Department of Food Technology

College of Agricultural Engineering Sciences

Salahaddin University-Erbil

Subject: Food Processing -2-

Course Book – (Year 4)

Course Book – (4th Stage)

Lecturer's name

Theory: Assist. Prof. Dr. Nabil Hussain Rasul

Practical: MSc. Mahmood F. Saleem

Academic Year: 2022-2023

Course Book

1. Course name	**Food preservation**
2. Lecturer in charge	***Dr. Nabil Hussain Rasul** ****MSc. Mahmood F. Saleem**
3. Department/ College	**Food Technology / Agricultural Engineering Sciences**
4. Contact	**e-mail: nabil.rasol@su.edu.krd** **mahmood.saleem@su.edu.krd** **Tel: +9647504729357**
5. Time (in hours) per week	**Theory: 2** **Practical: 3**
6. Office hours	**3 hours**
7. Course code	
8. Teacher's academic profile	***Bsc: in food Industrial 1991, Msc: in Food Technology in 2003, PhD. In Food Sciences 2010.** ****Bsc: in food technology in2005, Msc: in Food processing in 2011**
9. Keywords	**Lycopene, Puree, Ketchup, Sauce , Clarification , Disintegration, Drinks, Dibs, Tahini, Marmalade.**

10. Course overview:

Food processing includes the methods and techniques used to transform raw ingredients into **food** for human consumption. **Food processing** takes clean, harvested or slaughtered and butchered components and uses them to produce marketable **food** products

11. Course objective:

The aim for this course.

- To understand the methods of food processing & techniques of each methods .
- To understand the types & methods of pre-treatments before food processing .
- To know definition, ingredients and steps for each of food products.
- To know the defects that appear on the products and it is reasons.

12. Student's obligation

The student has to prove its presence in the lecture and that by taking the percentage of attendance by me and has quiz every lecture, working in lab production of food products and in the end the students have exam by monthly and finally.

13. Forms of teaching

Lectures , papers, data show, white board, videos, pictures, Laboratory, Samples

14. Assessment scheme

Daily activity , quiz, Exam.

15. Student learning outcome:

1. **Training and teaching students how to processing foods**
2. **To identify the different methods of foods processing.**
3. **To identify the different types of food industries & its products such as juice, Jam ketchup and jelly.**
4. **To identify the steps and procedure of food processing.**
5. **To identify the factors that leads to elongate the shelf life of food.**

16. Course Reading List and References:

- Key references:
  1. **Brennan, J. G. (2006).**Food Processing Hand book. published by WI LEY-VCH Verlag GmbH& Co. KGaA, Weinheim ISBN: 3-527-30719-2.
  2. **Scott Smith, J., Hui, Y.H. (2013).** Food Processing: Principles and Applications. Wiley India Pvt Ltd. .
  3. **Steffe.J.F. (1992).** Rheological methods in food process engineering, Freeman Press, Michigan University, East Lansing, MI, 1.

- Useful references:
  1. **Manay , N. S. and Shadaksharaswamy , M. (2008)**. Foods facts and principles. Third revised edition. New Age International (p) Ltd., publisher.
  2. **Ramaswamy , H. and Marcotte, M. (2006)**. Food processing principles and applications. Published by CRC pres., Taylor and Francis group, Library of Congress.
  3. **Ahvenainen, R. (2000).** Ready-to-use fruits and vegetables, Flair-Flow Europe Technical Manual. http://flairflow4.vscht.cz/fru_veget00.pdf

- Magazines and review (internet):
  1. Journal of Food Processing and Preservation
  2. **http://www.who.int/en/**http://www.4shared.com/Food_Process_Design.html

17. The Topics:	
Theoretical Topics	
1.**Tomato Products**	
Composition of tomatoes	
Preparation of tomatoes for processing	
- Dry sort	
- Size grading	
- Washing	
- Final sorting and trimming	
- Coring	
- Peeling	Lecture's name
- Steam peeling	Dr.Nabil H. Rasul
- Lye peeling	
- Infrared peeling	2 hours
- Other peeling methods	
- Inspection	

2. Tomato Products:

- Tomato Juice
- Tomato Puree
- Tomato Paste
- Whole Tomato Canning
- Strained tomatoes
- Tomato soup
- Dehydrated Tomatoes
- Frozen Tomatoes
- Catsup or Ketchup
- Tomato Sauce

3. Juice And Paste Production

Raw Materials Preparation
Grading
Washing
Sorting
Coring And Trimming
Break
Hot Break
Cold Break

4. Extraction

Screw-Type Extractors
Paddle-Type Extractors
Deaeration
Homogenization
Concentration Into Paste

5. Canned Whole Or Sliced Tomato Production

Peeling
Manual Sorting
Filling, Additives, And Containers
Exhausting And Sealing
Canning/Retorting

6. Types of Evaporators

Main Functions
Theory
The more common types of evaporators include:

1. Batch pan
2. Calandria)Short-Tube)

3. long -Tube
A. Rising film tubular
B. Falling film tubular

4. Natural circulation
5. Forced circulation
6. Wiped film
7. Plate Type Evaporators

Based on method of operation evaporators also can be classified as:

- single effect evaporator

- multiple effect evaporators

7. Technology of Soft Drinks and Fruit Juices

four primary sectors of the global commercial beverage
First, hot drinks
Second, milk drinks
Third, Soft drinks
Fourth, alcoholic drinks

8. According to juice production method

Raw Material Quality
Harvest time
Cleaning, sorting and inspection
Crushing/Pulping
Enzyme Treatment
Pectolytic Enzymes
Commercial Uses

9. Pectic enzymes

Pectinesterase (PE)
HOT-BREAK method
Polygalacturonase (PG)
Amount of enzyme required for clarification of juice
Pressing
Juice Clarification & Filtration
Dearation & Concentration
Final Juice Quality

10. Filtration

Membrane Filter Technology
general categories of membrane filtration systems

1. Microfiltration
2. Ultrafiltration
3. Nanofiltration
4. Reverse Osmosis

Disadvantages of using ultrafiltration, nanofiltration or reverse osmosis to treat water.

