



INC ACADEMIA
EXECUTIVE EDUCATION
FOR THE NUT & DRIED FRUIT INDUSTRY

Basic Program

TEACHING GUIDE

1. OVERVIEW
2. TIME FRAME, ASSESSMENT AND CERTIFICATE DELIVERY
3. TECHNICAL SUPPORT
4. ACADEMIC PROGRAM



1. OVERVIEW

The Basic Program on Nuts and Dried Fruits covers the fundamentals of the nut and dried fruit industry. The program consists of eight compulsory courses, including reading materials, videos and self-assessment tests.

COURSES

1. ORIGIN AND DESCRIPTION
2. SOIL AND CLIMATE
3. VARIETIES AND USES
4. HEALTH AND NUTRITION
5. HARVESTING AND PROCESSING
 - 5.1. HARVEST
 - 5.2. SHELLING
 - 5.3. BLANCHING
 - 5.4. DRYING
 - 5.5. OPTICAL SORTING
 - 5.6. PASTEURIZATION
 - 5.7. FUMIGATION WITH PHOSPHINE
 - 5.8. STORAGE
 - 5.9. FRYING AND DRY ROASTING
 - 5.10. FLAVORING
6. FOOD SAFETY AND QUALITY STANDARDS
7. PRODUCTION, TRADE AND CONSUMPTION
8. MARKET INSIGHTS

Each course has some exercises between chapters and a final self-assessment to evaluate your understanding of the subjects.

2. TIME FRAME, ASSESSMENT AND CERTIFICATE DELIVERY

You have **three months to complete the online program**, starting the day you were given access to begin your courses, when you received an email with the subject “You can now start your INC Academia training”.

In order to successfully complete the program and get the certificate of completion issued by the INC, at the end of each course, you must complete the self-assessment test. **A minimum score of 60% is required to pass each course.** You will only have **one attempt** to complete each test.

To download the certificate, ALL courses and lessons, as well as the satisfaction survey, **MUST be completed.**

If you fail the online course, you may retake the self-assessments you did not pass for an additional fee of €450.

3. TECHNICAL SUPPORT

During all the program, you will have the full support and technical assistance of the **Academic Tutor**:

- Dr. Julia Cartelle, Senior Analyst, Industry Statistics, INC International Nut and Dried Fruit Council
 - o Email: julia.cartelle@nutfruit.org
 - o Tel: (+34) 977 331 416

4. ACADEMIC PROGRAM

COURSE 1. Origin and Description: Introduction to the long history of nuts and dried fruits, their description and physiology. In this course, students will learn the general features of nuts and dried fruits; major species; domestication and distribution; floral and reproductive biology; and flower and fruit anatomy. It also contains some of the knowledge and skills required for successful and sustainable orchard management. Author: Prof. Dr. Uygun Aksoy, Consultant, Türkiye.

Learning outcomes:

- Know the long history and general features of nuts and dried fruits, learning the history and distribution of different nuts and dried fruits quoting excerpts dating back thousands of years.
- Get basic information on major dried fruit and nut species, learning about their original centers of diversity and steps in their distribution.
- Acquire knowledge of botany, and flower and fruit anatomy to establish links, and identify the main differences between certain crops.
- Gain some knowledge and skills required for successful and sustainable orchard management.

COURSE 2. Soil and Climate: Which climates nuts and dried fruits are adapted to, soils, water demand and how climate conditions may affect the crops. This course examines the main factors that determine the growth of nuts and fruits; what climates nuts and dried fruits are adapted to; water demand; range of temperatures; and how climate conditions may affect the crops. It also identifies what soils are best to grow nuts and fruits, and key factors for their optimum growth. Author: INC with the cooperation of Dr. Louise Ferguson, University of California, Davis, USA.

Learning outcomes:

- Know the key features of the climate and soils; the main factors that determine the growth of nuts and fruits.
- Recognize what climates nuts and fruits are adapted to, their water demand, the range of temperatures and how climate conditions may affect the crops.
- Identify what type of soils are best to grow nuts and fruits, as well as factors for their optimum growth.

