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Development of Herbal Milk Shake Dip Bags from Milk Powder, Tulsi Powder and Turmeric Powder

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***Abstract*: Food industries have rather high demand for the products that meet the consumer's demand for a healthy life style for which functional food fortified with the plant ingredients plays an important role. Tulsi, turmeric and cinnamon are such important medicinal plants whose medicinal usage has been reported in the Indian and British Pharmacopoeias and in the Ayurvedic system of medicine and day to day life of human beings, also having various health benefits including immunomodulatory, anti-inflammatory, antiarthritis, and anti-bacterial, antioxidant, anti-diabetic and anti-tumor. The present study was anticipated to develop ready to mix and make herbal milk shake bags by using natural herbs such as tulsi, turmeric and brown sugar with milk powder. The herbal shake was developed by adding different level of milk powder (T1) 10 %, (T2) 20 %, (T3) 30 %, while control sample was prepared without addition of milk powder (T0). Sensory attributes, physic-chemical constituents and microbiological analysis were analyzed from prepared product and data was collected from that were tabulated.**

***Keywords*: Herbal milk shake.**

1. Introduction

A. Tulsi

Tulsi (Ocimum sanctum) is an aromatic plant which has many medicinal properties. It contains several phyto-constituents such as cardinene, cubenol, borneol, linoleic acid, orientin, linolenic acid, steric acid, oleic acid, palmitric acid, eugenol, vallinin, vicenin, vitexin, vllinin acid, circineol, gallic Acid, vitamin A, vitamin C, phosphorus and iron due to which it possesses multifarious medicinal properties such as antiviral, antifungal, antibacterial, antimalarial, anthelmintic, anti-oxidant, anti-cataract, anti-inflammatory, chemo preventive, radio protective, hepato-protective, neuro-protective, cardioprotective, anti-diabetic, anti-hypercholesterolemia, anti-hypertensive, anti-carcinogenic, analgesic, anti-pyretic, anti-allergic, immunomodulatory, anti-asthmatic, diaphoretic, antithyroid, anti-fertility, anti-ulcer, anti-emetic, Anti-spasmodic, anti-arthritic, adaptogenic, anti-stress, anti-cataract, anti-leukodermal and anti-coagulant.

B. Turmeric

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. Bioactive components of turmeric have a wide spectrum of biological actions such as anti-inflammatory, anti-oxidant, anti-carcinogenic, antimutagenic, anti-coagulant, anti-fertility, anti-diabetic, anti-bacterial, anti-fungal, anti-protozoal, anti-viral, anti-fibrotic, anti-venom, anti-ulcer, hypertensive and hypocholesteremic activities. Thus, both turmeric and curcumin have the potential for the development of modern medicine for the treatment of various diseases.

C. Milk Powder

Milk Powder is also called as dried milk or dry milk. It is manufactured by dairy products by evaporating milk or dryness. One of the purposes of drying milk is to preserve it; milk powder has a far longer shelf life than liquid milk and does nor needs to be refrigerated, due to its low moister content. Another purpose is to reduce its bulk for the economy of transportation. Powdered milk and dry products include such items as dry whole milk, non-fat (skimmed) dry milk, dry buttermilk, dry whey products and dry dairy blends. Powdered milk is used for food as additive, health (nutrition), and also is biotechnology (saturating agent). Powdered milk is frequently used in the manufacture of infant formula, confectionery such as chocolate and caramel candy, and in recipes for baked goods where adding liquid milk would render the product too thin. Powdered milk is also widely used in various sweets such as Indian milk balls known as gulab jamun and popular Indian sweets delicacy (sprinkled with desiccated coconut) known as chum-chum (made with skim milk powder). Milk powder contains all 21 standard amino acids, the building blocks of proteins, and is high in soluble vitamins and minerals. According to USAID, the typical average amounts of major nutrients in the unreconstituted nonfat dry milk are (by weight) 36% protein, 52 % carbohydrates, 26-40 % fat, and 5-7 % ash (minerals).

