

# Advanced Food Technology

FST 8572

Fall 2002

J. L. Silva

Time: M or F 12:00- 2:00 pm (tentative)

Place: 100 Herzer building

1. Course Objective: To introduce the student to basic principles in recent developments in the field of Food Science and Technology. The course will contain a significant amount of discussing on recent literature. The student at the end of the course would be able to read the literature and comprehend it thoroughly.
2. Course Content:
  1. Food Preservation Technology
  2. Crossflow Membrane Filtration
    - S Filtration
    - S Ultrafiltration
    - S Reverse Osmosis
  3. Aseptic Processing and Packaging
    - S Principles
    - S Microbiology & Chemistry
    - S Packaging
  4. Ionizing Radiation
    - S Basic Principles
    - S Chemical, Physical, Microbiological Implications
    - S Applications
  5. Oxygen Reduced Packaging
    - S Modified/Control Atmosphere
    - S Vacuum Packaging
    - S Applications/Problems
  6. Minimal Processes
    - S Pulsed Light/Dielectric Heating
    - S Ultrahigh Pressure
    - S High Frequency Ultrasound

- 7. Novel Heating Processes
  - S Ohmic Heating
  - S Microwave Heating
- 8. Cryogenic Separations
- 9. Engineered Foods
  - S Seafoods
  - S Protein Foods
- 10. Heat and Mass Transfer Developments/Encapsulation
- 11. Food Biotechnology
- 12. Other Topics
  - S Surface Decontamination
  - S Automation and Controls

3. Grading

1.	1 test (Final).....				30%
2.	Reports (4).....				40%
3.	Class discussion.....				30%
4.	Grading system:	90	-	100	A
		80	-	89	B
		70	-	79	C
		60	-	69	D
			<	59	F

4. Requirements

- 1. Reports are on a topic as directed.
- 2. Final covers topics discussed in class (basics).

5. References

Text: Barbosa-Canovas, G. V. et al. 1999. Nonthermal Preservation of Foods. Marcel Dekker, New York.

Books:

- 1. Connor, J. M. 1988. A Food Processing - An Industrial Powerhouse in Transition.@ Lexington Books/D. C. Heath, Lexington, MA. 416 pp.
- 2. Urbain, W. M. 1986. A Food Irradiation.@ Academic Press, Inc. 351 pp.
- 3. Anon. 1988. A New Technologies for the Food Industry.@ A Conference Presented by the Monterey Seminar Group. San Jose, CA. April 6-8.

4. Nelson, P. E., J. V. Chambers, and J. H. Rodriguez. 1987. *Principles of Aseptic Processing Packaging*.@ The Food Processors Institute, Washington, D. C. 120 pp.
5. Decareau, R. V., and R. A. Peterson. 1986. *Microwave Processing and Engineering*.@ Ellis Horwood Ltd., Chichester, England and VCH Verlagsgesellschaft MbH, Weinheim, FRG.
6. Bartholomai, A. (Ed.). 1987. *Food Factories*.@ VCH Verlagsgesellschaft MbH, FRG. 289 pp.
7. Cheryan, M. 1986. *Ultrafiltration Handbook*.@ Technomic Publishing Co., Lancaster, PA.
8. Brody, A. L. 1989. *Controlled/Modified Atmosphere/Vacuum Packaging of Foods*.@ Foods and Nutrition Press, Trumbull, CT. (TP374.C66 - 1989)
9. Brody, A. L. 1994. *Modified Atmosphere Food Packaging*.@ IPP, Herndon, VA. (TP374.M62 - 1994)
10. Blakistone, B. A. 1998. *Principles and Applications of Modified Atmosphere Packaging of Foods*.@ Blackie, New York. (TP374.P75 - 1998x)
11. Gould, C. W. 1999. *New Methods of Food Preservation*. Aspen Publishers, Gaithersburg, MD.

Journals:

1. Journal of Food Science. Institute of Food Technologists (IFT).
2. Food Technology. IFT.
3. Food Reviews International. Marcel Dekker, Inc.
4. Food Engineering. Chilton Co.
5. Food Processing. Putman Publishing Co.
6. Journal of Food Processing and Preservation. Food and Nutrition Press, Inc. (FNP)
7. Journal of Food Technology
8. Journal of Food Processing and Preservation (FNP)
9. Food Manufacture

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Fall 2000

J. L. Silva and R. S. Chamul

TENTATIVE SCHEDULE

August

- 22 Introduction, Hurdle Technology, VP/MAP
- \* 29 High Frequency Ultrasound

September

- 5 VP/MAP, TTIs
- 12 Packaging/ Sovann/ Tour
- 19 Irradiation/Microwave
- 26 Microwave/Pulsed Light

October

- 3 Pulsed Light
- \* 10 Ultrahigh Pressure
- \* 17 Crossflow Membrane Filtration
- 24 Surface Decontamination - Doug Marshall
- \* 31 Aseptic Processing

November

- 7
- 14 (Reports Due) - Automation and Controls
- 21 Presentation of Reports
- 28 Biotechnology/GMOs

December

5

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Fall 2005

ASSIGNMENTS

1. Collect and read all reviews on VP/MAP/CAS for the past 10 years.
2. Collect and read all reviews on minimally refrigerated foods for the past 10 years.
3. Collect and read all reviews on nonthermal processing/new technologies for the past 5 years.
4. Generate a literature search on VP/MAP of fishery products including freshwater and seafood products, regulations, safety, packaging, smoked fish, etc. One paper assigned 8/23 - due 9/1/00.
5. Other topics to be assigned as follows (from the past 4 years):

<u>Topic</u>	<u>Name</u>
Overview	Sovann Kin
Developments in refrigeration & freezing technology	
TTIs (temperature monitor)	
Pulsed-light treatment	
High frequency ultrasound (HFU)	
Ionizing radiation, including X-ray, E-beam	
Post-harvest intervention treatments	
GMOs and biotechnology	
New/smart packaging technology	
Ohmic/high frequency heating	
Ultrahigh pressure processing	