



**COUNCIL FOR SCIENTIFIC AND INDUSTRIAL
RESEARCH-FOOD RESEARCH INSTITUTE**

ACCRA-GHANA

**TECHNICAL REPORT ON TRAININGS ON
ADVANCED FRUITS DRYING AND FRUIT
JUICE/MARMALADE/JAM**

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1.0 Introduction

At the end of 2020 report, it was concluded that trainings will be organized in groups for all trainable activities. For instance, institute's traditional programs like plantain *fufu*, *Banku* mix, HQCF trainings in groups. This is to enhance effectiveness and efficiency. During one Commercialization Division meeting, group training programs were proposed to the office of the Commercial Division and the proposals were accepted.

1.1 Meeting with the Director

A meeting was called by the Director of the institute to deliberate on the best ways of organizing the institute's training programs. He also re-entreated the need to have trainings done in groups. Eight (8) training programs were identified

1.2 Engagement with other Scientists

Twenty-two (22) Scientists (Lead consultants and their assistants) were engaged in deliberations towards proposed training programs, in a meeting. At the end of the meeting 24 unique training programs were identified and accepted to be rolled out in the year 2021. A representative from the Business Development Section of the Commercialization Division, was tasked by the Director to coordinate all proposed trainings and prospect for clients for the training programs. During the deliberations, the underlisted training modules were earmarked for 2021

Table 1.0 Proposed training programs in CSIR-Food Research Institute for 2021

No	Training program	Amount (GHC)	Duration/Days	Leader/ Assistant
1	Mushroom cultivation	1,000.00	5	Ms. Matilda Dzomeku
2	Mushroom cultivation	300.00	2	Ms Matilda Dzomeku
3	Value Addition of mushroom	600.00	2	Mrs. Buckman
4	Food safety & quality control for SMEs	300.00	1	Dr. Margaret Owusu
5	Fruit Juice/ Jams Training	500.00	2	Ms. Winifred Arthur
6	Cocoa Beans processing & Chocolate production	2,000.00	5	Dr. Margret Owusu/ Dr. J. Kongor
7	Chocolate spread	800.00	2	Dr. Margret Owusu/ Dr. J. Kongor
8	Vegetable processing	500.00	2	Mrs. Evelyn Buckman
9	Fish Processing & preservation	500	3	Dr. Aseidu Ameyaw

10	Cereal (rice)processing	300	2	Mrs. Leonora Charlotte Baffour Gyasi
11	Aflatoxin-free groundnut paste processing	400	2	Mr. George Anyebuno
12	High Quality Cassava Flour	700	2	Dr.G.A. Komlaga
13	Composite flour Value addition	600	2	Mrs. Evelyn Buckman
14	Spices processing	600	2	Mrs. Evelyn Buckman
15	Soy Milk Processing/ Tofu	400	2	Mr. Frank Mboom/
16	Orange Fresh Sweet Potato yogurt	500	2	Papa Toah Akonor
17	Tea Processing using herbs	300	2	Papa Toah Akonor
18	Training on snacks using extruder	500.00	2	Ms. Nancy NellyIdun-Acquah
19	Drying of fruits and vegetables	400.00	2	Ms. Nancy Nelly Idun- Acquah
20	Nutritional profile and labelling for Industries	N/A	1	Dr.Jolene Nyako
21	Childhood Nutrition for school caterer/cooks/canteens	N/A	2	Dr.Jolene Nyako
22	Coconut Milk Processing	500.00		Papa Toah Akonor
23	Malting of cereals for brewing	500.00	3	Dr. Gregory Afra Komlaga
24	Determination of pathogens in foods using molecular Techniques	1,000.00	2	Mrs. Amy Atter
25	Malting and Brewing	700.00	5	Dr. Gregory Afra Komlaga

2.0 Two (2) training programs to take off

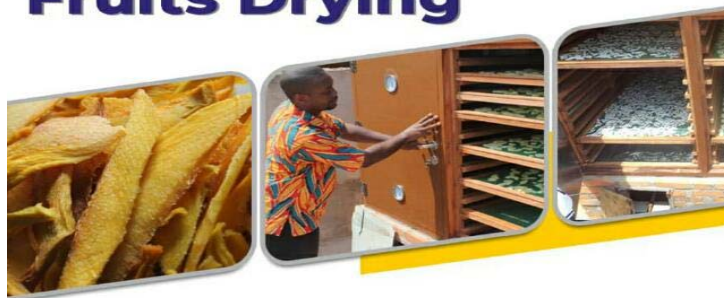
Dates 23rd to 24th and 24th to 25th were set for both Advanced Fruit Drying and Fruit Juice/Marmalade/Jam trainings, respectively, after thorough discussions.