In Canada powdered milk must contain added vitamin D in an amount such that a reasonable daily intake of the milk will provide between 300 and 400 international units (IU) of vitamin D. However inappropriate storage conditions, such as high relative humidity and high ambient temperature can significantly degrade the nutritive value of milk powder.

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D. Brown Sugar

Brown sugar is a sucrose sugar product with a distinctive brown color due to the presence of molasses. It is either an unrefined or partially refined soft sugar consisting of sugar crystals with some residual molasses content (natural brown sugar), or it is produced by the addition of molasses to refined white sugar (commercial brown sugar). The Codex Alimentarius requires brown sugar to contain at least 88% of sucrose plus invert sugar. Commercial brown sugar contains from 3.5% molasses (light brown sugar) to 6.5% molasses (dark brown sugar) based on total volume. Based on total weight, regular commercial brown sugar contains up to 10% molasses. The product is naturally moist from the hygroscopic nature of the molasses and is often labelled as "soft." The product may undergo processing to give a product that flows better for industrial handling. The addition of dyes or other chemicals may be permitted in some areas or for industrial products. Particle size is variable but generally smaller than granulated white sugar. Products for industrial use (e.g., the industrial production of cakes) may be based on caster sugar, which has crystals of approximately 0.35 mm. Brown sugar is often produced by adding sugarcane molasses to completely refined white sugar crystals to more carefully control the ratio of molasses to sugar crystals and to reduce manufacturing costs. Brown sugar prepared in this manner is often much coarser than its unrefined equivalent and its molasses may be easily separated from the crystals by simply washing to reveal the underlying white sugar crystals; in contrast, with unrefined brown sugar, washing will reveal underlying crystals which are off-white due to the inclusion of molasses. One hundred grams of brown sugar contains 377 Calories, as opposed to 387 Calories in white sugar. However, brown sugar packs more densely than white sugar due to the smaller crystal size and may have more calories when measured by volume. Any minerals present in brown sugar come from the molasses added to the white sugar. In a 100-gram reference amount, brown sugar contains 15% of the Daily Value for iron, with no other vitamins or minerals in significant content.

2. Materials and Methods

A. Sample Collection

Fresh Pasteurized cow milk was procured from the local dairy of vadodara. Tulsi leaves, Turmeric, Cinnamon Sticks, Brown sugar and coffee filter paper were purchased from the local market.

Instruments:

1. Incubator
2. Weighing balance
3. Ph meter
4. Colony counter

Glass wares:

1. Measuring Cylinder
2. Conical Flask
3. Beakers
4. Glass bottles
5. Test tube
6. Pipette
7. Petri plates
8. Spreader

B. Preparation of Milk Powder

1. For making powdered milk or dry milk use pasteurized milk of (3.2% FAT & 8.5% SNF).
2. Freshly packed milk is collected from local dairy of vadodara.
3. Boil 3 to 4 litres milk in a boiler and add water if needed.
4. Simmer the milk for a few hours until the water has evaporated and the milk gets a creamy consistency.
5. Pour the milk into a large bowl.
6. Pre heat the oven at 150°F and place the bowl in it. Leave the oven slightly open so that the moisture gets out.
7. When the milk is dry take it out of the bowl and grind the pieces in a blender.
8. To make powder blend the dried milk in mixer until it forms a powder.
9. Store the powdered milk in a vacuum seal jar for longer shelf life.

C. Preparation of Tulsi Powder

1. Tulsi leaves brought from local market.
2. Tulsi leaves were sorted and washed with water thoroughly.
3. Heat the tulsi leaves at 65 ^{o}C for 5 min with 1:4 amount of water.
4. Dry the tulsi leaves for further process.
5. Crushed the dried leaves of tulsi with motar and pestle.
6. Filter the crushed leaf with strainer and collect the fine powder of crushed tulsi leaves.
7. Store the sample for further use.

D. Preparation of Turmeric Powder

1. Turmeric has brought from local market.
2. Break the turmeric into small pieces and keep for drying.
3. Spread the broken pieces on a plate and cover it with a mesh to prevent dust settling on top.
4. Grind the turmeric pieces in a blender for making smooth and fine powder.
5. Sieve it and then grind the left over again to a smooth powder.