COURSE 3. Varieties and Uses: An overview of the main varieties and geographical distribution of species, as well as traditional and recent products and uses. In this unit, students will learn about the main species/varieties of nuts and dried fruits, their geographical distribution and main producing

countries. It also provides an overview of traditional and recent products, and their uses. Author: Prof. Dr. Uygun Aksoy, Consultant, Türkiye.

Learning outcomes:

- Know the biological classification system and gain familiarity with the widely used binomial nomenclature.
- Acquire knowledge of how this diversity has arisen over time and how it may change depending on future needs and natural processes.
- Understand the overall basic ecological requirements for production.
- Have an overview of the current geographical distribution, major producers and main species/varieties for each nut and dried fruit crop.
- Comprehend the key properties of leading varieties or species, traditional usage of these varieties, and potential use in the future to develop new products and new markets.

COURSE 4. Health and Nutrition: A review of the nutritional value and evidence-based health benefits of nut and dried fruit consumption. This part of the program summarizes the nutritional value and potential health benefits of nut and dried fruit consumption, their contribution to nutritional intake, and how they aid in protecting against the development of chronic diseases. Authors: Prof. Jordi Salas-Salvadó, Rovira i Virgili University, Spain, and Assoc. Prof. Cesarettin Alasalvar, TÜBİTAK Marmara Research Center, Türkiye.

Learning outcomes:

- Gain knowledge of the nutritional value of nuts and dried fruits.
- Identify the potential health benefits on nut and dried fruit consumption, understanding their contribution to nutritional intake, and how they aid in protecting against the development of chronic diseases.
- Know the authorized health claims approved by the European Commission and the U.S. Food and Drug Administration.

COURSE 5. Harvesting and Processing: Main processing operations that can take place during and after harvest, including shelling, blanching, drying, sorting, pasteurization, fumigation with phosphine, storage, frying, dry roasting, and flavoring. This course includes 10 lessons.

5.1. Harvest: The different harvesting systems of each nut and fruit are described in this lesson. Although there are many common elements, operations differ according to the type of crop. This unit also covers basic hygiene practices for the elimination of potential sources of contamination during harvesting. Author: INC.

5.2. Shelling: A historical background of shelling, from ancient times to current technologies and trends. The main mechanical cracking systems for several types of nuts are briefly described. Author: Mr. José Roig Borrell, Borrell®, Spain-USA.

5.3. Blanching: This lesson gives a historical background of blanching and describes the differences between dry blanching (only applicable to peanuts and hazelnuts) and wet blanching –a more complicated technique. Author: Mr. José Roig Borrell, Borrell®, Spain-USA.

5.4. Drying: The objectives and importance of drying, how the process works and what steps are involved. Existing types of dryers and methods are also explained in this lesson. Author: Mr. Thomas Barber, Bühler Aeroglide, USA.

5.5. Optical Sorting: This chapter gives an overview of the benefits of optical sorting and the different types of sensor technology commonly used in the nut and dried fruit business. Author: Mr. Brendan O'Donnell, former Global Segment Director - Nuts & Citrus, TOMRA Food, USA.

5.6. Pasteurization: The different pasteurization processes currently available to eliminate pathogens and the validation process to demonstrate the effectiveness of the process. Author: Dr. Cameon Ivarsson, Napasol, Switzerland.

5.7. Fumigation with Phosphine: The minimum requirements for safe and effective fumigation using phosphine gas, from pest prevention through preplanning of the treatment, transportation, storage, application, monitoring, ventilation, gas-free release, disposal of degassed carrier material and record keeping. Author: Mr. Klaus Ihrig, Detia Degesch, Germany.

5.8. Storage: As nuts and dried fruits can be stored for a long time, proper storage conditions are crucial to preserve the safety and quality of the products. This lesson describes the main food-safety and quality concerns that might arise during the storage period, as well as the major factors influencing quality and shelf life. Author: INC.

