

# Starch Technology: Extended Online Course

Product development and operational aspects

AVAILABLE ON DEMAND

ID# 542

Directed by: **Herberto Dutra**, Sr. Manager - Engineering



## Course Topics Include:

- Science and Application
- Thermal/Mechanical Processes
- Newtonian and non-Newtonian Products
- Gelatinization and Retrogradation Phenomena
- Proper Equipment Selection
- Formulation and Processing

## course description

Starch is a recognized natural hydrophilic polymer that is popularly utilized in various kinds of formulations as a swelling agent and gel-forming excipient. It has multiple structural arrangements and functionalities.

This 2-day accredited course will cover the science and operational aspects of products using starches, which are amongst the most important ingredients used in a variety of industries. This course will cover the science behind starches, its behavior when hydrated under different temperatures, rheology of gelatinized starches, viscosity measurement, correlation between viscosity and desired finished product attributes as well as changes during processes such as extrusion, powder processing, liquid dispersion in batches and cooking.

## who should attend

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This course is intended for Food Scientists, Engineers, Operations and any other professionals involved in the development, production and product designs requiring an understanding of processes which uses starches as one of its main ingredients. Professionals who work in the Food, Beverages, Cosmetics, Pharmaceutical, Cleaning Products industries, just to name a few, will gain scientific and practical knowledge to help in their day to day challenges.

## learning objectives

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Upon completion of this course, you will be able to:

- Describe the behavior of hydrated starches under different conditions of temperature.
- Explain the starch gelatinization and retrogradation phenomena.
- Explain the rheological behavior of Newtonian and non-Newtonian products, especially gelatinized starches.
- Describe the correlation between viscosity and desired product attributes.
- List different applications for starches in various products, with the corresponding benefits in processing and product attributes.
- Describe the behavior of starches through the cooking extrusion process.
- Explain the importance of the starch behavior in processing parameters and its impact in the proper equipment selection.

## course outline

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### first day

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#### Review of Learning Objectives

#### Fundamentals

#### Introduction to Starches

- Starch: What is it?
- The Starch Granule
- Amylose and Amylopectin and the structure of the starch granule
- Starches from different cereals
- Thermal process of starches
- Starches gelatinization
- Stabilizers
- Modified Starches
- Q&A

#### Module 2:

#### Introduction to Rheology

- Definition of Viscosity
- Newtonian x Non-Newtonian Fluids
- Non-Newtonian fluids rheological behaviors
- Rheological parameters of the gelatinized starch
- Rheological measurements
- Q&A

### second day

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#### Module 3:

#### Applications

#### Thermal/Mechanical Processes

- Grain refining – Starch separation
- Wet milling
- Maltodextrin process
- Introduction to extrusion
- Extrusion line components
- Changes inside the barrel
- Extrusion line variables
- Behavior of different types of cereal in the extrusion process
- Rheological behavior of gelatinized starch
- Cereals tempering and conditioning
- Starch cooking inside the barrel
- Cereal products – effect of Amylose and Amylopectin ratios in different formulas
- Q&A

#### Module 4:

#### Formulation and Processing Considerations

- Harvesting and storage effects in starch based products.
- Starches Hydrolyzation
- Emulsions and stabilizers.
- Effects of starches in texture and mouth feel.
- Dispersion of starches and stabilizers in water.
- Cooking – Effects of thermal processing in starches.
- Processing equipment considerations in formulas handling starches.
- Critical measurements and analytical instruments: Viscometers, Rheometers, Amylographs.
- Q&A

#### Assessment Opportunity

## course director

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**Herberto Dutra**, Mechanical Engineer has over 30 years of experience in processing industries with careers at Kraft Foods, Nestle, Bay Valley and Sensient, including 20 years of hands-on experience in Spray Drying. Mr. Dutra's expertise ranges from pilot plant scaling up, design and construction of numerous Spray Drying plants, day-to-day operation, troubleshooting and optimization. Academically, Mr. Dutra holds a Bachelor's Degree in Mechanical Engineering from UERJ (Rio de Janeiro, Brazil), an MBA from Keller Graduate School and a Master's in Mechanical Engineering from Purdue University.

Through his employers, Mr. Dutra has written and taught a number of training courses in Spray Drying, Powder Handling, Agglomeration, Liquids Handling, Cooking Processes, Plant Design, Packaging and many other programs developed for operations professionals, engineering, scientists, etc.

## accreditations/recertifications for this course

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The Center for Professional Advancement (CfPA) has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171. In obtaining this approval, CfPA has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice internationally. CfPA is therefore authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards. CEUs will be awarded for participation in CfPA's courses at the rate of .1 CEU per contact hour upon successful completion of the entire course and 70%

accuracy in the required Learners' Assessment. This course offers a total of 12 contact hours, or 1.2 CEUs.

## tuition and registration

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**TUITION- Single Rate: U.S.\$1800.00 per person**

Register at [www.cfpa.com](http://www.cfpa.com). Enter **Course ID# 542** into **Search**. To register click **Register Now**.

For Questions and Information call Customer Service at 732-613-4500.

**Please Note:** Multiple participants are not authorized to share access provided to a single registrant, a single dedicated seat license must be purchased for each individual. CfPA reserves the right to cancel access or collect the group rate payment if this requirement has been violated. Only registered participants will receive accreditation.

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- **Starches: Fundamentals and Process Applications in Industrial Operations-An Online Course**  
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course ID# 2812



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