E. Preparation of Cinnamon Powder

1. Cinnamon Sticks has bought from local market.
2. Break the Cinnamon sticks in to small sticks.
3. Breaking the Cinnamon sticks into small sticks helps the sticks to get powdered without much difficulty.
4. Now blend it into a fine powder using a blender.
5. Transfer the sieved powder and brown sugar in to the blender and blend it.
6. Store in an air tight container for a longer shelf life.

F. Preparation of Herbal Milk Shake Dip Bags

1. The herbal milk was prepared using Tulsi, Turmeric, milk powder and cinnamon powder.
2. Take the powdered tulsi, turmeric, cinnamon and milk powder in a dry pan.
3. Mix brown sugar with the mixture and heat with low flame.
4. The mixture was mixed with milk powder at 40 percent by weight of mixture in three different treatments 10%, 20%, 30% and the mixture was mixed uniformly.
5. For making a dip bags of herbal shake take a coffee filter paper.
6. Cut the sides of coffee filter paper so that it creates a rectangle.
7. Place the ready mixture of herbal shake powder on the coffee filter paper.
8. Fold the coffee filter paper and make the dip bags and staple a string on the top folds of the packet.
9. Take a cup of hot water and place the ready dip bag of mixture in hot water.

G. Physiochemical Analysis

1) Ph

The Ph content was determined by (M. Tronic digital-255) Ph meter.

2) Moisture

Method:

1. Dry the empty dish and lid in the oven at 150 °C for 3 hr and transfer to desiccators to cool. Weigh the empty dish and lid.
2. Weigh about 3 g of sample to the dish. Spread the sample to the uniformity.
3. Place the dish with sample in the oven. Dry for 3 hr at 150 °C.
4. After drying transfer the dish with partially covered lid to the desiccators to cool. Reweigh the dish and its dried sample.

Calculation:

$$\text{Moisture (\%)} = \frac{(M1\text{-}M2)}{CC\ (M1\text{-}M2)} \times 100$$

Where,

M = mass in g of empty dish.

M1 = initial mass in g of dish + material taken for analysis.

M2 = Final mass in g of dish after drying.

3) Total Solids

In this process, a known quality of milk is dried on a boiling water bath. Subsequently sample is dried in hot air oven at 102+ 2°C and from the weight of the residue, the total solids content in milk is determined.

Calculation:

$$\text{Total Solid Content} = \frac{M2\text{-}M0}{M1\text{-}M0} \times 100$$

4) Titratable Acidity

Weigh accurately about 10 g of the material in a suitable dish or beaker. Add 30 ml of warm water. Add 1ml of phenolphthalein indicator. Shake and titrate against standard NaOH solution. Complete the titration in 20 seconds. Keep a blank by taking 10 g of material diluted with 30 ml of water in another dish for comparison of colour.

Calculation:

$$\text{Titratable acidity} = \frac{\text{No of ml of 0.1N NaOH for X 0.009 X 100}}{\text{Weight of sample}}$$

$$\text{(Weight of sample – volume of milk X specific gravity)}$$

5) Fat

Take 1 gm of sample add equal amount of water for homogenization. Add 9 ml hydrochloric acid and 0.3 ml of ammonia in that beaker; put that beaker on water bath for 2 hours. After that add 10 ml absolute alcohol add 50 ml of petroleum ether and 50 ml of diethyl ether and shake vigorously for minute. Now take out the upper layer in pre weighed beaker. Evaporate it completely on water bath at temperature that does not cause bumping. Dry the fat in the oven at 102+ 2°c to a constant weight. Weigh that cooled beaker.

Calculation:

$$\text{Fat \%} = \frac{100(W1 - W2)}{W3}$$

Where,

W1 = Weight in g of contents in the flask or metal dish or glass bowl before removal of fat.

6) Protein

1. Take 10 gm of sample accurately weighed in a conical flask.
2. Add 1 ml of phenolphthalein indicator.
3. Add 0.4 ml of saturated potassium oxalate solution.
4. Set aside for 2 minutes.
5. Titrate against 0.1 N Naoh till end point (presence of light pink colour).
6. Add 2 ml formaldehyde.
7. Titrate against 0.1 N Naoh till end point.
8. Calculate the protein present using the formula given below.

