

## Functional Dairy Products

Dr. Satla Sneha Priya<sup>1</sup>, Dr. Gajanavena Akhila<sup>2</sup>

<sup>1</sup>Contract Teaching Faculty, Department of Livestock Products Technology, R'nagar, Hyd

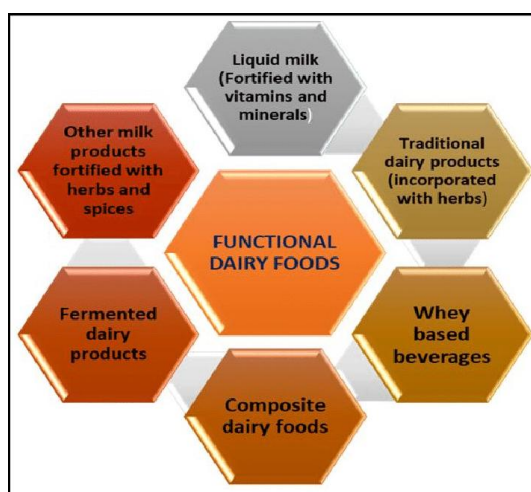
<sup>2</sup>PG Student, Department of Livestock Products Technology, CVSc, Rajendranagar, Hyd

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**Definition:** Functional Dairy Products are the conventional milk based products like yogurt, cheese which are enhanced by probiotics, prebiotics or vitamins to provide health benefits apart from providing basic nutrition.

**Classification:**

- Liquid milk (Fortified with vitamins and minerals)
- Traditional dairy products (Incorporated with Herbs)
- Whey based beverages
- Composite dairy foods
- Fermented dairy products
- Other milk products fortified with herbs and spices



### 1. Fortified Liquid Milk:

The milk to which vitamins and minerals were added. These additions can help in overcoming potential nutrient deficiencies in the diet and is a common public health practice. Milk is a rich source of high quality protein, calcium and fat soluble vitamins A & D. These vitamins lost when milk fat is removed during processing. Fortification of milk with vitamin A & D is required in India because of the deficiencies in population. A survey done by NNMB and ICMR in 2012 stated that population in India mostly young children especially living in urban areas having less exposure to sunlight due to which they are suffering with deficiency of these vitamins. Since milk is consumed by most of the population, fortification with certain micronutrients is good to address malnutrition.

### 2. Traditional Dairy Products (Incorporated With Herbs)

Incorporation of herbs into products like ghee, dahi, lassi & paneer can enhance their nutritional value, shelf life & flavour, while it also offer potential therapeutic benefits.

**a. Ghee:** herbs like sage and rosemary can be added to ghee to extend its shelf life and enhance flavour. Herbs are added after heating the ghee over medium flame, if dried herbs add directly to hot ghee, in case of fresh herbs wash and dry and then added to ghee then heat the ghee at low heat for 10-15 minutes, remove the herbs using fine mesh sieve and allow the ghee to cool then store for future use.



***SAGE HERB***

**b. Dahi:** adding aloe Vera to dahi can improve its properties like immune protective action and enhance the probiotic growth. It is important to use aloe vera gel from inner part of aloe vera leaf and avoid the outer latex which can cause digestive problems. Usage of aloe vera should be in moderate amounts and should be aware of potential laxative effects.



***ALOEVERA***



**c. Lassi:** Fortifying lassi with herbs like ginger, turmeric & carrot extracts can provide physico chemical effect and enhance its nutritional value. In a bowl add curd, cardamom powder, water, turmeric, honey & some dry fruits (optional), next using a whisk mix the contents thoroughly until it become smooth & creamy, transfer and garnish and serve cold.

**d. Paneer:** Herbs & spices can be incorporated into paneer to enhance its shelf life and nutritional value, with some herbs exhibiting antifungal and antibacterial properties.

