

Packaging of Milk and Milk Products

Chaitradeepa G Mestri¹ and Preeti Birwal^{2*}

¹Ph.D. Scholar, Department of Food Technology, M S Ramaiah, University of Applied Sciences,
Bangalore, Karnataka, India

²Scientist, Punjab Agricultural University, Ferozpur Road, Ludhiana-141004,

*Corresponding Author: preetibirwal@gmail.com

The art of using the best possible materials for carrying, identifying, and merchandising any product is known as packaging. It serves as a crucial link between the producer and the final consumer to ensure the product is delivered safely through all the pathways including manufacturing, storage, transport, distribution, and marketing stages. Protective packaging is required to withstand the risks of climate changes, shipping, handling, etc. in order to offer fresh, sound, and convenient forms of milk and to minimise losses (Paine& Paine, 2012).

Currently, milk production is increasing at a global pace of 2%, while it is increasing at a rate of over 6% in India. India has substantially higher per capita milk availability than the rest of the globe (Boland& Hill, 2020). When compared to the global average of 322 grammes per day in 2021, the country's daily milk consumption increased from a low of 107 grammes per person in 1970 to 427 grammes per person in 2020-21 during three decades (the 1980s, 1990s, and 2000s).

Packaged, branded pasteurised milk makes up just 12% of the milk sold today. The proper packaging of dairy products is crucial not only to maintain nutritional content and reduce waste, but also to increase marketability and generate higher profits. There are many different forms of milk that provide packaging manufacturers in the fields of glass, metal, paper, plastics, etc. with a wealth of difficult chances

to innovate and introduce packaging solutions that may be readily adopted in our nation (Muehlhoff& Bennett, 2013).

The packaging industry's challenge is to provide consumers with nutrient-dense dairy products in the most cost-effective, hygienic, secure, and environmentally responsible packages possible (Kawabata et al., 2020).

Selection of packaging material

Milk and dairy products are packaged using a variety of materials depending on the type of product, the processing and storage circumstances, the handling requirements, and the intended use. Most often used containers are laminates (multilayer materials), pouches, plastic tubs, cans, and glass and/or plastic bottles. All of them must give all product information mandated by law, which is something they all have in common (Mirza Alizadeh et al., 2021).

There is no "one size fits all" solution or good or terrible packaging material; instead, it all depends on striking the right balance between the required packaging function and the least possible environmental impact. Although it is normally necessary for a packaging material to be inert and not interact with the dairy product being packed, current trends are moving in the direction of developing packaging that does interact in order to increase the shelf life (Millican& Agarwal, 2021).

Types of packaging materials used for packing of milk and milk products (Atanu Jana, Food packaging technology)

Dairy product	Packaging material used
Packaging of fluid milk • Pasteurized milk	Glass / plastics (LDPE) / tetra packs
Packaging of cream	Polyethylene / Polystyrene / Polypropylene
Packaging of fermented dairy products • Yogurt	Polystyrene tubs covered with aluminium foil LDPE sachets, polystyrene cups,
• Buttermilk / sour cream/ lassi	polypropylene cups, wax coated paper Aseptic tetra packs,
• Dahi	Polystyrene / polypropylene cups with aluminium foils-based lids
• Shrikhand	Polystyrene / polypropylene cups
Packaging of ice cream	Liner less bleached sulphate board carton coated with wax / polyethylene wax blends Aluminium container Plastic container
Packaging of milk-based sweets • Khoa	Polypropylene containers with lids
• Peda	Paper board lined with polyethylene /
• Paneer	Polypropylene Vegetable parchment paper / polyethylene bags
• Rasogolla	Tin cans

The necessary characteristics of packaging materials for packing of milk and milk products are:

- Compatible with the product.

- Protection from mechanical risks, particularly those related to transportation.
- Work well with production lines.
- Advertising potential.
- Attractive appearance.
- Simple to handle while manufacturing, storing, and distributing
- Resistant against moisture.
- Enough mechanical strength to withstand shock, compression, vibration, etc.
- Resistance to acids and bases.
- Resistance to oil and grease.
- Product resistance to photochemical modifications.
- Tolerance to rodents and insects.
- Fireproof and water, fume, and smoke resistant.
- Inert: Has no impact on scent or flavour.
- Safe for human health.
- Economical
- Easy accessibility.
- Take precautions against climatic risks.
- Provide microbial protection.

Microbes should not live there; instead, it should govern growth factors to limit their proliferation.

Disposal of dairy packages

The empty packages that remain after product use must be thrown away, and they make up a sizable amount of the solid waste generated by the community. Authorities in the ministry or the department of public health are responsible for the garbage collection and proper disposal. The principal packaging materials that mix with municipal trash and pose a concern for proper disposal are glass,

paper, plastic, and tin cans. Because many packaging materials cannot be properly disposed of in the environment without disrupting its stability, it is significantly more difficult.

Hierarchy of waste disposal

1. **Prevention:** Using proper packaging material might also aid in reducing waste.
2. **Minimization:** During the process of designing a package, one of the factors to be minimised is the mass and volume of the packing.
3. **Reuse:** Reusing a packaging material for several uses is recommended and hence long economic life.
4. **Recycling:** Reprocessing resources (packaging material) into new goods or new packaging material reduces the cost of final product.
5. **Energy recovery:** The heat from the packaging components can be used in permitted facilities for waste-to-energy from recycled materials.
6. **Disposal:** Some materials require incineration or deposit in a sanitary landfill (Patel et al., 2017)

Standardization in packaging of milk and milk products

There is a need to raise packaging standards as a result of rising industrialisation, increased milk output, value addition, better storage facilities, and advancements in transportation techniques. Modernising packaging standards will preserve food

product quality, extend shelf life, satisfy market expectations, and maintain consumer trust.

References

- Paine, F. A., & Paine, H. Y. (2012). *A handbook of food packaging*. Springer Science & Business Media.
- Boland, M., & Hill, J. (2020). World supply of food and the role of dairy protein. In *Milk Proteins* (pp. 1-19). Academic Press.
- Muehlhoff, E., & Bennett, A. (2013). *Milk and dairy products in human nutrition*.
- Kawabata, M., Berardo, A., Mattei, P., & de Pee, S. (2020). Food security and nutrition challenges in Tajikistan: Opportunities for a systems approach. *Food Policy*, 96, 101872.
- Mirza Alizadeh, A., Masoomian, M., Shakooie, M., ZabihzadehKhajavi, M., & Farhoodi, M. (2021). Trends and applications of intelligent packaging in dairy products: A review. *Critical Reviews in Food Science and Nutrition*, 62(2), 383-397.
- Patel, H. G., Modha, H., & Ranganadham, M. (2017). Packaging of dairy products. *December*, 20, 1-120.
- Prof. Atanu Jana, Food packaging technology
- Millican, J. M., & Agarwal, S. (2021). Plastic pollution: a material problem?. *Macromolecules*, 54(10), 4455-4469.

* * * * *