# Training Course on Food Processing and PreservationTechniques

13-17 January 2019

# **Course Completion Report**



National Agriculture Training Academy (NATA)
Ministry of Agriculture
www.nata.gov.bd

# Training Course on Food Processing and PreservationTechniques

# 13-17 January 2019

# **Course Management**

Course Advisor: Dr. Md. Abu Sayeed Miah

Director General NATA, Gazipur

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Director (Training) NATA, Gazipur

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NATA, Gazipur

Asst. Course Coordinator: 1. MD. Eskander Hossain

Senior Assistant Director

NATA, Gazipur

2. Nilufa Akter

Senior Assistant Director

NATA, Gazipur

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#### 1. Introduction

Food processing and preservation is a set of physical, chemical and biological processes that are performed to prolong the shelf life of foods and at the same time retain the features that determine their quality, like colour, texture, flavor and especially nutritional value. Food preservation is achieved by destroying enzymes and microorganisms using heat (blanching, pasteurization), or preventing their action by: removal of water, or increasing acidity or using low temperatures.

#### 2. Course objectives :

- 1. To improve participant's skills in designing and implementing food processing operations in their own jurisdiction.
- 2. To develop advanced knowledge and idea of participants to investigate various parameters involved in food processing and preservation with respect to their influence on final product quality and safety
- 3. To develop knowledge of personnel working in agricultureabout processing steps involved in a range of contemporary and novel manufacturing operations

**Target population:** officers of different organizations under Ministry of Agriculture.

**Duration of each session:** 60 minutes.

#### 3. Course Content

SL.No.	Topics
1	Post-harvest transformation and value addition to agro-processed products
2	Concept on Safe and Nutritious Foods
3	Osmotic dehydration
4	Packaging of fresh and processed foods
5	GAP and SOP
6	Principles and Methods of Food Preservation
7	Causes of Food Spoilage
8	Food Preservation by increasing solids
9	Preparation of Jam/Jelly/Marmalade
10	Food Processing by Frying
11	Preparation of fried products
12	Fermentation as the methods of food processing and preservation
13	Overview on Minimal Processing of Fruits and Vegetables
14	Food Processing and Preservation by Heat Treatments
15	Modern Techniques in Food Processing
16	Food Processing by Drying
17	Food & Nutrition situation in BD
18	Overview on Washing and Cooling of fresh produces
19	Good Manufacturing Practices
20	Pickling

# Participants of course...... (annexure-01) "Food Processing and PreservationTechniques"

#### বিষয়ক প্রশিক্ষণে প্রশিক্ষণার্থীদের তালিকা

সময় কালঃ ১৩-১৭ জানুয়ারী ২০১৯ খ্রি:

