

BHARATHIAR UNIVERSITY : COIMBATORE-641046

Syllabus for PhD (Food Science / Food Technology)

PART I Examination

(Effective from the academic year 2013-2014 onwards)

G03 Special Paper* - Novel Food Processing Technologies

UNIT I: Microwave Processing, Infra-red, Radio frequency Processing and Ohmic Heating

Microwave Processing: Difference between conventional and microwave heating, Applications of microwave in food processing.

IR: Principle and application in food industry.

Radio frequency Processing: Principle and Application in food industry.

Ohmic heating: Principle, Application of Ohmic heating in Food Processing.

UNIT II: Food Irradiation Technology

Food Irradiation Technology: General Aspects of Irradiation, ionizing radiation, irradiation process, units, mechanism, advantages and disadvantages of irradiation process, general purposes of irradiation process, inactivation of micro-organisms, inhibition of sprouting, delay of ripening and senescence and miscellaneous effects on food properties.

UNIT III: Ultrasound and Pulsed Light in Food Processing

Ultrasound in food processing and preservation: Introduction, ultrasound instrumentation, ultrasound processing for enhancement of mass transfer, heat transfer and homogenization and emulsification. Effect of sonication on microorganisms and enzymes. Thermosonication and its application in food processing.

Pulsed Light: Introduction, Principle of Pulsed Light, Mechanism of action, Inactivation of micro-organisms in foods with pulsed-light treatment. Application of Pulsed Light technology in Food Processing.

UNIT IV: Pulsed Electric Field Processing (PEF) of Foods

Pulsed Electric Field Processing (PEF) of foods – Introduction, Fundamental aspects of microbial membrane electroporation, Microbial inactivation by Pulsed Electric Fields, Effect of Pulsed Electric Fields on enzymes and food constituents, Application of Pulsed Electric Fields Technology in Food Processing.

UNIT V: High Pressure Processing

High Pressure Technique: Principles, mechanism, applications of high pressure technique in food processing, effect of high pressure processing on microorganisms, enzymes and nutrients.

References:

1. Barbosa-Canovas, G.V., & Gould, G.W. (2000).
2. Innovation in Food Processing. Lancaster, UK: Technomic Publication.

2. Mason, T.J., & Lorimer, J.P. (2002). *Applied Sonochemistry. The uses of power ultrasound in chemistry and processing*. Weinheim, Germany: Wiley-VCH Verlag GmbH.
3. Shoh, A. (1988). *Industrial Applications of Ultrasound*. In K.S.Suslick (ED.), *Ultrasound, its chemical, physical and biological effects*. New York: VCH Publishers, Inc.
4. Tang, J., Hao, F., & Lau, M. (2004). *Microwave Heating in Food Processing*. World Scientific Publishing Co.pte.Ltd.
5. Barbosa-Canovas, G.V., Gongora-Nieto, M.M., Pothakamury, U.R., & Swanson, B.G. (1999). *Preservation of Foods with Pulsed Electric Fields*. London: Academic Press Ltd.
6. Vega-Mercado, H., Gongora-Nieto, M.M., Barbosa-Canovas, G.V., & Swanson, B.G. (1999). *Nonthermal Preservation of Liquid Foods using Pulsed Electric Fields*. In M.S. Rahman (Ed.).
7. Raso, J., & Heinz, V., (2006). *Pulsed Electric Fields Technology for the Food industry- Fundamentals and Applications*. Springer Publication.
8. Richardson, P., (2000) *Improving the Thermal Processing of Foods*, CRC Press Publication.

Syllabus for PhD (Food Science) – PART – I Examination

GO3 Special Paper* - Baking Science

UNIT – 1

Wheat

Production, Types, Varieties, Classification, Quality characteristics of wheat- physical, chemical and physicochemical.

Milling of wheat: Milling methods, Types of products and by-products, physical, chemical, physico-chemical characteristics of flour, Dough development, Methods of dough mixing, Rheological testing of dough - Farinograph, Mixograph, Extensograph, Amylograph / Rapid Visco Analyzer, Falling number.

UNIT - 2

Technology of Biscuits, Cookies and Breads

Quality of raw materials, Functions of ingredients, types of biscuit and bread, Manufacturing methods, Faults & remedies.

UNIT – 3

Food Additives for Bakery Products

Food additives- definitions, classification and functions, Preservatives, antioxidants, colours and flavours (synthetic and natural), emulsifiers, sequestrants, humectants, hydrocolloids, sweeteners, acidulant, buffering salts, anticaking agents, etc. - chemistry, food uses and functions.

UNIT – 4

Evaluation of Biscuits by Sensory and Objective measures

Introduction to sensory analysis, Methods of sensory evaluation, Factors influencing sensory attributes, Sensory quality parameters – Size, shape, texture, aroma, taste, mouth feel, colour and overall acceptability.

Objective evaluation of biscuits using Texture analyzer. Physical measurement of biscuits for weight, thickness, spread, spread ratio etc.

UNIT – 5

Nutritional Aspects of Bakery Products

Effects of Baking on nutritional quality, Fortification of flours, Composite flour in bakery products, Multigrain bakery products, Role of biscuits in nutrition.

Reference

1. Manley D. 2000. Technology of Biscuits, Crackers & Cookies. 2nd Ed. CRC Press.
2. Pyler EJ. Bakery Science & Technology. 3rd Ed. Vols. I, II. Sosland Publ.
3. Dubey SC. 2002. Basic Baking. The Society of Indian Bakers, New Delhi.
4. Branen AL, Davidson PM & Salminen S. 2001. Food Additives. 2nd Ed. Marcel Dekker.
5. Jellinek G. 1985. Sensory Evaluation of Food - Theory and Practice. Ellis Horwood.
6. Bamji MS, Rao NP & Reddy V. 2003. Textbook of Human Nutrition. Oxford & IBH.
7. Swaminathan M. 1974. Essentials of Foods and Nutrition. Vol. II. Ganesh & Co.