**e. Cheese:** Shelf life & consistency of cream cheese improved on addition of moringa oleifera ethanol extract at different ratios i.e. 2, 3 and 4grams per 100g skimmed milk which has gone through ultrafiltration process. In case of *spicy mudaffara cheese* 3 different spices are added like clove, black cumin and black pepper, which can be stored at room temperature for 4-6weeks with good taste and the shelf life also increased up to 8weeks when kept in refrigerator, whereas in case of *Gibna cheese* 0.02% fenugreek, cinnamon & cardamom powder to coagulated curd which is prepared from goats milk.

For preparation of *otlu peynir cheese* 25 different types of herbs including allium spp. thymus spp. ferula spp. & so on are added to milk obtained from sheep. Cinnamon stick, oregano, clove, pomegranate peel & grape seed extracts were effective against 3 food borne pathogens in cheese like *Listeria monocytogens*, *Staphylococcus aureus* & *Salmonella enterica*. at room temperature. Herbal cottage cheese with fresh or dried parsley, chili pepper, garlic and rosemary. The herbal cottage cheese had optional sensory properties, improved biological value and extended shelf life.

**f. Shrikhand:** Herbs like Ashwagandha powder can be added. Prepared by addition of 0.5% Ashwagandha powder to shrikhand, which was organoleptically superior. The treated product is acceptable upto 52days of refrigerated storage.



### **ASWAGANDHA POWDER**

**g. Sandesh:** This is chhana based sweet which can be infused with herbs like moringa and roselle leaves to enhance its microbiological properties & it also enhances nutritional value



and potentially add a unique flavour. Direct moringa leaf extract can be added to the chhana during sandesh preparation or dried & powdered leaves can be added to chhana or to the final Sandesh mixture.



**POWDERED MORINGA LEAVES**

### 3. Whey Based Beverages:

Whey based beverages are drinks formulated using whey like the liquid by products from cheese or casein production it contains lactose, whey proteins, vitamins & minerals.

**Types:** fruit-based whey beverages, whey combined with fruit juices (e.g. Mango, orange), herbal whey beverages enriched with extracts like tulsi, ginger or aloe vera, carbonated whey drinks like fizzy functional drinks with added flavours or nutrients and probiotic whey beverages containing live beneficial bacteria like lactobacillus or Bifidobacterium.

#### **Benefits:**

- Rich in high quality proteins
- Promotes muscle repair and growth
- Popular in sports nutrition
- Aids gut health, especially when probiotics enriched
- Contains bioactive peptides with anti-hypertensive, anti-oxidant & anti-microbial growth.

#### **Challenges:**

- High lactose content may not be suitable for lactose-intolerant individuals
- Requires flavouring and stabilization to improve palatability.

### 4. Composite Dairy Foods:

These are the dairy based products blended with non-dairy components such as cereals, fruits, vegetables or nuts to enhance nutrition and functionality. Examples include yogurt with fruits chunks and seeds, cheese spreads containing vegetables, milk shakes fortified with oats or almond flour.



**Benefits:**

- Improved nutritional profile combines proteins from dairy with fibers, vitamins or minerals from plant sources.
- Enhanced sensory appeal, textural diversity and flavour improvements.

**Applications:**

- Targeted at health-conscious consumers
- Convenient meal replacements or functional snacks.

**5. Fermented Dairy Products:**

These are the dairy products produced by microbial fermentation primarily using lactobacillus streptococcus or Bifidobacterium species. Examples include yogurt, kefir, buttermilk (chaas), lassi, dahi, cultured sour creams & cheese.



***KEFIR***

**Health benefits:**

- Probiotic rich
- Lactose reduction
- Potential to lower cholesterol and improve metabolic health
- Contains bioactive peptides with anti-oxidant, anti-inflammatory and anti-cancer properties.

**Functional innovations:**

- Fortified with prebiotics
- Enriched with vitamin B<sub>12</sub>, K via microbial synthesis
- Some products contain plant based additions (e.g. moringa, turmeric) for enhanced benefits.



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