ক্র. নং.	নাম	পদবী ও কর্মস্থল	মোবাইল নম্বর	ই-মেইল ঠিকানা
1.	মোরসালীন জেবীন তুরিন	বৈজ্ঞানিক কর্মকর্তা, বারটান, আঞ্চলিক কার্যালয়, সিরাজগঞ্জ	০১৭২৩-৬৭২১৯২	turinbsmrau@gmail.com
2.	মো: সামসুজ্জোহা	বৈজ্ঞানিক কর্মকর্তা, আঞ্চলিক কার্যালয়, বারটান, রংপুর	০১৭২৯৮১৪২৩৬	kbdzoha@gmail.com
3.	ফারজানা ছিমি	বৈজ্ঞানিক কর্মকর্তা, বারটান, আঞ্চলিক কার্যালয়, বরিশাল	০১৭১২-৬৭৮০৪৭	farjana@birtan.gov.bd
4.	সোনিয়া শারমিন	বৈজ্ঞানিক কর্মকর্তা, বারটান, আঞ্চলিক কার্যালয়, ঝিনাইদহ	০১৭৩৮-৫৭৩১৮১	sharmin@birtan.gov.bd
5.	মোহাম্মদ ওমর ফারুক	বৈজ্ঞানিক কর্মকর্তা, বারটান, আঞ্চলিক কার্যালয়, নোয়াখালী	০১৬৭৫-০০৯৯৪৩	omarbau07@gmail.com
6.	ড. মাহবুবা কানিজ হাসনা	উৰ্দ্ধতন বৈজ্ঞানিক কৰ্মকৰ্তা, উদ্ভিদ রোগতত্ত্ব বিভাগ, বিনা, ময়মনসিংহ।	০১৭১৩-৩৫৭০৯৫	kaniz69@yahoo.com
7.	ড. মো: শামছুল আলম	উৰ্দ্ধতন বৈজ্ঞানিক কৰ্মকৰ্তা, উদ্যানতত্ত্ব বিভাগ,বিনা, ময়মনসিংহ।	02922-248944	mithuhort@yahoo.com
8.	সাদিয়া আফরিন জুঁই	বৈজ্ঞানিক কর্মকর্তা, প্রজনন বিভাগ, বিজেআরআই, ঢাকা।	০১৭৬৮-৬৬৫৪৫৬	sadiabsmru@gmail.com
9.	মাহমুদা হক	অতিরিক্ত উপপরিচালক (প্রশাসন ও অর্থ), এসসিএ, গাজীপুর।	০১৭১৮-৪২৫৩১১	mahmudahuq15@gmail.
10.	মো: আলমগীর হোসেন	বীজ বিশ্লেষক, আঞ্চলিক বীজ প্রত্যয়ন অফিস, খুলনা	০১৭২৪-৮৮৬০৭৩	md.alamgirhossain78@yahoo.com
11.	আহমেদ রাশেদ -উন-নবী	কৃষি সম্প্রসারণ অফিসার, বোদা, পঞ্চগড়	০১৭১৮-১৪০৩৬৫	ahmedshuvo513@gmail.com
12.	মো: মারুফ হোসেন	এইও, হরিপুর, ঠাকুরগাঁও	০১৭৪৪-৬৩৫৫৯৪	haripurdae@gmail.com
13.	মো: মশিউর রহমান	এইও, বোচাগঞ্জ,দিনাজপুর	০১৭৬৩-৪৬৬৬৫৮	moshiur.bau@gmail.com
14.	মো: উজ্জল হোসেন	এইও, লোহাগড়া, চট্টগ্রাম	০১৭৫৪-৮১৮৮৩১	uaolohagora@dae.gov.bd
15.	শ্যামল চন্দ্র সরকার	এইও, বাঁশখালি, চট্টগ্রাম	০১৫১৫-৬১৫২২৮	uaobanshali@dae.gov.bd
16.	শামিমা ইয়াসমিন	এইও, আদিতমারী, লালমনিরহাট	০১৭৬৪-৯৭৫৫১৭	yesminrani32@gmail.com
17.	মো: আমজাদ হোসেন চৌধুরী	এইও, তিতাস, কুমিল্লা	০১৮৭৬-০৭০১৭৭	amzad.dae@gmail.com
18.	তানজিলুল হাসান	এইও, বরগুনা সদর, বরগুনা	০১৯৩৫-৪৪৯৫৫৬	ddaebarguna@gmail.com
19.	মো: মাইন উদ্দিন আহমেদ	এইও, লাকসাম, কুমিল্লা	0 <b>5958-80</b> 6408	uao.laksham@gmail.com
20.	মোছা: মিমি তালুকদার	সহকারী পরিচালক, বিএডিসি, রাজশাহী	০১৭৪০-৭৮৪১৭৯	mimitalukdar04@gmail.com
21.	ফারিয়া হোসেন শান্তা	বৈজ্ঞানিক কর্মকর্তা, বিএসআরআই, সিরাজগঞ্জ	০১৭২৬-২৩৪৪৩৬	fsshanta bau@hotmail.com
22.	মো: জাহিদুল ইসলাম	সহকারী পরিচালক, ডিএম, খামারবাড়ী, ঢাকা।	০১৭২৩-৩৮২৯১৪	adfs@dam.gov.bd
23.	ড. নিলুফা ফেরদৌস	উর্দ্ধতন বৈজ্ঞানিক কর্মকর্তা, ব্রি, গাজীপুর	০১৫৫৬-৩০২৯৭০	nilufa.ferdous.nm@gmail.com
24.	ড. মো: মোস্তাক আহমেদ	উৰ্দ্ধতন বৈজ্ঞানিক কৰ্মকৰ্তা, মসলা গবেষণা কেন্দ্ৰ, বারি, লালমনিরহাট	০১৭১৬-৩১৪৭০২	lalinsrsc@yahoo.com
25.	মোছা: শামসুরাহার	বৈজ্ঞানিক কর্মকর্তা, মসলা গবেষণা কেন্দ্র, বারি, শিবগঞ্জ,বগুড়া	০১৭৪৬-১৭৪২৯৮	mahmud.nahar@yahoo.com
26.	মো: নুরুল আমিন	বৈজ্ঞানিক কর্মকর্তা, বারি, দেবীগঞ্জ, পঞ্চগড়	০১৭৭৪-৬০৪২৯৫	nurul01141@yahoo.com
27.	মো: জাকারিয়া মাসুদ	বৈজ্ঞানিক কর্মকর্তা, প্রজনন বীজ উৎপাদন কেন্দ্র, বারি, দেবীগঞ্জ, পঞ্চগড়	০১৭৩৬-৬৮৩৭৮৮	zmasudbari@gmail.com
28.	আশফাক আহমেদ সবুজ	বৈজ্ঞানিক কর্মকর্তা, পোষ্টহারভেষ্ট টেকনোলজি বিভাগ, বারি, গাজীপুর	o\$9\$9-bo&8\$8	ashsabuz@gmail.com
29.	লায়লাতুল রোকসানা লিমা	সিনিয়র সহকারী পরিচালক, নাটা, গাজীপুর।	০১৭১৪-৬১২০২৯	lima1geb@gmail.com
30.	মোস্তফা হাসান ইমাম	এইও, ইশ্বরদী, পাবনা	০১৭১৭-৭২২৭১০	hasan35878@gmail.com