2.1 Searching for clients

A decision was made by the Business Development Section to electronically prospect for clients/participants because of the COVID-19 pandemic. Samples of electronic fliers which were developed and distributed are shown below:

CSIR- FOOD RESEARCH INSTITUTE

Training On Advanced Fruits Drying



Theory and practical sessions
Reading manuals

FEBRUARY
23-24

Fee
GHC

3.0 Training on Advanced Fruit Drying on 23rd of February, 2021

A total of eleven (11) participants attended the training. At the opening ceremony, the Director of the Institute, Prof. Charles Tortoe reminded the participants to take advantage of other training programs of the Institute to be able to create their own jobs. A group picture was taken after the opening ceremony followed by lectures on Advanced Fruits Drying by Ms. Nancy Nelly Idun-Acquah and Mrs. Leonora Charlotte Baffour Gyasi

Table 2.0 List of clients' payment and attendance details

Name of client	Amount (GHe)	Training program	Receipt number	Remarks
Genevieve Yao Brou	400.00	Advanced fruits drying	18743383	Did not attend
Sandra Snowden	400.00	Advanced fruits drying	18743380	Did not attend
Rita Brobey	400.00	Advanced fruits drying	18743381	Did not attend
Mike Adazuku	400.00	Advanced fruits drying	18743382	Did not attend
Rosemary Kulafe	500.00	Fruits juice/marmalade/jam	18743384	Attended
Giftu Oteng Adjei	200.00	Advanced fruits drying	18743508	Attended
Florence Adzayao	400.00	Advanced fruits drying	18743510	Attended
Margarete Opoku Agyeman	400.00	Advanced fruits drying	18743522	Attended
Doris Perpetual	500.00	Fruits juice/marmalade/jam	18743524	Attended
Samuel Laryea Khartey	400.00	Fruits juice/marmalade/jam	18743533	Attended
Meshack Dadzie	400.00	Advanced fruits drying	18743535	Attended
Ray Snowden	400.00	Advanced fruits drying	18743534	Attended
Safiatsu Sumani Amankwa	400.00	Advanced fruits drying	18743555	Attended
Genevieve Naayi Abban	400.00	Advanced fruits drying	18743555	Attended

Claudia Pappoe	500.00	Fruits juice/marmalade/jam	18743556	Attended
Nii Nartei Nartey	400.00	Advanced fruits drying	18743564	Attended
Felicia Dzidzor	500.00	Fruits juice/marmalade/jam	18743561	Attended
Victoria Maami Ekua Hajar	500.00	Fruits juice/marmalade/jam	18743560	Attended
Giftly Oteng - Adjei	200.00	Advanced fruits drying	18743565	Attended
Wendy Jones - Mensah	400.00	Advanced fruits drying	18743562	Attended
Wendy Jones - Mensah	500.00	Fruits juice/marmalade/jam	18743563	Attended
Ama W. Biney	500.00	Fruits juice/marmalade/jam	18743570	Attended
Lidia Naa Koshie Akrong	500.00	Fruits juice/marmalade/jam	18743574	Attended

Training on Advanced Fruit Drying (23rd and 24th of February, 2021)

A total of eleven (11) participants attended the training. At the opening ceremony, the Director of the Institute, Prof. Charles Tortoe reminded the participants to take advantage of other training programs of the Institute to be able to create their own jobs. A group picture was taken after the opening ceremony followed by lectures on Advanced Fruits Drying by Ms. Nancy Nelly Idun-Acquah and Mrs. Leonora Charlotte Baffour Gyasi.



Fig. 3.0 Group Picture for opening ceremony

Table 3.0 List of participants for Advanced Drying Training

CSIR- FOOD RESEARCH INSTITUTE

ADVANCED FRUIT DRYING TRAINING LIST FROM 23RD TO 24TH FEBRUARY, 2021

No	Name of Participant	Tel Number	Signature
1	Genevieve Yao Brou		
2	Sandra Snowden		
3	Rita Brobey		
4	Mike Adazuku		
5	Gifty Otieng Adjei	0547702562	B.A
6	Florence Adzayno	0243887544	h
7	Margarete Opoku Agyeman	0270095626	Margarete
8	Samuel Laryea Khartey	0208140830	h
9	Meshaek Dandzie, Jennifer Agyebo, Dany	024537935	h
10	Meshaek Dandzie	0541782766	Pi
11	Ray Snowden	0247721167	R Snowden
12	Safiya Sumani Amankwa	0247603785	Safiya
13	Genevieve Naayi Abban	0244681000	Genevieve
14	Wendy Jones - Mensah	0553501796	Wendy
15	Nii Nartei Nartey	0544303996	Nii



