EDITORIAL

New technologies in food industries

Carol Petterson

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ABSTRACT

Fruit drying provides livelihood options for people in rural, periurban, and urban areas in Sub-Saharan Africa, including raw material farmers, commodities merchants, food processors, sellers, and exporters. Dried fruits and vegetables are progressively making up a substantial component of Ghana's export offerings. In 1995, the entire value of dried fruits and vegetables exports was $124,678, with fruits accounting for 21% of the total. By 1998, the overall value of dried fruits and veggies exports had climbed to $3,600,600, with fruits accounting for 42% of the total. Despite advancements in innovative food manufacturing techniques and designs, market limits connected to perceived product safety and quality issues jeopardise the potential for long-term income growth.

Key Words: *Food industries, Dried fruits and vegetables, Food supply chain, Food consumption*

EDITORIAL

Increased This necessitates the use of advanced drying technologies and food management safety systems, such as hazard analysis critical control point (HACCP) programmes, which are meant to identify, categorise, and remove food safety threats through the use of effective process controls. However, the necessary changes and controls can only be realised with a thorough understanding of the food manufacturing process [1].

Food, like healthcare, energy, and communication, is considered important infrastructure in a country; as a result, normal operations should be maintained to feed the people during the pandemic. During the global coronavirus pandemic, this industry has faced significant issues ranging from supply chain disruption and its impact on food systems to fulfilling high market demand, protecting its employees, and reducing absenteeism while maintaining a high level of food safety and consumer trust. Furthermore, the United States' Centers for Disease Control and Prevention (CDC) recorded 4913 COVID-19 cases and 20 deaths among US workers in 115 meat and poultry processing facilities across 19 states (Dyal et al., 2020). Physical distancing in the job, hygiene, crowded living, and transit conditions were all highlighted as factors that could increase the risk of infection [2]. Food product innovation might take the form of a new product, an enhancement, or a complete overhaul. A new flavoured chocolate bar, for example, is a minor, fashionable alteration. The incremental improvement of instant soup, for example, is the continuous modification in a food through time: enhancing the solubility, introducing new types, altering the box to make it more appealing, and lowering the calories. The step-jump is the basic alteration, as evidenced by the emergence of quick-frozen items. Food corporations use such product adjustments as a result of technological advancements and social shifts. In the food business, there are two criteria for effective innovation: an innovation-oriented company and a positively responding environment. Innovation development builds on previous industrial advances while also taking into account anticipated technology and social developments. These projections are used to design food industry and company innovation strategies [3]. Innovation builds on earlier technological advancements while also anticipating future technological and social developments. These forecasts are used to develop food industry and business innovation plans. Simultaneously, shifts in consumer demand and food-related lifestyles have led in finer market segmentation, faster product turnover, and the emergence of international food consumer segments+. Firms must respond not simply by offering more innovative items, but also by better targeting them at both domestic and international consumers+. This implies that marketing skills, as well as scientific R&D+, must be upgraded. One, most closely associated with the industrial economics profession, has emphasised the links between R&D and technological

Editorial Office, Journal of Food and Drug Research, Windsor Berkshire, UK

Correspondence: Joseph Johnson, Editorial Office, Journal of Food and Drug Research, 35 Ruddlesway, Windsor Berkshire, UK, E-mail: puljfdr@pulsuspublishers.com

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innovation, as evidenced by patents, and has looked into the relationships between R&D, patents, or new product introductions and industry variables like market size, growth, product differentiation, industry concentration, and firm size [4].

One, most closely associated with the field of industrial economics, has emphasised the links between R&D and technological innovation, as evidenced by patents, and has investigated the relationships between R&D, patents, or new product introductions and industry variables such as market size, growth, differentiation, manufacturing concentration, and firm size. There has also been a growing interest in evaluating the various approaches and vehicles for conveying information, not only in terms of their role and mechanisms, but also in terms of their effectiveness. Much time and effort has gone into studying the effects of food quality and safety advertising and media coverage, investigating the function of trust and reliability in information sources, and analysing consumer interest in and use of available information signals. Regardless of the fact that foodstuff has never been as safe and healthful as it is now, people appear to be increasingly concerned about the quality and safety of their food. Consumers appear to want information to assist them maintain a healthy diet, avoid allergens or substances that have proven to be problematic for them, and learn about the food's origins, as well as the environmental, ethical, and technological conditions under which it was created. Among the reasons for requesting all of this information, safety concerns take a prominent position. Consumers can utilise safety as one of the food product qualities in their evaluation of product alternatives and the establishment of quality expectations. As a result, safety should be regarded an intrinsic aspect of quality, as it influences buying intentions and choices (Grunert, 2005). Under normal circumstances, the majority of consumers are unconcerned with food safety, however some lingering ambiguity may exist. Recent situations, such as genetically modified foods, food irradiation, and even functional foods, show that when new information is supplied, even without medical or scientific evidence, perceived safety can plummet substantially [5].

