

Honey is normally used in our daily life for treatment of hearing loss, heart diseases, toothache, hair loss, bladder infections, infertility etc. It is used as a mixture with many natural products like lemon, clove, milk, cinnamon and water for treatment of various aliments and other health disorders. Jabri (2005) The combination of milk and honey proved to be an important source of nutrition and for protection against microbial infection. It can also relieve a cough or cold.

Chia seeds

Chia seeds are an excellent source of calcium, protein and a number of antioxidants and also contain high levels of omega-3 fatty acids that further boost the milk's omega-3 fatty acid levels. Milk with chia seeds makes a healthy flavored drinks.

III. PRODUCTION TECHNOLOGY

Dalim (2012) studied the chikoo flavored milk based beverage compared to that of banana flavored milk-based beverage. Average fat content in chikoo flavored and banana flavored milk-based beverage was found to be 0.12 % and 0.18 %, respectively. Maximum concentration of protein content was found in banana. Total carbohydrate content 11.51 % was remarkably higher in chikoo flavored milk-based beverage compared to that of in banana flavored milk-based beverage 10.96 %.Banana flavored milk-based beverage was found to be more ($p<0.05$) acidic (0.20±0.003%) contrast to that of chikoo flavored milk-based beverage (0.18±0.0.004%). He has studied the method of production and comparison of banana and chikoo flavored milk-based beverages and figure 1.

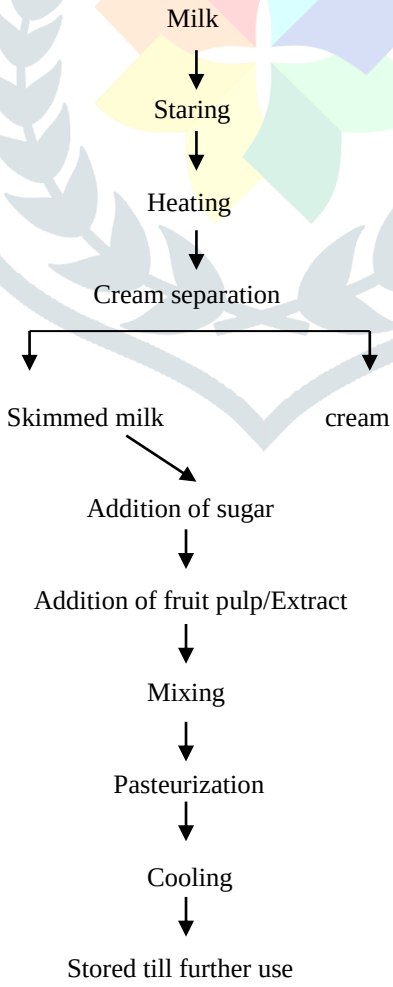

Figure 1.

Flavored fruit milk as a nutritional food has become the topic of research. In fact, consumption of dairy product flavored milk has been linked to several health benefits that are the direct antitheses of diseases and complications that arise from overweight and obesity. For example, individuals that consume low-fat dairy products are more likely to have lower weight, lower blood pressure.

IV.CONCLUSION:

Milk is an excellent source of an essential nutrients and similarly turmeric has therapeutic and anti-oxidant properties. It is used in various drugs and pharmaceutics, mainly because of its immunity boosting power. The reason behind the development of turmeric blended milk is relieve from swelling and pain due to headaches and wounds as well as relieves cough and cold. Almost three quarter of the day, children drinks less than one portion of plain milk. Flavored milk can help children to meet their nutrient needs, and helps to consume the daily serving of dairy recommended by Dietary Guidelines for Americans. Huge majority of the children prefers flavored milk over plain milk.

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