

# COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH- FOOD RESEARCH INSTITUTE



## A REPORT ON TRAINING IN FLAVORED MILK BEVERAGES PROCESSING FOR SMALL SCALE FOOD INDUSTRIES



By

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## Summary

A 2-day training in flavored milk beverage production was organized for a small scale enterprise from 14<sup>th</sup> to 15<sup>th</sup> June, 2017 at the Food Technology research Division, CSIR-Food Research Institute. The program was in two sessions (theory and practical) and covered topics in basic food processing, milk processing, food safety and sanitation. This approach was adopted in order to give the participant a deeper understanding of food processing techniques and also equip him with practical skills in milk beverages processing. Food processing and food safety theories were explained in the 1<sup>st</sup> session and the unit operations involved in flavored milk beverage production practically demonstrated in the 2<sup>nd</sup> session to complement the theories. The participant acquired knowledge in basic food processing and food safety and was also equipped with the skills in flavored milk beverages. He expressed appreciation for taking part in the training program and promised to implement food safety measures in his facility in order to ensure that quality beverages are produced.

## 1.0 Introduction

Milk, as defined technically as the lacteal secretion obtained by complete milking of one or more healthy cattle, goat or buffalo (). It is considered a complete food and is valued as an important source of nutrients essential for the proper development and maintenance of the body. It is usually composed of 87% water and 13% solids and is highly perishable. Milk solids portion is made up of nearly 3.5% fat and 9.5% non-fat (proteins, sugars, etc). Milk is a good source of calcium, phosphorus and the fat soluble vitamins (Walstra et al., 1999). Milk is classified according to its fat content (for instance, whole milk, skimmed milk, low fat milk, etc) or processing procedures it has undergone (pasteurized milk, UHT milk, sterilized milk etc).

Flavored milk beverages are available in many forms and these are processed differently. These include milkshakes and they may be produced from different forms of milk. The most common for is milk powder, which is contains less than 5% moisture (). Flavored milk drinks are formulated in way to sweeten and improve the flavor of the final product to make its consumption more attractive. These milk beverages are formulated with milk, sweeteners, flavorings (vanilla, strawberry, cocoa). Desired mouth-feel and acceptable consistency of these beverages is achieved by addition of hydrocolloids (Deshpande, 2004).

Consumption of processed milk beverages in Ghana is on a gradual ascendancy. This may be attributes to the fact that many consumers are attracted to the nutritional benefits of milk and milk products. However, the demand for milk beverages exceed local production. This huge deficit created by this situation is met by imports, and this had led to the local market being dominated by foreign flavored milk beverages. It is for this reason that some local small scale companies have ventured into the production of flavored milk beverages.

This report presents the event of training in flavored milk products processing organized by CSIR-FRI for a small scale milk processing company. The training was organized over a 2-day period for Steven Bonsoe, who is the general manager of the company. The purpose of the program was to introduce basic food processing, safety and hygiene and also impart the knowledge and skill involved in flavored milk beverage production to management of the company.

### 1.1 Resource persons

Resource persons for this training were Papa Toah Akonor, Mrs. Nina Bernice Ackah, Mr. Emmanuel Saka, Mrs Agartha Amuzu.

## 2.0 Training module

### 2.1 Theory Session

The theory session was essentially to introduce participant to basic of food processing, food safety and good manufacturing practices. This session was made interactive and participatory, with ample time being allowed for questions, comments and general discussions. This approach is key in linking and relating indigenous knowledge in food processing to proven scientific and professional food processing technologies.

The participant was taken through the importance of food processing, various methods available for food processing, beverage processing and the importance of heat treatment operations such as pasteurization. They were also taken through the basics of food packaging, food safety and hygiene, and good manufacturing practices. The trainees were taught how to carefully implement and apply these operations in their food processing facilities. The different kinds of milk powder and their utilization in various milk products as well as the functionality of some additives (applicable to milk processing) were also discussed in the theory session.

### 2.2 Practical session

The trainees were taken through a practical demonstration of processing flavored milk beverages from powdered milk and other ingredients. This was to enable them relate theory with practice and enhance their skills and capacity to produce the beverage on commercial scale. They were taken through the various unit operations practically for them to understand the basis for employing these operations during milk shake production.

#### 2.2.1 Processing the milk beverage

The flavored milk beverage (milk shake) was processed from full cream powdered milk and additives such as sugar, aromatic essence and food color, following the unit operations presented in Figure 1.

##### *2.2.1.1 Reconstitution of powdered milk*

This step involved dissolution of the instant powdered milk. Full cream milk powder is reconstituted using hot water. Prior to reconstitution, the water is heated to 85 C. Hot water is used in order to fully disperse and dissolve the powdered milk completely. For good consistency and mouth-feel, 1 part of powdered milk is reconstituted in 2 parts of water.

##### *2.2.1.2 Formulation*

After reconstitution of the milk to desired consistency, additives are added following a prepared formula to obtain the final milk shake which meets the standards required by the manufacturer and consumer. The sweetener (sucrose) was added first to the reconstituted milk followed by vanilla essence, food color

and a preservative (potassium sorbate). The mixture is then stirred at low speed in a blender to ensure uniformity and adequate consistency. Stirring also thoroughly dissolves the solid ingredients (including sugar and preservatives).

