

## Syllabus for Entrance Test for Ph.D. (Science) in Food Science

- 1. Chemistry of food constituents:** General composition of foods, proximate analysis of foods, chemistry of carbohydrates, proteins, lipids, vitamins and other minor constituents, water activity, texture, flavor, colour of foods, various minor phyto-constituents, Natural fragments and flavor constituents, Anti-nutritional factors in plant foods.
- 2. Human nutrition:** Energy value of foods, calculation of energy value based on proximate composition of foods, daily energy need of body for basal metabolism, physical activity and diet induced thermogenesis, energy balance, B. M. I.; role of carbohydrates in nutrition including dental caries, lactose intolerance, galactosemia, dietary fiber, resistant starch, glycemic index of foods, prebiotics including oligosaccharides; role of proteins in nutrition including essential amino acids, protein quality, complete proteins, animal and plant sources of proteins, protein calorie malnutrition, protein quality estimation methods including in vivo and in vitro; role of lipids in nutrition including fat digestion, absorption, saturated fats, medium chain triglycerides, PUFAs as essential fatty acids, omega 6 and omega 3 fats, cholesterol, plant sterols; role of micronutrients in nutrition including fat and water soluble vitamins and minerals; role of water and electrolytes, rehydration therapy; assessment of nutritional status; lifecycle nutrition; sports nutrition; food fortification; effect of food processing and storage on nutrients; nutraceuticals and functional foods; nutrigenomics
- 3. Biochemistry:** cell structure and organization, biomolecules, enzymes, classification, nomenclature, structure, regulation of activity, kinetics, mechanism of catalysis; primary metabolic pathways of carbohydrates, proteins and fats, energy metabolism, structure and synthesis of nucleic acids and their role in protein synthesis, mutations, regulation of pathways, inborn errors in metabolism.
- 4. Microbiology:** including classification and taxonomy of microorganisms; growth and physiology; methods of microbial enumeration; microbial metabolism, microbiology of fermented foods, pathogenic/ toxigenic microorganisms, microorganisms involved in spoilage of foods, microbial genetics, microbes in industry.

5. **Food commodity science:** chemical composition of various food commodities like cereals, legumes, oilseeds, fruits, vegetables, tubers, plantation crops, meat, fish, poultry, milk etc.
6. **Fundamentals of food processing and preservation:** fundamental principles of food preservation by heat processing, low temperature storage, chemical preservatives –bio preservatives traditional methods, freezing, dehydration, non-thermal processes, packaging etc., Hurdle technology and use of enzymes in food industry.
7. **Food analysis:** principles of analysis of food constituents in raw and processed foods- chemical and instrumental methods.
8. **Fermentation science:** different types of industrially important fermentations, role of microbes and enzymes thereof, changes in the substrate involved in the fermentation, benefits/risks of fermentation
9. **Nutraceuticals & their functions**
10. **Human physiology**

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