Calculation:

$$\text{Protein (\%)} = \text{Volume of Naoh X } 1.7$$

H. Microbial Analysis

Standard plate count method, yeast and mould count, coliform count were analyzed using methods employed in manual of microbiological testing of FSSAI. For enumeration of coliforms the red bile agar was used for solidifying the petri plates. The plates were allowed to solidify and were incubated at 37 ºC for 1-2 days. For enumeration of yeast and mould count serial dilutions of sample were performed and the plates were

allowed to solidify and then incubated at 22-25 ºC room temperatures for 3-5 days.

I. Sensory Evaluation

When the quality of a food product is assessed by means of human organs, the evaluation is said to be sensory or subjective or orgonoleptic. Every time food is eaten a judgement is made. Sensory quality is a combined of different senses of perception coming into play in choosing and eating a food. The effective characteristic is not the property of the food but the subject's reaction to the sensory qualities of foods. This reaction is highly conditioned by a variety of psychological and social factors thus playing a vital role in the acceptance and preference of food. The systematic sensory evaluation was carried out on prepared product having different ratios of milk powder compared each with control product by 9 points headonic scale. Sensory evaluation of control as well as experimental products was carried out by 9-point headonic scale test.

3. Results

A. Moisture

Table 1
Moisture

Treatment	Moisture (%)
T0	43.46
T1	45.12
T2	48.73
T3	50.07
Mean Value	±46.845

B. Total Solid

Table 2
Total solid

Treatment	Total Solid (gm %)
T0	58.54
T1	56.69
T2	53.83
T3	51.72
Mean Value	±55.195