### 2.2.1.3 Pasteurization

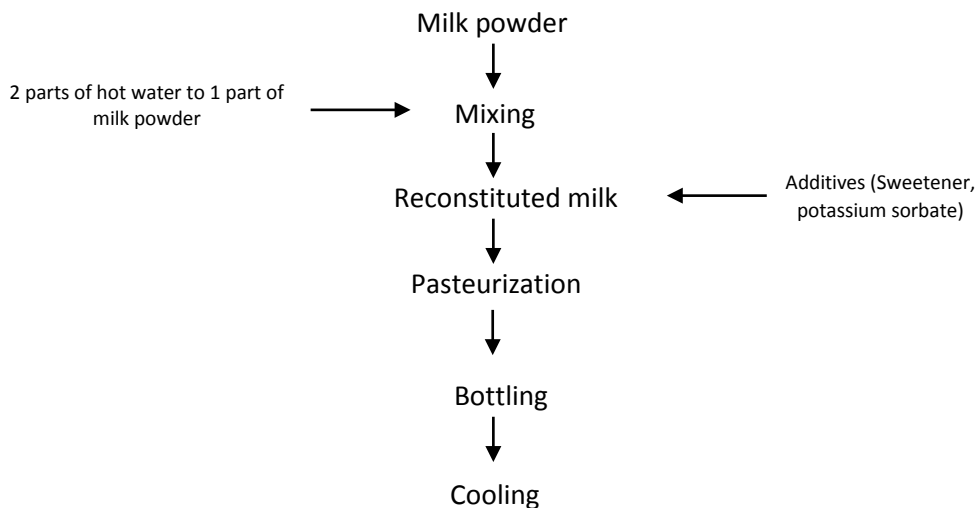
When the final beverage, with desirable sensory and physical properties have been formulated, it is pasteurized. Participants were given the theoretical bases of pasteurization during the theory session on basic food processing. The milk shake was pasteurized at 70C and held at this temperature for 5 m. The participants were asked to undertake pasteurization cautiously, sticking to strict temperature-time regimen. The essence of pasteurization was re-echoed during the training session and participants informed that this unit operation is considered a critical control point in food processing. Adequate pasteurization is needed for keeping the product safe for consumption and also extending its shelf life. The participants were also told to stir the milk during pasteurization to prevent the product from overheating or burning at the bottom.

### 2.2.1.4 Packaging/Bottling

Bottling was done immediately after pasteurization of the beverage, while it is still hot. This approach is essential for preventing contamination after pasteurization. Prior to filling, the participants were taught how to wash and sanitize the plastic bottles. Sanitizing of packaging materials is an important procedure in ensuring that the bottles are adequately sterile before filling-in the final milk shake. Capping was done carefully done immediately each bottle is filled in order to prevent contamination. In a situation where cold-fill PPT bottles are used, hot-filling could be accomplished by immersing the bottles in ice-cold water during filling. This is to prevent the bottles from deforming.

### 2.2.1.5 Cooling

After filling, bottles are placed on their side to cool, before storage by refrigeration.



**Figure 1: Process flow diagram for Milkshake**



**Figure 2: The theory session on food safety and GMP**



**Figure 3: Participant and resource persons in a discussion**



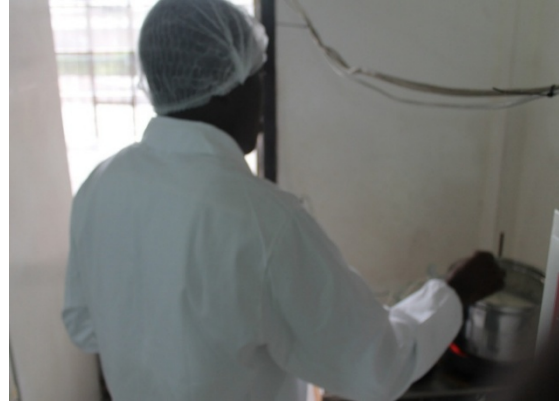


Figure 4: Trainee participating actively in practical demonstration



Figure 5: Milkshake

### 3.0 Remarks by participant

Mr. Samuel Bonsoe was glad to have participated in the workshop to acquire the theoretical and practical knowledge in food processing in general and milkshake in particular. Although he had started a few experimental trials, he admitted having faced a lot of challenges, especially regarding product quality, consistency standard and shelf-life. Having gained much technical insight from this workshop, he hoped to improve on the quality and shelf-life of his product, implement and observe good manufacturing and hygienic practices and scale-up his production capacity. Mr. Bonsoe envisaged that the ultimate outcome of the training would increase his customer base and rake-in more profit for his business.

### 4.0 Closing remarks

Papa Toah wished the trainee well and admonished him to apply the knowledge and skills gained from the training program in order to improve on the quality standards and shelf-life of his

product. He explained that a quality product is key and would serve as the basis for increased profit and rapid business growth. He admonished the trainee to make an effort at taking further steps to register his product with the Food and Drugs Authority. Papa Toah concluded by mentioning that CSIR-FRI is ready to offer technical assistance in support of food processing industries and therefore he should not hesitate to call on the Institute whenever the need arises.

## 5.0 Training evaluation

The 2-day training workshop was evaluated for its effectiveness and ...using a questionnaire. The trainee revealed that the training met his expectations and expressed their satisfaction about the quality of instructions, discussions held and the hand-on approach used in the workshop. He agreed strongly that the content was valuable and easy to follow, with more time being allowed for questions and discussions. Overall, the training program was rated “very good” by the trainee. He, however remarked that the presentation slides should be made more interactive by including more pictures and animations.