5.9. Frying and Dry Roasting: The most important industrial processes to alter and enhance the flavor of peanuts and tree nuts –frying and roasting. It includes an overview of the available methods and the differences between them. Author: Dr. Ing. Malte Ahrens, former Process Engineer at Bühler Aeroglide, USA; updated by Dr. Patrick Strähl, Bühler Aeroglide, USA.

5.10. Flavoring: This chapter addresses the importance of seasoning –developing a flavored snack from a base product. The components of seasoning and the different application systems are described in this chapter. Author: Mr. David Woollard, former Group Product Manager, tna Solutions, Australia.

Learning outcomes:

- Get an overall perspective of the general processes in the nut and dried fruit chain, from the field to the final consumer product.
- Compare the different harvesting systems of each nut and dried fruit, understanding the basic hygiene practices for the elimination of potential sources of contamination during harvesting.
- Get information of the historical background of shelling, from ancient times to current technologies and trends, identifying the main mechanical cracking systems for several types of nuts.
- Get information of the historical background of blanching, comparing the differences between dry blanching (only applicable to peanuts and hazelnuts) and wet blanching -a more complicated technique.
- Learn the objectives and importance of drying, how the process works and what steps are involved, comparing the different existing types of dryers and methods.

- Comprehend the benefits of optical sorting and recognize the different types of sensor technology commonly used in the nut and dried fruit business.
- Understand the different pasteurization processes currently available to eliminate pathogens and the validation process to demonstrate the effectiveness of the process.
- Gain knowledge of the minimum requirements for safe and effective fumigation using phosphine gas.
- Analyze the main food-safety and quality concerns that might arise during the storage period, as well as the major factors influencing quality and shelf life.
- Acquire knowledge of the most important industrial processes to alter and enhance the flavor of nuts –frying and roasting, comparing the differences between the available methods.
- Understand the importance of seasoning –developing a flavored snack from a base product, learning the components of seasoning and the different application systems.

COURSE 6. Food Safety and Quality Standards: Review of the essential aspects of food safety, quality standards and best practices. This course focuses on the most basic aspects concerning food safety and quality of nuts and dried fruits, as well as the best practices in order to avoid, or at least minimize, potential hazards and factors resulting in a decrease of quality throughout all stages of the food chain. Author: INC.

Learning outcomes:

- Understand the most relevant contaminants associated with nuts and dried fruits.
- Get knowledge about the different types of safety regulations.
- Familiarize with the minimum quality requirements and the procedures necessary to ensure safety and quality.
- Learn the main factors and manufacturing stages that may increase the likelihood of contamination or loss of quality.
- Understand the Hazard Analysis and Critical Control Point (HACCP) and the seven principles that should be applied to address the potential hazards.
- Gain familiarity with quality standards, why they are developed and the difference between public and private standards.
- Comprehend the importance of the sampling procedures used in contamination detection and quantification.
- Know the evaluation, identification and control of food allergens.

COURSE 7. Production, Trade and Consumption: Global review of industry statistics, including production, trade and consumption volumes. This part of the program summarizes which are the most produced, traded and consumed nuts and dried fruits worldwide, as well as their volume ranges. Students will also be able to recognize the main producing countries, exporters, importers and consumers, both globally and by product. Author: INC.

Learning outcomes:

- Identify the main nuts and dried fruits produced worldwide, their volume ranges and supply value.
- Recognize the most traded nuts and dried fruits and their volume ranges.
- Gain knowledge of the general consumption trends for each product and by region.
- Understand the leading producing, trading and consuming countries.

COURSE 8. Market Insights: This course presents a global analysis of the tree nut, peanut and dried fruit current supply volumes and market global trends. Besides, in order to contextualize and to help to critically read supply statistics and market information, an analysis on the last 10 years historical price trends is featured for the most produced tree nut, almonds, and the world top producer, California. Author: INC.

Learning outcomes:

- Hear first-hand from industry experts on the state of the industry and current supply volumes.
- Learn how to read information of historical price trends with a practical case on Californian almonds.