11. Fruit and vegetables preserves

1. Chutney 2 . Confit
3 . Conserve 4 . Fruit butter
5. Fruit curd 6 . Fruit spread
7. Jam 8. Jelly
9. Marmalade

12. Baby food production

Best-practice lines for baby food and infant formula
Drum drying technology
Pre-cooking
Enzymatic treatment

CIP and flushing system

18. Practical Topics **1. Tomato Product Processing** Objective of the topic: The purpose of it is training and educating the students in the preparation, extraction tomato to produce juice & how to concentrate it to produce tomato puree, paste & The calculation of the amount of paste which produce. **2- Tomato ketchup** Objective of the topic: The purpose of it is training and teaching students how to processing ketchup, Basic quality factors & Essential materials, technology of ketchup& steps. **3- Sauce** Objective of the topic: The purpose of this subject is training and teaching students the basis of sauce processing, raw material of sauce, sauce properties & steps of sauce production. 4- Fruit juice : Objective of the topic: The purpose of this subject is training and teaching students what is the juice, types of it, steps of processing and its preserving methods & types of juice spoilage. **5- Drinks:** Objective of the topic: The purpose of this subject is training and teaching students Drinks, basis of drink preservation, general steps of processing and its preserving methods, types of drinks preparation & its advantages & defects . **6- Soft Drink** Objective of the topic: The purpose is training and teaching students to how to produce soft drink , what are its raw material and role each of it, steps of processing, corruption of soft drinks & calculating example. **7- Dibs/ Date syrup** The purpose is training and teaching students to know what's dibs, Steps of dibs production,& defects of dibs production. **8- Tahini:** Objective of the topic:	Lecturer's name Mr. Mahmood (3 hrs)

The purpose of this subject is training and teaching students how tahini produce, steps of Manufacturing tahini, sensory tests & Methods of deceiving tahini.

9- Food Preservation by Sugar / Jam

Objective of the topic:

The purpose of this subject is training and education of students on food preservation by sugar with its principles, The Factors that effects on the jam industry, Steps of Processing, Defects that appear on the jam, marmalad.

10- Baby food

Objective of the topic:

Introduction ,Food types, Baby formula food, Raw Materials & The Manufacturing Process.

11- Banana and plantain processing technologies

Objective of the topic:

Uses and Dietary Significance, Preservation Methods and Processes, Industrial processing, Processing technology, Banana (puree, slices, powder, flour, chips)

12- Fruit paste

Objective of the topic:

The purpose of this subject is training and teaching students how to produce fruit pastas & and their procedures.

13- smoked Food

Objective of the topic:

Introduction , Principles of it , Methods of it & the tool which used, and the advantages and disadvantages of this method

19. Examinations:

Sample of Questions

1- Define the following

2-What is the cause each of the following:

3- Write what you know about the following

Tomato juice extraction

4-prepare sugary solution with 20% concentration and its weight 60 kg

5- Enumerate each of the following

6- Fill the following blanks with appropriate word

7-Answer by true or false the following statement & correct the false statement :

8- What are the differences between:

.

False One:-

1. Pectin is a protective colloid that helps keep insoluble particles in suspension.
2. Thickeners are substances which, when added to the mixture, increase its viscosity without substantially modifying its other properties.
3. Ultrafiltration would remove these larger particles, and may remove some viruse.

Q1-B // Write briefly about each of the followings:-

1. Dehydrated or powdered fruit juice
2. Carbonated RTD soft drinks
3. Reverse Osmosis

Q2- A// Write two Examples for each the following :-

1. Unintentional Additive.
2. Emulsifiers
3. Sweeteners

Q2-B// Write Different between

1. Rising film tubular and Falling Film Tubular , Evaporator
2. Sorting and Grading
3. Ultrafiltration and Nanofiltration
4. Hot break and Cold break

Q3 -A// Choose the correct answer "A , B, C, or D" :-

1. In Concentration tomato juice into paste the paste is concentrated to a final solids content of at least
   A. 20-24% NTSS B. 4- 6% NTSS C. 44-49% NTSS D. 24-29% NTSS
2. It is Example of Oxygen scavengers
   A. Glucose Oxidase B. Ascorbyl palmitate C. Propylgallate D. EDTA
3. Method Prevents foaming during concentration of juice
   A. Homogenization B. Deaeration C. Extraction D. Concentration
4. The creation of a large particle surface area of juice and increases product viscosity
   A. Homogenization B. Deaeration C. Extraction

Q3 -B// What are the require treatments or procedure for

1. Clarification of fruit juices/wines.
2. Ultra pure water production.
3. Decrease loss of vitamin C through Tomato juice production.
4. Concentration of corn syrups

Q4- A// Draw:-

1. Isotope irradiation plant
2. Photoelectric color sorters

Q4- B// Enumerate :-

1. Tomato Products
2. The main advantages of irradiation .

Q1-A // Write whether the following statements are True or False and Correct the

20 Extra notes: Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.
21. Peer review This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section. *(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*