# List of Resource Speaker (Annexure- II)

SL No.	Name	Designation	Organization	e-mail and mobile No.
1	Dr. M. Burhan Uddin	Professor	Dept. of Food tech. & Rural Ind, BAU	01711-110509
2	Dr. Mohammad Gulzarul Aziz	Professor	Dept. of Food tech. & Rural Ind, BAU	01631-748866
3	Dr. MD. Miaruddin	CSO	Post-harvest Technology Division	01713-273806/ 01199-825632
4	Dr. Abdullah Iqbal	Professor	Dept. of Food tech. & Rural Ind, BAU	01712-555485
5	Dr. Delowar Hossain Mojumder	DD	NATA	01855-333570
6	Dr. Md. Ayub Hossain	CSO	Farm Machinery Division, BARI	01716-979034
7	Dr. Amdadul Hoque	AssociatePro fessor	Dept. Agroprocessing, BSMAU, Gazipur	01934-499867
8	Dr. Golam Ferdous Ahmed Chowdhury	SSO	Post-harvest Division, BARI	01712-271163
9	Dr. Mohammad Mainuddin Molla	SSO	PHTD, BARI	mainuddinmolla@yahoo .com 01712-231121
10	Maruf Ahmed	Head of Q/C	PRAN RFL	pblqc@pip.prangroup. com 01912-257201
11	Dr. Saleh Ahmed	Chairman	Kernel Foundation Dhaka	Saleh4s@yahoo.com 01712-740107
12	Dr. Shahjahan	Former CSO	BARI	shah_phd@yahoo.com 01716-174288
13	Dr. Taslima Ayesha Akter Nasrin	SSO	Horticulture Division, BARI	01751-904470

## (Annexure- III)

### **Training schedule on Food Processing and Preservation Techniques**

**Duration: 13-17 January 2019** 

Ist Day: 13/01/2019

Time	Topics	Methods	Speaker
08:30-09.00	Registration	-	Lucky
09.00-09.30	Pre evaluation		CC/ ACC
09:30-10:15	Inaugural session	-	DG/Directors/Faculties
10:15-11:15	Post-harvest transformation and value	L&D	Prof. Dr. M. Burhan Uddin,
	addition to agro-processed products		Dept. of Food tech. & Rural Ind, BAU
11:15-11:45	Tea Break		
11:45-12:45	Do	L & D	Do
12:45-02:00	Prayer and lunch break		
02:00-03:00	Concept on Safe and Nutritious Foods	L & D	Prof. Dr. Mohammad Gulzarul Aziz, Dept. of
			Food tech. & Rural Ind, BAU
03:00-04:00	Do	L & D	Do
04:00-04:15	Tea Break		
04:15-05:15	Osmotic dehydration	L & D	Dr. Mohammad Mainuddin Molla
			SSO, PHTD, BARI

