

Career Opportunities for Food Technologists

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Introduction

University curricula in this field came into existence in Kenya about two decades ago. Currently, only three public universities offer diploma, graduate and postgraduate programs in food science and technology, namely, the University of Nairobi, Egerton University and Jomo Kenyatta University of Agriculture and Technology. The annual total capacity output of graduates from these universities is approximately 75-90. This figure has been justified in the basis of prospective job opportunities in the areas of emphasis by the three academic programs. The program at the University of Nairobi is a broad, general one, while those at Egerton and Jomo Kenyatta universities have been oriented towards dairy science and postharvest technology, respectively. A survey of manpower requirements for the food industry in Kenya carried out in 1986 revealed that these can generally be met by training food scientists and food technologists at the degree, diploma and certificate levels. The survey put the number of food scientists and food technologists expected to have been trained by 1996 at 1150, but projected the food industry's manpower requirements to be 343, thus projecting over-training of food scientists by as much as 300% by 1996. The current situation is not clear, but all indications are that it is becoming increasingly difficult today for the increased number to be absorbed into the food industry. This can be attributed to several underlying factors, which are beyond the scope of this paper and would not be discussed. Under these circumstances, it is absolutely necessary for both the food industry and the training institutions to collaborate. Ultimately, the training must focus not only on securing employment in industry or government, but also on the ability of graduates to create job opportunities for themselves through self-employment, initially as small scale processors.

There is a wide variety of jobs available for young men and women trained in food science and technology as applied to food processing and preservation. In Kenya, the majority of these positions are in the food industry and related agro-industries supplying ingredients, packages, services, etc. The remainder are in research, teaching government, extension, and a variety of other organizations concerned with the processing and preservation of food.

Food Industry

Opportunities for a career in the food industry and related agro-industries are involved in one or more of the following activities:

Quality Assurance: Quality assurance or quality control involves an organized control activity, the primary purpose of which is to guarantee that certain levels of quality and other characteristics of the processed food have been met. In other words, the entire spectrum of activity from raw material

selection and handling to processing, preservation, packaging and finally distribution must be monitored and controlled in order to assure that the food possesses the required attributes when it reaches the consumer.

Ideally, professionals employed in quality assurance should have a B.Sc. degree, usually in food science, but it is not uncommon for firms to hire graduate chemists or microbiologists for this type of work. Such employees are usually given special on-the-job training in food quality assurance before undertaking any real responsibility. A new quality assurance employee usually begins by carrying out routine assignments, such as collecting samples from the production line and making laboratory examinations of them, or assisting in the analyses, or preparing daily quality assurance reports. As the employee gains experience and competence, he/she usually moves up into a supervisory position and eventually might become director of quality assurance. A prerequisite for the job, from a technical point of view, is that the person have a good working knowledge of food chemistry, food analysis, food microbiology and food plant sanitation. An understanding of statistical quality control methods is absolutely important. Short refresher courses from time to time may be necessary in order to learn new techniques of quality assurance and to make up for deficiencies. Conscientiousness, systematic and thorough work habits, and an appreciation of the need for precision and accuracy in analytical work are some of the invaluable personal characteristics for success on food quality assurance. Effective communication with others in the firm, both verbally and in writing, is necessary for transmitting technical information to those who need and must use it to achieve control of quality of raw materials and processed foods.

Products development and improvement: An employee is such and activity is required to create or acquire viable concepts for new or improved products, and developing formulations and technologies for the commercial production of these products. An example of a new product would be a composite flour for making "uji" (light porridge). Potentially, such a product would be produced easily in the kitchen. Developing such a product requires work in a test kitchen, possibly also some research in the laboratory.

Whereas a food science would generally head up such a project, at least through the initial stages, he/she usually needs help from a home economist, a technical service person and possibly also an engineer. If special problems in providing adequate shelf life of in solving health hazard problems are encountered, he/she might also need the assistance of a microbiologist.

Product development departments usually employ people trained in food science and technology. A minimum of a B.Sc degree is essential, and not uncommonly those with M.Sc. or Ph.D. degrees in food science are preferred in large firms with a variety of product interests. A product development person needs to have a good working knowledge of food chemistry, biochemistry and food processing and preservation technologies. He /she should be imaginative and resourceful, innovative, and be readily motivated to create new and improved product. One must also be able to sell one's self and ideas to others, especially to the marketing and top management people in the firm.

Process development and improvement: People employed in this area develop new methods or improve on existing ones for the processing and preservation of food. Process development and process improvement projects are usually placed in the hands of graduate chemical or mechanical engineers. Because of their limited knowledge and experience with food, it is not unusual for them to team up with food scientists, who are more knowledgeable about the properties and characteristics of engineering concepts and unit operations. Successful process development and process improvement also calls for certain personal attributes, besides a good academic background. These include imagination, inventiveness, resourcefulness, as well as an ability to sell one's self and one's ideas to top management in the firm.

Technical Service: Suppliers to the food industry employment technically trained personnel to work with customers. Although they may do some selling, their main efforts are usually directed at assisting customers in problem solving. For instance, a technical service person working for a sugar company would work with a soft drink manufacturer in the selection of the type and amount of sweetener for a certain beverage. Similarly, a technical service person from a flavour or spice house would advise a meat processing and packing firm in the selection of flavouring and spicing ingredients for the meat.

The appropriate academic training for a technical service person is a B.Sc. degree in food science. Sometimes, graduate chemists are employed for this type of work and given special on-the-job training before being sent out to deal with customers. He/she needs to have a good working knowledge of food chemistry, biochemistry and microbiology, as well as some knowledge of the commodity technologies with which he or she works. It is also very valuable to him or her to be familiar with applicable laws and regulations pertaining to processed foods. Personal characteristics of importance include good communication skills, aggressiveness, effectiveness, in "troubleshooting" and, above all, effectiveness in working with the variety of people with whom the technical service-person always comes into contact.