Encapsulation is the process of putting food ingredients, enzymes, cells, or other elements into tiny capsules. The food sector has increased its use of this approach since encapsulated products can be protected from moisture, heat, and other harsh environments, improving their stability and viability. Food encapsulation is also used to disguise odours or tastes. Spray drying, spray chilling or spray cooling, extrusion coating, fluidized bed coating, liposome entrapment, coacervation, inclusion complexation, centrifugal extrusion, and rotating suspension separation are all used to make the capsules. This review goes through each of these methods in detail. Flavoring agents, acids, bases, artificial sweeteners, colourants, preservatives, leavening agents, antioxidants, agents with disagreeable flavours, smells, and nutrients are all encapsulated. Encapsulation of sweeteners like aspartame and flavourings in chewing gum is a well-known practise. Encapsulating materials include fats, starches, dextrins, alginates, protein, and lipid compounds. The substances can be released from the capsules in a variety of ways. Changes in pH, temperature, irradiation, or osmotic shock can indicate release, which can be site-specific, stage-specific, or signalled by changes in pH, temperature, irradiation, or osmotic stress. Solvent-activated release is the most frequent approach in the food sector. Water can be added to dry beverages or cake mixes, for example. Liposomes have been used to make cheese, and their usage in the creation of food emulsions such spreads, margarine, and mayonnaise is still a work in progress. Encapsulation of meals for controlled release, carrier materials, and preparation procedures are among the most recent advancements [6].

In Europe, ozonation has been used to disinfect drinking water for years. Ozone has a variety of different commercial applications, including bottled water disinfection, swimming pools, cooling tower fouling prevention, and wastewater treatment. Although ozone has not been widely employed in the food business in the United States, the US Food and Drug Administration gave generally recognised as safe (GRAS) certification for the use of ozone in bottled water in 1982. In 1997, the US Department of Agriculture allowed the use of ozone to recondition recycled poultry cooling water. Because of its possible oxidising capacity, ozone is a potent antibacterial. The usage of ozone in the food business could offer a number of benefits. Food surface hygiene, cleaning of food plant equipment, reuse of waste water, and lowering biological oxygen demand (BOD) and chemical oxygen demand (COD) of food plant waste are some of the potential applications of ozone in the food business. Ozone is a promising agent because of its multifunctionality. Although ozone is not widely used in the dairy and food industries, it has found limited applications in a few areas, including the conversion of green tea to black tea, shellfish cleansing, and poultry carcass disinfection and chill water in the poultry industry [7].

Consumers in developed countries expect high-quality, consistent food products in a wide variety of flavours and at reasonable prices throughout the year. The quality and safety of food, as well as the negative repercussions of bio-industrial production, have become increasingly important to today's customer. Every year, millions of people in OECD countries become ill as a result of food contamination. Salmonella, campylobacter, and E. coli O are all common causes. Furthermore, recall notices appear in practically every newspaper on a weekly basis. Despite the fact that food items appear to be safer than ever before, from a technical standpoint and as a result of several quality control initiatives, consumers' perceptions of food safety have deteriorated dramatically. At the same time, the food industry has become increasingly globalised. Local or regional supply is no longer sufficient to meet market demand. Retailers and food companies today source items from all over the world, transforming the food sector into a complex network of interrelated systems. Even fresh vegetables from halfway around the world may now be purchased for a reasonable price. This has resulted in a massive expansion in product selection in supermarkets. Food production, trading, and distribution have all changed dramatically as a result of these changes. Governments, both national and international, are responding by enacting new legislation and regulations to guarantee that manufacturing is safe and animal-friendly, that pollution is limited, and that resources are used efficiently. The Codex Alimentarius standards (FAO/WHO), the General Food Law (EU) 2002/178), and the EU-BSE restrictions are all examples. For food enterprises, this means putting a greater emphasis on quality and safety control, food traceability, and environmental issues while also transitioning away from bulk manufacturing and toward production of high-value specialties. Furthermore, due of their interconnectedness in the global economy, all firms must collaborate with one another to produce safe and high-quality food items for consumers. This means that company strategies must now shift their attention away from conventional economic and technological objectives and toward current challenges like as food safety and health, animal welfare, the environment, and so on. These processes have an impact on the entire food supply chain, from the farmer to the merchant [8].

Uses of Laccases in the Food Industry

Laccases (p-diphenol:dioxygen oxidoreductases) are common in white-rot fungus, which are the only species capable of degrading the entire wood structure. Fungal laccases are glycosylated proteins with two disulphide linkages and four copper atoms distributed in one mononuclear T1 (where the reducing substrate is) and one trinuclear T2/T3 (where oxygen attaches and is reduced to water) cluster. As a result, electrons are transported from substrate molecules to the trinuclear T2/T3 centre via the T1 copper. The dioxygen at the trinuclear centre is reduced to two molecules of water after four electrons are transferred. One of the schemes can be used to illustrate the reactions catalysed by laccases from a mechanistic standpoint. By direct contact with the copper cluster, the substrate molecules are oxidised to the appropriate radicals in the simplest instance. However, the substrates of interest are frequently unable to be oxidised directly by laccases, either because they are too big to pass through the active site of the enzyme or because they have a particularly high redox potential [9].

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