2nd Day: 14/01/2019

Time	Topics	Method	Resource person
09:00 - 10:00	Packaging of fresh and processed foods	L & D	Dr. Saleh Ahmed
			Postharvest Technology Management Specialist,
			Safe Hort. Crops Production & Postharvest
			Technology Transfer Project, DAE, Khamarbari,
			Dhaka
10:00-11:00	GAP and SOP	L & D	Do
11:00-11:15	Tea Break		
11:15-12:15	Principles and Methods of Food	L & D	Prof. Dr. Abdullah Iqbal, Dept. of Food tech. &
	Preservation		Rural Ind, BAU
12:15-01:15	Do		Do
01:15-02:30	Prayer and lunch break		
02:30-03:30	Causes of Food Spoilage	L & D	Do
03:30-04:30	Overview on Minimal Processing of	L & D	Dr. Taslima Ayesha Akter Nasrin
	Fruits and Vegetables		SSO, Horticulture Division, BARI
04:30-04:45	Tea Break		

3rd Day: 15/01/2019

Time	Topics	Method	Resource person
09:00 - 10:00	Food Preservation by increasing solids	L&D	Dr. MD. Miaruddin, CSO, Post-harvest Technology Division, BARI
10:00 -11.00	Preparation of Jam/Jelly/Marmalade	Practical	Do
11:00-11:15	Tea Break		
11:15-12:15	Food Processing by Frying	L&D	Dr. Golam Ferdous Ahmed Chowdhury, SSO, Post-harvest Division, BARI
12:15-01:15	Preparation of fried products	Practical	Do
01:15 - 02:30	Prayer and lunch break		
02:30-03:30	Fermentation as the methods of food processing and preservation	L & D	Dr. Md. Shahjahan Vising professor BSMAU, Gazipur
03:30-04:30	Overview on Minimal Processing of Fruits and Vegetables	Practical	Dr. Taslima Ayesha Akter Nasrin SSO, Horticulture Division, BARI
04:30-04:45	Tea Break		

#### 4th Day: 16/01/2019

Time	Topics	Method	Resource person
09:00 - 10:00	Food Processing and Preservation by Heat	Lecture	Amdadul Hoque,
	Treatments		Associate Professor
			Dept. Agroprocessing, BSMAU, Gazipur
10:00 -11.00	Modern Techniques in Food Processing	Lecture	Do
11:00-11:15	Tea Break		
11:15-12:15	Food Processing by Drying	L&D	Dr. Md. Ayub Hossain
			CSO,
			Farm Machinery Division, BARI
12:15-01:15	Food Processing by drying	L & D	Do
01:15 - 02:30	Prayer and lunch break		
02:30-08:30	Field Visit (BARI, Aarong Dairy,		
	BRAC, Bangobondhu safari Park)		

#### 5thy Day: 17/01/2019

Time	Topics	Method	Resource person
09:00 - 10:00	Food & Nutrition situation in BD	L & D	Dr. Delowar Hossain Mojumder
			DD, NATA
10:00 -11.00	Overview on Washing and Cooling of	L & D	Md. Hafizul Haque Khan
	fresh produces		PSO, Post-harvest Technology Division,
			BARI
11:00-11:15	Tea break		
11:15-12:15	Good Manufacturing Practices	L & D	Maruf Ahmed,
			Head of Q/C, PRAN RFL
12:15-01:15	Good Manufacturing Practices	L & D	Do
01:15 - 02:30	Lunch and prayer		
02:30-03:30	Pickling	Practical	Dr. Md. Shahjahan
			Vising professor BSMAU, Gazipur
03:30-04:30	Do	Practical	Do
04:30-05:00	Concluding session		Co-coordinator