C. Fat

Table 3
Fat

Treatment	FAT (gm %)
T0	8.93
T1	8.62
T2	8.25
T3	7.76
Mean Value	±8.39

D. Protein

Table 4
Protein

Treatment	Protein (gm %)
T0	7.98
T1	7.86
T2	6.93
T3	6.80
Mean Value	±7.392

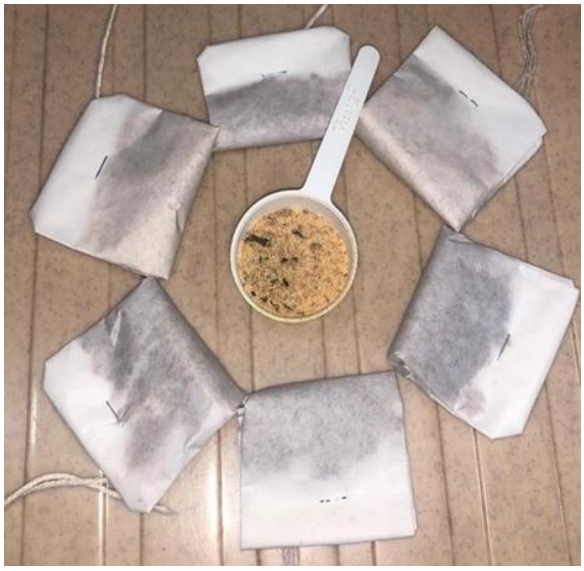

Fig. 1. Herbal milk shake dip bags

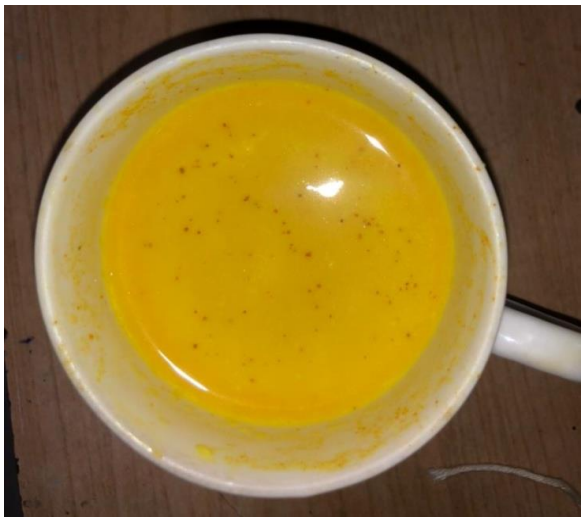

Fig. 2. Dipped bag of herbal shake in hot water for use

E. Microbiological analysis of the product

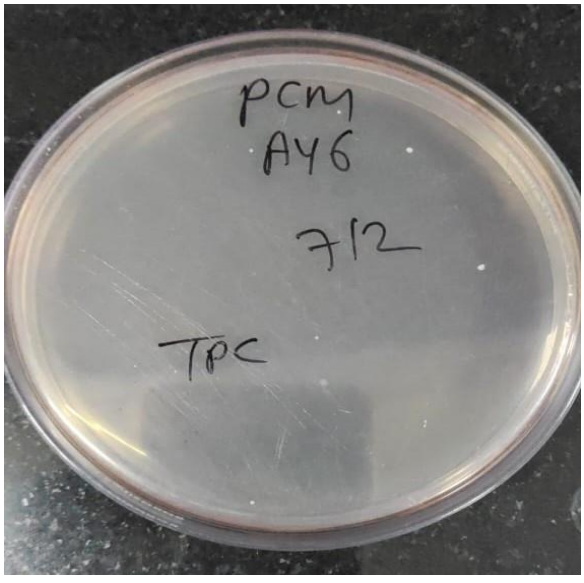

Fig. 3. Standard plate count plate

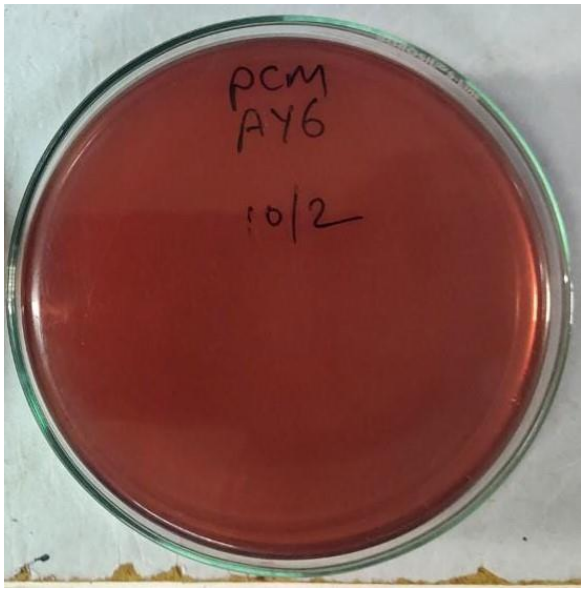

Fig. 4. Coliform plate count plate

4. Conclusion

The Present investigation was undertaken for "Development of herbal milk shake with tulsi powder, turmeric powder and milk powder" for sensory, physic-chemical and microbial analysis. The present study was conducted with sample preparation and the product was developed and standardized by using addition of different milk powder ratio T0 (0 % milk powder), T1 (10 % milk powder), T2 (20% milk powder), T3 (30% milk powder). Sensory analysis of the product had been done. After developing the product physic-chemical analysis of product was done and then finally in last microbiological analysis of different experimental and control treatments were done. Sensory attributes was done at the same period of time. According to sensory attributes all different treatments were accepted. Results obtained were satisfactory and the herbal milk shake showed good quality characteristics on Ph, Acidity, Moisture, Total solid, Ash, Fat, Protein and Lactose. The overall acceptability was found with T1control sample.

From the above result of the present investigation, it was concluded that tulsi powder, turmeric powder could be successfully utilized for preparation of herbal milk which is nutrionally rich, wholesome and reasonable. Present investigation also revealed that herb played an important role alerting the functional properties of milk fortified with it. Addition of tulsi and turmeric powder gave typical flavor and improved the sensory quality and acceptability of the product. Having good amount of antioxidant and total phenolic content it can give various health benefits such as anti-microbial, anti-inflammatory, cardio-protective, anti-carcinogenic, anti-pyretic.

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