Fig 4.0 Lectures on advanced Fruits drying underway



Fig 5.0 Section of participants in attentive mode

Participants were lectured on the fruit drying processes, factors that affect the rate of fruit drying, quality parameter of dried fruits, types of fruits dryers, criteria for selecting fruit dryer, food safety and quality of measures. Nancy Nelly Idun-Aquah and Mrs. Charlotte Barfour Gyasi Were the main Lead Consultants with Mr. Thomas Najah handling Marketing and Rebranding strategies

3.1 Fruits Drying Processes

Participants were made to understand that the processes involved in drying fruits, from fruit reception through to packaging of dried fruits

3.2 Factors that affect the rate of drying

Consultants took Participants through the factors that affect the rate of drying as below; The rate at which sliced fruit lose moisture during the fruit drying process depends on a number of factors. These factors include:

- type of fruit to be dried
- initial amount of water (moisture content) in the fruit
- drying temperature
- drying time
- size of fruit slices

3.2.1 Type of Dryers

The consultants introduced participants to different types of fruits dryers such as the gas cabinet dryers and the mechanical dryers. They further explained the operation procedure of cabinet dryers. Participants were taken through criteria for selecting a fruit dryer. Quality requirements of fruits and heat sensitivity of fruits were prominent in the discussion. In addition, participants were taken through the basic operations in fruits drying

3.3 Food Safety and quality measures

The participants were made to understand that fruits must be of good quality and wholesome for human consumption. They were also trained on standard measures to ensure food safety and food quality.



Fig 6.0 Prepared fruits slices being spread on lined trays



Fig 7.0 Slicing and spreading on fruits on drying trays



Fig 8.0 Section of the participants listening attentively



Fig 9.0 Participants demonstrating their slicing skills



Fig 10.0 Participants pushing trolleys into the cabinet dryer

Consultants tackled the safety and quality measures with participants. They made the participants to understand that dried fruits must be of very good quality and wholesome for human consumption. The product quality must also be consistent and meet the standards set by the Ghana Standards Authority. Safety and quality are also important in ensuring consumer confidence and ultimately increasing market share of the product. To achieve this, quality and safety must be the hallmark of the processor or manufacturer. Food safety and quality measures that must be observed before, during and after drying of fruits include the following

4.0 Fruits Juice, Marmalade and Jam Training

Papa Atoah Akonnor and Ms. Winifred Arthur took the trainees through theory and practical sessions respectively while Mr. Thomas Najah handled the Marketing and Branding Strategies session.

CSIR- FOOD RESEARCH INSTITUTE

**TRAINING ON
FRUIT JUICE,
MARMALADE,
JAM PROCESSING
& MARKETING**

Package

- Theory and practical sessions
- Lunch
- Certificate

Fee:
GHC **500**

FEBRUARY
24-25

All covid-19 protocols will be observed

☎ **0243 759 744/ 0240 999 452** | Loc: Opp. Nurses & Midwifery hostels, Okponglo

Table 4.0 List of participants for Fruit Juice/Marmalade/Jam Training

FRUITS JUICE/MARMALADE/JAM TRAINING AT CSIR- FOOD RESEARCH INSTITUTE FROM 24TH TO 25TH OF FEBRUARY, 2021
LIST OF PARTICIPANTS

No	Name of participant	Tel. Number	Signature
1	Rosemary Kulate		
2	Dorcas Perpetual <i>FCMY</i>	0546246790 0244 846383	<i>[Signature]</i>
3	Claudia Pappoe	0247703149	<i>[Signature]</i>
4	Felicia Dzidzor <i>Ati Ky</i>	024.3177980	<i>[Signature]</i>
5	Victoria Maami Ekua Hajar		<i>[Signature]</i>
6	Wendy Jones - Mensah	0244263144	<i>[Signature]</i>
7	Anna W. Diney <i>WILHELMINA ANNA BIASEY</i>	0247416887	<i>[Signature]</i>
8	Lydiah Nakoshie Akrong	0242825767	<i>[Signature]</i>
9	Maami <i>Anoff</i>	0501290234	<i>[Signature]</i>
10	Athamide Gifty	0557348445	<i>[Signature]</i>



Fig 11.0 Lectures on Fruit Juice/Marmalade and Jam processing under way

In Fruit Juice Training, participants were taken through topic like: Sorting, washing, peeling and de –stoning, slicing, extraction, formulation, pasteurization and bottling. Trainees were made to understand the importance of processing fruits or adding value to fruits as it helps

- Reduce losses
- Improve efficiency
- Generate income



Fig. 12.0 Various ways to package fruit Juice

4.0 Marmalade and Jam production

4.1 Key Ingredients of Marmalade and Jam production

Participants were taken through key ingredients in the processing of Marmalade and Jam making as follows:

- **Fruit;** they are the basic ingredient for jam making and it provides some acids as well as color and flavor
- **Sugar;** it gives jam the sweetness taste and aid in the formation of gel. It also serves as a preservative
- **Organic acid (citric acid);** it is used as gel formation in jam making. It draws out pectin from fruit, contributes to flavor and prevent sugar crystallization
- **Pectin or Gelatin;** Pectin may come from the fruits but its purpose in jam making is for gel formation. Commercial pectin and gelatin are available



Fig. 13.0 Getting ready for Fruit Juice/Marmalade/Jam practicals



Fig. 14.0 Some pep talk before the extraction



Fig. 15.0 Participants demonstrating slicing skills



Fig. 16.0 Fruit Juice Extraction underway



Fig. 17.0 Packaged Fruit Juice on display



Fig. 18.0 Jam and Marmalade on display

Fresh fruits are subject to spoilage hence there is a need for value addition to extend its shelf life. Fruits can be processed into juices, jams, and marmalades.

5.0 Marketing and Branding Strategies

5.1 Objective(s) for this section were as follows:

Participants should be able to

- Develop the concept of bookkeeping in their daily business activities
- Appreciate and use basic Marketing mix in their profession
- Relate Product Life Cycle concept in their businesses
- Understand branding and re-branding as a process.

Participants were taken through basic bookkeeping, Importance of bookkeeping, Marketing essentials, Marketing mix, Product Life Cycle, concept of branding

This aspect was handled by Mr. Thomas Najah, The Marketing Officer of CSIR-Food Research Institute

They were made to understand that Bookkeeping refers to daily written records of events (such as business transactions) in a book. Business owner or someone employed/engaged to do it.

5.2 Importance of Bookkeeping

The following were taught as the importance of Bookkeeping:

- It helps the business owner to always be on track and on top of issues in the business
- It enables the entrepreneur to use Activity Based Costing (ABC) in pricing his/her product
- It is an aid to indicate seriousness on the part of the entrepreneur when seeking financial support from a bank or any source of funding

5.3 Marketing Mix (7 Ps Concept)

Participants were made to understand that without the concept of Marketing mix, it will be difficult for one to be successful in the market.

- **Products/Services:** How can you develop your products or services
- **Prices/Fees:** How can we change our pricing model?
- **Place/Access:** What new distribution options are there for customers to experience our product, e.g., online, in-store, mobile etc.
- **Promotion:** How can we add to or substitute the combination within paid, owned and earned media channels? **Physical Evidence:** How we reassure our customers, e.g., impressive buildings, well-trained staff, great website
- **Processes:** Are there internal process barriers in the way to delivering the best customer value
- **People:** Who are our people and are there skills gaps?

5.4 Product Life Cycle

There are 5 main stages in the life of any product or business. Any stage and the strategies that could be adopted to be able to stay in the competition.



Fig. 19.0 Marketing and Branding lectures underway



Fig. 20.0 Marketing Officer explaining a point at the Fruit juice lectures



Fig. 21.0 Participants are in the attentive mood here



Fig. 22.0 Issuing certificate to participants at Advance dfruit drying workshop



Fig 23.0 Director of the Institute issuing certificates to the participants



Fig. 24 .0 Closing ceremony for the Advanced Fruits drying training



Fig. 25.0 Closing ceremony for Fruit juice/Marmalade/Jam workshop

6.0 Evaluation and Recommendations

Participants are normally assessed to see whether or not the class was successful. This will enable the Training coordinator, consultants and management to streamline and to improve upon it subsequently.

6.1 Bottlenecks of Fruits Juice/Marmalade/Jam Team

The marmalade and Jam processing requires heat using burners. The burner in the laboratory is outmoded. This prolongs processing hours.

6.2 Challenges of the advanced Fruits Drying

The outages of power in plant 1 is very frequent and that always hampers the development of the trainings. The team will need a smaller dryer that can be mobile for mobile trainings in 2022

6.3 Challenges of BDS (prospecting team)

The development of the electronic flyers is outsourced . This service is supposed to be paid. Since **no** budget is allocated for that effect, the team encounters problems. The Marketing Officer had to foot the bill (Ghc150.00) per month.

7.0 Conclusion

The two trainings were organized in a professional manner. The consultants exhibited high level of professionalism and all clients were excite

It is recommended that the outmoded burner in the fruit Juice Laboratory be replaced by the more effective and efficient one to enhance productivity.

The dryers at the processing hall use only electricity. So, the frequent outages disturb the smooth drying processes. It is therefore recommended that dryers which use gas can be fabricated to replace with the electrical ones.

On the budget for electronic flyer development, it is recommended that a budget of one hundred and fifty Ghana cedis monthly should be allocated to BDS to be used in paying for the services.

8.0 Recommendations

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On the budget for electronic flyer development, it is recommended that a budget of one hundred and fifty Ghana cedis monthly should be allocated to BDS to be used in paying for the services.