Training Coordinator
Dr. Md. Mayen Uddin
Deputy Director (Food Technology)
NATA, Gazipur

#### **Course Evaluation by the Participants ....(annexure IV)**

#### **Best Training Methods choose by the participants**

- 1. Practical class
- 2. Group discussion
- 3. Video clip

#### The issues that are disliked by the participants

- 1. More theory class
- 2. Arrangement of soap, towel in dormitory
- 3.. Many information in a topic
- 4. One speaker in more than two class
- 5. Not supply hand note
- 6. Load shedding
- 7. Shortage of field trip food manufacturing company

#### The others associated issues they liked

- 1. Topic wise expert resource persons were selected very prudently.
- 2. Management of dining by mess committee
- 3. Time management
- 4. Discipline & management
- 5. Management of dormitory
- 6. Expert resource persons
- 7. Wi-fi facilities
- 8. Cooperation of NATA Authority
- 9. Cooperation of Course Coordinator and Asst. Course Coordinator very remarkable.

#### Conclusion and recommendation by the Course Management Team:

- 1. Uninterrupted internet and electricity supply should be provided
- 2. Training duration should be increased.
- 3. Arrangement of food manufacturing company visit
- 4. Provide more time for practical class
- 5. Hard copy of manual of training course
- 6. Refresher's course should be arranged
- 7. Selection resource speaker on the basis of speaker evaluation score by the participants
- 8. Important class should be conducted in the morning
- 9. Sports facilities should be available.
- 10. Common room should be opened upto 12 am.
- 11. Sports facilities in the morning
- 12. Single room for single officer
- 13. Recreation facilities (TV) in each dormitory
- 14. Incorporate quality food export related class in traing schedule
- 15. Incorporate Govt. policy & BSTI standard class in traing schedule
- 16. Incorporate postharvest disease & insects pests management class in traing schedule

(Annexure - V)
Speaker Evaluation by Trainees
Grade range: 1-6 (Higher marks represent the higher grade)

Speaker name and address	Subject	Criteria	Obtained grade (Average)	Comments
Prof. Dr. M. Burhan	Post-harvest transformation and	Knowledge Over subject	5.2	
Uddin,	value addition to agro-processed	Ability to present ideas		
Dept. of Food tech.	products	clearly/relevantly		
& Rural Ind, BAU		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Prof. Dr.	Concept on Safe and Nutritious	Knowledge Over subject	5.4	
Mohammad	Foods	Ability to present ideas		
Gulzarul Aziz, Dept.		clearly/relevantly		
of Food tech. &		Ability to make the	=	
Rural Ind, BAU		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Dr. Mohammad	Osmotic dehydration	Knowledge Over subject	4.4	
Mainuddin Molla	osmone denyaration	Ability to present ideas		
SSO, PHTD, BARI		clearly/relevantly		
		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A		
		Control over class	_	
		Time management		
Dr. Saleh Ahmed	Packaging of fresh and processed	Knowledge Over subject	4.8	
Postharvest	foods	Ability to present ideas		
Technology		clearly/relevantly		
Management		Ability to make the		
Specialist,		class/session participatory		
DAE, Dhaka	GAP and SOP	Ability to Handle Q/A		
		Control over class		
		Time management		
Prof. Dr. Abdullah	Principles and Methods of Food	Knowledge Over subject	4.9	
Iqbal, Dept. of Food	Preservation	Ability to present ideas		
tech. & Rural Ind,		clearly/relevantly		
BAU		Ability to make the		
		class/session participatory		
	Causes of Food Spoilage	Ability to Handle Q/A	_	
	Thurst of the appendix	Control over class	4	
D T 1' 1 1	0	Time management	4.5	
Dr. Taslima Ayesha	Overview on Minimal Processing	Knowledge Over subject	4.7	
Akter Nasrin	of Fruits and Vegetables	Ability to present ideas		
SSO, Horticulture		clearly/relevantly	-	
Division, BARI		Ability to make the		
		class/session participatory	-	
		Ability to Handle Q/A	-	
		Control over class	-	
		Time management		

