

Diploma in Spices Processing Technology

(DSPT)

Program Objective. This program is specifically aimed to impart knowledge and skill in spices and spices processing technology to aspirants who are desirous of building a career in spice industry

Course Outcomes. The trainees on completion of the program will be able to

- 1 Understand different types of spices, flavors, pungency and aroma components of spices and also the uses of spices.**
- 2 Understand the needs for seasoning, drying and storage of spices.**
- 3 Understand the chemical composition of spices and manufacturing technology of spices oil and spice oleoresins**
- 4 Identify different primary processing techniques for different spices.**
- 5 Understand the process of producing value added products from spices**
- 6 Explain milling practices for different spices**
- 7 Understand different manufacturing process of spice pastes.**
- 8 Understand different packaging techniques and the need for packaging**

Eligibility For admission

The minimum qualification for candidates to join this diploma program is graduation in science subjects or engineering graduates. The students who are in the final year of the graduation (3rd /4th) can join this program.

Duration.

This diploma program is flexible and can be completed in 6 months or 1 year depending on the convenience of the student. Classes will be scheduled in the evenings 5.00 pm to 7.00 pm or on Saturdays according to the convenience of students and the college. Total 150 hours classes.

Evaluation

There will be formative assessments based on class tests, assignments and internal examinations. Final assessment will be done based on a 3 hours written examination for each of the first 4 courses and one practical course consists of one industrial visit during the program and one week internship in one of the spices industry. The 4 core courses DSPT 001, DSPT 002, DSPT 003 and DSPT 004 will have 40% waiteage for internal assessment and 60% for final examinations. The practical course will be evaluated based

on the performance of the participant during the internship (50% waitage) and internship viva (25%) based on the internship report (25%). Those who qualify with a minimum of 50% in each course, will be awarded diplomas jointly by the college and industry

Program Structure.

There are 5 courses of 3 credits as given below for the Diploma program

Courses

DSPT – 001 .Introduction to Spices and Spices Industry

DSPT- - 002. Spices - Primary Processing Operations and Quality Evaluation

DSPT- 003. Spices- Milling and Packaging

DSPT- 004. Spices – Extraction Technology, Processing Methods and Quality Control

DSPT- 005. Industry Visit, Internship and Internship Report

Detailed syllabus of the courses

Course code- DSPT -001. Introduction to spices and spices industry

Module-I. Introduction to spices processing Industry. 10hrs

Status and scope of spices processing industries in India , spices ,definition and needs, composition and nutritive of different spices, availability and market trends, challenges in spice industry , global requirements of spices , sources, production, selection criteria, classification on the basis of origin,

Module-2 Spices and Quality. 5hrs

Major spices - Physical characteristics, composition, and functions. Basics on international regulations for food. Major international quality specifications, spices reconditioning, spice grading.

Module- 3. Drying and storage of spices. 10hrs

Importance of drying in spices processing. Drying pattern of spices and deferent methods of drying. Component of artificial dryer and its operation. Types of dryers used in spices industry and comparison among them. Quality affecting factors in drying. Conditions for storage of spices.

Module 4. Application of spices. 5hrs

Food industry, pharmaceutical industry, Nutraceutical industry, poultry feed supplements, perfumery products.

Course code. DSPT-002 Spices- Primary Processing Operations and Quality Evaluation

Module -1 Spices Processing. 5hrs

Laws of size reduction, energy relationships in size reduction, methods of size reduction, classification of equipments, crushers, Grinders, disintegrators for coarse intermediates and fine grinding , power requirement.

Module 2. Unit Processes and Unit Operations 10 hrs

Concept of unit processes and unit operations, description of different unit processes and unit operations, extraction, evaporation, distillation, drying , absorption and crystallization, extractors- batch, continuous , LLE,SCPE, evaporators-RFE, FFE, ATFE , WFE, batch, Vacuum distillation, simple distillation, fractional distillation Azeotropic distillation, steam distillation and extractive distillation.

Module- 3 Heat and Mass Transfer- 5hrs

Basics of heat and mass transfer and its laws, materials, mass and heat balancing, modes of heat transfer, latent heat and sensible heat, heat exchangers, theory of evaporation-single effect and multiple effect evaporation.

Module -4 Measurements and transferring systems. 10hrs

Classification, performance characteristics and sizing of pumps, compressors and fans. Flow measurement- constant and variable head meters, velocity measurement techniques, Types, characteristics and sizing of valves.

Mixing and agitation- Mixing of liquids (With and without solids), mixing of powders, selection of suitable mixers, power requirement for mixing. Storage and conveying of solids- Bunkers, silos, bins, and hoppers, transportation of solids in bulk, powder hazards, conveyer selection, different types of conveyers and their performance and characteristics.

Course code. DSPT-003. Spices -Milling and Packaging

Module- 1. Milling of Spices 10hrs

Selection of raw materials and secondary processing of spices before milling. Steps in ground spices production, different types of Grinding, methods and machines and comparison among them. Standards of ground spices. Product scope-curry power mixtures, chilly power, Turmeric power, chilly pieces, pepper powder, etc.

Module- 2. Spice pastes. 10hrs

Selection of raw materials machinery and Equipments. Product scope, Ginger paste, garlic paste, mustard Cream, goraka paste, etc. Finished product specifications, packaging and Labeling.

Module-3 . Packaging, labeling spices and certification. 10hrs

Different methods of packaging, packaging materials, Laminated bags

Whole spice bulk and retail packaging, Ground spice and curry mixture packaging. Packaging machineries and equipments. Regulation in labeling, good manufacturing practices and product certification

Course code. DSPT-004. Spice Extraction Technology, Processing Methods and Quality Control

Module- 1.Flavor technology . 10hrs

Definitions, Spices and condiments , flavor , pungency, and aroma components and their functions, Essence (Flavor, flavor intensifiers, synthetic) recovery techniques from fruits, spices, and herbs along with the equipments used. Liquid and solid flavor production, flavoring, remixing, flavors, and effect of processing on flavor quality. Spice essential oils. Methods of extraction, isolation separation, equipments. Spices and flavor quality evaluation: criteria for assessment of flavor quality, identification of natural food flavors, methods of flavor evaluation (chemical, instrumental, seasoning). FSSAI standards for flavoring materials and flavors.

Module-2. Processing of different spices. 15 hrs

Definition, methods of extraction, isolation, separation equipments. Processing technology for pepper, Black pepper and White pepper, Cardamom, nutmeg, clove, Processing machines, products. Grades and standards.

Processing technology for Vanilla, ginger, bleached ginger, turmeric, chilly, processing machinery and equipments, standards and grades.

Introduction to gas chromatography, HPLC, AAS, spectrophotometer

Module-3. Value added products from spices. 5hrs

spices encapsulation, recent developments in production, retention and recovery of spices, effect of processing on quality of spices, contamination of spices with micro organisms and insects., spice volatile oils, spice oleoresins, use of spice extractives, and replacement of

spices with oils and oleoresins, alternative products, ground spices, processed spices, organic spices, curry products.

DSPT-005 – Industry visits and internship, internship report. 30hrs

DSPT- 005 consists of one industry visit for a day during the second week after commencement of the program to make the students aware of different processes in the spices industry. The participant will have one week internship before the final examination. The internship and the internship report will have the same waitage as given to other courses. Students will be assessed by the industry experts during the internship and internship viva will be conducted based on the internship report by the college involving Industry expert.

