

FST-402,Dairy Technology 3 (2-1)

Educational Objectives:

This course aims to introduce students to an understanding of the chemistry of milk constituents. Milk and various dairy products are discussed from the perspective of the chemical, physical and biological changes that occur during processing. This course will help to train students to scientifically undertake all operations of animal husbandry and dairy technology and to create employment potential and manpower for dairy development. Moreover, it will help to create entrepreneur in dairying and dairy associated activities.

Course Outcomes:

1. Students will be able to describe the composition of milk, identify the approximate content of individual types of present, and describe physicochemical characteristics of the main components.
2. Students will integrate their knowledge of food chemistry/engineering/microbiology and physical properties of foods to understand the processing of dairy products.
3. Student will be able to explain how dairy products (such as fluid milk, yogurt, butter, powder, cheese) are made and the key functions of the processing steps involved.
4. Students will be able to use their knowledge of the chemistry of dairy components (proteins, fats, lactose, salts) to evaluate the impact of processing conditions (e.g. heat, pH) on milk and dairy products.

Theory:

- Milk: production statistics, standards, physical properties.
- Biochemistry of milk constituents.
- Factors influencing the raw milk quality.
- Milk handling: GMP in manual and machine milking, farm cooling, collection, reception, transportation.
- Unit operations: cream separation, standardization, bacto-fugation, filtration, thermization, homogenization, pasteurization, extended shelf life (ESL) milk, sterilization, UHT, Methods Steam Injection (ISI), aseptic packaging, storage, distribution.
- Influence of unit operations on milk constituents.

- Technology, chemistry, microbiology and production of industrial products: evaporated, condensed and powder milks, butter, yogurt, cheese, ice cream, Butter oil,
- Indigenous products,
- Milk by-products: whey products, butter milk products and casein.

Practical:

- Milk sampling methods.
- Reception tests: Organoleptic/sensory test, sedimentation, pH, acidity; lactometer reading, clot on boiling, alcohol precipitation test, standard plate count, reductase test.
- Physico-chemical and microbiological analysis of milk and milk products.
- Tests for adulterants.
- Preparation of selected dairy products.
- Visit to commercial dairy farms and milk processing plants.

Recommended Books:

1. Alfa Laval/Tetra Pak. 2003. Dairy processing handbook. Tetra Pak Processing System, Pakistan.
2. Kim Etingoff, 2014, Dairy products, mason Crest Publishers
3. Joginder Singh, Ashish Vyas, 2022, Advances in dairy microbial products, Woodhead publishing
4. El-Bakry, Mamdouhm; Mehta, Bhavbhuti M.; Sanchez, Antoni, 2018, Microstructure of dairy products, Wiley Blackwell
5. Garg, Sudhi Ranjan; Jadhav, Vijay J. 2012, Handbook of quality control of dairy and meat products
6. Tuyen Truong, Christelle Lopez, Bhesh Bhandari, 2020, Sangeeta Prakash, Dairy fat products and functionality, Springer international
7. Park, Y.W. and Haenlein, G.F.W. 2013. Milk and dairy products in human nutrition: production, composition and health. Wiley-Blackwell Publishers, USA.