Speaker name and address	Subject	Criteria	Obtained grade (Average)	Comments
Dr. MD. Miaruddin, CSO, Post-harvest	Food Preservation by increasing	Knowledge Over subject	5.0	
Technology	solids)	Ability to present ideas		
Division, BARI	,	clearly/relevantly Ability to make the	_	
Division, Di ard		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Do	Preparation of	Ĭ	5.2	
Do	Jam/Jelly/Marmalade	Knowledge Over subject	3.2	
	Jann/Jenry/Ivrammarade	Ability to present ideas		
		clearly/relevantly	<u> </u>	
		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A Control over class		
D C 1 E 1	E 1D ' 1 E '	Time management	4.0	
Dr. Golam Ferdous	Food Processing by Frying	Knowledge Over subject	4.8	
Ahmed Chowdhury,		Ability to present ideas		
SSO, Post-harvest		clearly/relevantly		
Division, BARI		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Dr. Md. Shahjahan	Fermentation as the methods of	Knowledge Over subject	5.5	
Vising professor	food processing and preservation	Ability to present ideas		
		clearly/relevantly		
BSMAU, Gazipur		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Dr. Taslima Ayesha	Overview on Minimal Processing	Knowledge Over subject	4.8	
Akter Nasrin	of Fruits and Vegetables	Ability to present ideas		
SSO, Horticulture		clearly/relevantly		
Division, BARI		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Dr. MD. Amdadul	Food Processing and Preservation	Knowledge Over subject	4.3	
Hoque,	by Heat Treatments	Ability to present ideas	- '	
Associate Professor	of Heat Heatinghits	clearly/relevantly		
Dept.		Ability to make the		
Agroprocessing,		class/session participatory		
BSMAU, Gazipur		Ability to Handle Q/A	+	
, r		Control over class	+	
		Time management	+	
Do	Modern Techniques in Food	Knowledge Over subject	4.2	
Du	Processing		-	
	1 locessing	Ability to present ideas		
		clearly/relevantly	-	
		Ability to make the		
		class/session participatory	-	
		Ability to Handle Q/A	-	
		Control over class	-	
		Time management		

Speaker name and address	Subject	Criteria	Obtained grade (Average)	Comments
Dr. Md. Ayub	Food Processing by Drying	Knowledge Over subject	5.0	
Hossain		Ability to present ideas		
CSO, Farm		clearly/relevantly		
Machinery Division,		Ability to make the		
•		class/session participatory		
BARI		Ability to Handle Q/A		
		Control over class		
		Time management		
Dr. Delowar	Food & Nutrition situation in BD	Knowledge Over subject	5.7	
Hossain Mojumder		Ability to present ideas		
DD, NATA		clearly/relevantly		
		Ability to make the	_	
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Md. Hafizul Haque	Overview on Washing and	Knowledge Over subject	5.1	
Khan	Cooling of fresh produces	Ability to present ideas	3.1	
PSO, Post-harvest	cooming of mean produces	clearly/relevantly		
Technology		Ability to make the	_	
Division, BARI		class/session participatory		
,		Ability to Handle Q/A		
		Control over class		
		Time management	_	
Maruf Ahmed,	Good Manufacturing Practices	Knowledge Over subject	4.4	
Head of Q/C, PRAN		Ability to present ideas		
RFL		clearly/relevantly		
		Ability to make the	_	
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		
Dr. Md. Shahjahan	Pickling	Knowledge Over subject	5.9	
Vising professor		Ability to present ideas	1	
BSMAU, Gazipur		clearly/relevantly		
		Ability to make the		
		class/session participatory		
		Ability to Handle Q/A		
		Control over class		
		Time management		

# Training on Food Processing and Preservation Techniques Post Evaluation

#### Value of each questions are equal

Full Marks- 50 Times: 30 minutes

#### Name:

- 1. Define food and food processing.
- 2. What is food preservation?
- 3. State objectives food processing .Write common methods of food processing ?
- 4. Writedown the causes of food spoilage.
- 5. What are the factors which affects food technology?
- 6.Explain opportunities and challenges of food processing in Bangladesh?
- 7. Writedown the function of food.
- 8. Method of food processing
- 9. Define pasteurization.
- 10. Define jam, jelly and marmalade.

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