Management: With the increasing size and technical complexity of the food industry, there is a rising demand for management personnel with a technical background. These people share with others trained in marketing, finance, law, and other areas the responsibility for policy making and management of food manufacturing firms.

The appropriate academic training required for these jobs is at

least a B.Sc. degree in food science plus specialized training in business administration. The latter is often taken after a person has been with a firm a few years and is at times financed by that firm. Personal characteristics of importance for management positions include a capacity to analyse and interpret complex and complicated business situations, an ability to work effectively with a variety of people, and a keen sense of the economic potential of one course of action over another.

Regulatory Work

An increasing number of food professionals are working for government agencies that administer food laws and regulations. In Kenya, this responsibility is jointly carried out by the Kenya Bureau of Standards, the Inspection and Quarantine Services of the Kenya Agricultural Research Institute, the Ministry of Agriculture, Livestock Development and Marketing, the Ministry of Health (Public Health Division) and the Ministry of Commerce and Industry (Weights and Measures Division). A variety of activities are involved: Plant inspections, inspection of imports and exports, including collecting products and environmental samples, laboratory examination of collected samples to ascertain adherence to official grades and standards and regulations, watching for evidence of such violations as adulteration of illegal amounts of pesticides and preparation for and participation in litigation against alleged violators of existing laws and regulations.

In the past, many government agencies employed graduate chemists and microbiologists for food regulatory work, however, increasingly, food scientists are being recruited. A good working knowledge of food chemistry and analytical chemistry, food microbiology, and food sanitation is required. Specialized on-the-job training is frequently required of new employees, because of the specialized problems that must be faced by agencies engaged in regulatory work. The essential personal characteristics are a systematic and careful approach to identifying violators, precision and accuracy in the taking of samples and in subsequent work performed on them and factual, fearless and convincing preparation of evidence against violators.

Extension Education

A few university, government and industry people are engaged in providing information service and continuing education programs in food processing and preservation. They might be thought of as "go-betweens" filling the gap between the research scientist and the food scientist in industry and also between the researcher and the operating personnel in the food processing plant. Their job is to see to it that information generated through research is put to use.

The academic training required for this specialist is generally considered to be a BSc. degree in food science or in a closely related field such as agriculture and agricultural extension. Sometimes, persons with M.Sc. or Ph.D. degree are also being recruited to carry out these important educational programs. The people need to know food science sufficiently well to be able to interpret research findings to the working technologists in industry and to the operating people in the plant, so that they will be able to use the information in improving operations.

Certain personal characteristics have an important bearing in assuring success in this calling, such as ability and willingness to serve as a technology-transfer agent and effective verbal and written communication skills.

Basic and Applied Research

A large number of food professionals, especially in universities, government laboratories, and research institutes, are employed to work on basic and applied research problems related to processed food. These programs cover a wide spectrum of subjects, including studies on physical and chemical properties of foods, physiology of food raw materials and the effects of processing, microbiology of food spoilage, insect pest infestation of stored food products, control of food deterioration and food spoilage and microbial fermentation among others.

The academic training required for a research career is generally PhD. degree in food science or a closely related discipline and possibly a year of postdoctoral training. It is, however, well recognized that good research can be done and is being done by men and women with only a BSc. degree. The important point to remember is that good researchers should have the scientific background to pursue research in the subject matter of their particular interest. Also they should know how to formulate ideas and to design and carry out meaningful experiments that will answer important questions, thereby advancing the field. Important personal characteristics for the food researcher include inquisitiveness, imagination, initiative and drive, and tenacity. Also essential is the willingness to complete a research project and disseminate the findings to others, both verbally and in writing.

University and Polytechnic Training.

As has already been mentioned, there are 3 universities that offer degrees and diplomas in food science and food technology, and several other institutions that offer diploma and certificates in Kenya. A variety of courses are taught in these institutions, including food chemistry, food biochemistry, food microbiology, food processing and preservation, food engineering, food quality assurance, sensory evaluation of food, and food laws and regulations, among others. In

addition, research projects, seminars and thesis research are offered.

The usual educational background required for these academic positions is a PhD. in food science or in a related discipline, such as chemistry, biochemistry, microbiology, chemical or biochemical engineering nutrition etc. Important personal characteristics which can enhance one's position are ability to communicate, a sincere interest in teaching and in education generally, and the ability to stimulate and motivate students. Most academic positions involve, besides teaching, basic and applied research and/or extension education work.

Conclusion

Training in fields other than food science and technology can and does permit a person to have a career in the food industry. Some big companies, certain government agencies and even universities prefer to employ persons trained in a related discipline rather than specifically in food science. They believe that they themselves can provide better orientation to food by special on-the-job training programs during the first few years of employment. Therefore, graduates holding BSc. degrees in chemistry, biochemistry, microbiology, chemical engineering, mechanical engineering, nutrition, biometry, psychology, etc. have found jobs in the food industry.

It has been observed that, in Kenya, the food processing industries with great interest in hiring food technologists include fruits and vegetable processing, sugar, beer brewing, spirits distilleries and the soft drinks industries. Industries like the grain milling, bakery and confectionery have a very low demand for food technologists. Moreover, with the current liberalisation of the economy in the country, there is a lot of room for improvement and expansion of the food industry and hopefully, this can lead to the creation of more jobs and lead to high demand for food scientists and technologists in the Kenyan job market.

References

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