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Perspective

Technological Innovation and Food Engineering

Piotr Lewicki*

Department of Food Engineering and Process Management, Warsaw University of Life Sciences, Warsaw, Poland

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INTRODUCTION

Food engineering is a scientific, academic, and professional area that analyses and applies engineering, science, and math principles to the production, handling, storage, conservation, control, packaging, and distribution of food products. Food engineering is regarded as a diverse and specialized area due to its reliance on food science and more general engineering disciplines including electrical, mechanical, civil, chemical, industrial, and agricultural engineering. Food engineering also integrates the study of more specialized chemical and physical topics such biochemistry, microbiology, food chemistry, thermodynamics, transport phenomena, rheology, and heat transfer due to the complexity of food components. Food engineers use this knowledge to the creation of food systems, equipment, and technology as well as to the cost effective design, manufacture, and marketing of sustainable, secure, nourishing, healthful, enticing, inexpensive, and high quality ingredients and foods.

Food engineering is a relatively new and developing subject of study, although it is built on ideas and practices that have been around for a long time. Food stabilization and sterilization, spoiling prevention, and the long term preservation of nutrients in food were traditionally the main goals of food engineering. Food dehydration and concentration, protective packaging, canning, and freeze drying are some of the more specific traditional practices. The need for long-lasting and nourishing foods throughout wars and lengthy journeys, including space missions had a significant impact on and prompted the development of food technology. The procedures of grinding, storing, and fermenting are further prehistoric activities. The focus of food engineering has lately switched to food quality, safety, flavor, health, and sustainability, even if some classic tasks continue to be problematic and serve as the foundation for contemporary technologies and developments.

*Corresponding author. Piotr Lewicki, E-mail: Lewckiotr12@sggw.waw.pl

Food preservation by freezing or chilling primarily serves to maintain the nutritional value and safety of food ingredients. Perishable foods may be kept fresh longer using refrigeration and freezing, as well as by preserving certain aspects of food quality including color, texture, flavor, and nutritional value. The growth of microorganisms that can possibly harm customers is slowed down by freezing food.

DESCRIPTION

Food and liquid items can be pre concentrated, with their solid content increased, their color changed, and their water content decreased, using evaporation. Processing of milk, starch derivatives, coffee, fruit juices, vegetable pastes and concentrates, seasonings, sauces, sugar, and edible oil is a common example of this procedure. Food dehydration techniques also employ evaporation. Dehydration serves to stop the growth of molds in food, which can only flourish in damp environments. For instance, this procedure can be used on fruits, vegetables, meats, and fish. Food packaging technologies are used to increase product shelf life, stabilize food (preserve flavor, appearance, and quality), and keep food clean, safe, and consumer-appealing. Food can be packaged in jars and cans, for instance, to achieve this. Large amounts of trash are produced throughout the food production process, thus many businesses are switching to eco-friendly packaging to protect the environment and draw in ecologically concerned customers. Plastics manufactured from corn or potatoes, paper products that decompose during composting, bio compostable plastic and recycled materials are some examples of ecologically friendly packaging. Even though switching to eco-friendly packaging benefits the environment, many businesses are discovering other advantages, such as lowering superfluous packing, assisting in attracting and keeping consumers, and demonstrating a commitment to the environment. Energy efficiency and waste heat recovery are required to boost food processing's

sustainability. Another way to lower energy use, lower production costs, and increase sustainability in food production is to substitute emerging technologies like thermodynamic cycles and non-thermal heating techniques for traditional energy intensive food production methods.

Three Dimensional (3D) printing, commonly referred to as additive manufacturing, is the process of producing three dimensional items out of digital information. The processing of food layers using computer equipment is done in the food sector utilizing 3D printing of food. Although 3D printing is still a sluggish process, it is becoming faster with the aim of cutting prices and turnaround times. Chocolate, cheese, cake frosting, turkey, pizza, celery, and other popular foods have all been successfully printed using 3D technology. This technology is constantly evolving and has the potential to produce affordable, energy efficient food that satisfies consumer demands for diversity, nutritional stability, and safety. Biosensors can be utilized for quality control in labs and at various points throughout the processing of food. One strategy used by farmers and food producers to respond to the rise in global food demand while maintaining high levels of food output and quality is biosensor technology.

Furthermore, biosensors are evolving into a crucial instrument for ensuring the safety of food because food borne illnesses brought on by viruses and bacteria harm millions of people. They support monitoring and evaluating food quality at various points along the supply chain. In order to control the sale of genetically modified products, biosensors can also aid with the detection of Genetically Modified Organisms (GMOs). Biosensors are continually being enhanced in terms of both quality and applications because to technological advancements like those in nanotechnology. When milk storage conditions are kept under control, milk typically has an excellent flavor. However, milk's taste and safety are negatively impacted by the oxidized flavor, which is an issue.

CONCLUSION

Pasteurization procedures were created to stop the growth of dangerous bacteria and increase milk's shelf life. When compared to conventional pasteurization procedures, microwaved milk pasteurization has been examined and developed to prevent oxidation, and it has been determined that milk is of higher quality as a result.