

# Starch: Chemistry, Properties, and Applications

## Registration Information

\* \$1,200 Early-bird Registration Fee (US)  
by March 30, 2012

\* \$1,300 Regular Registration Fee (US)

You will receive a confirmation email within four weeks of registering. Payment in full is due by the time of registration. Cancellations received afterwards will be assessed a \$50 fee. The remainder of the registration fee will be refunded. No cancellations or refunds will be allowed after the short course starts. Registration fee will be completely refunded if the short course is filled or cancelled. Approximately \$150 of the registration fee will go toward food functions (continental breakfasts, scheduled breaks, and group luncheons) at this short course. A small portion of the course fee may be used for providing souvenirs for the participants. This information is being provided for tax reporting purposes. Hotel rooms and other meals are not included in the registration fee.

## Short Course Schedule

Participants may pick up their short course materials at the short course location (IGP Conference Center, 785-532-4070; [www.ksu.edu/igp](http://www.ksu.edu/igp)) starting at 7:30 a.m. on Tuesday, May 8. The short course will consist of a series of lectures beginning at 8:00 a.m. each day. There will be hands on evaluations of starch cooks and demonstration of uses of starch in food applications.

## Hotel Information

### Hilton Garden Inn

410 South 3<sup>rd</sup> Street, Manhattan, KS  
Phone: 785-532-9116

\*Single/Double Room - \$97.00 + tax

A block of rooms has been reserved at the Hilton Garden Inn at a special rate until April 27, 2012. Make your reservation directly with the hotel, and mention that you are with the KSU IGP Starch Short Course in order to obtain the special rate. The hotel will provide transportation to and from the course location, IGP Conference Center.

## Registration Discounts!

If two or more people from the same company or institution enroll in this short course, each is entitled to

a 10% discount off the registration fee. Your registration forms MUST be submitted together in order to receive the discount. Students who attend this short course will receive a 20% discount when they enclose a written endorsement of their student status from a professor in their department.

## About the International Grains Program (IGP)

KSU's International Grains Program is part of the Dept. of Grain Science and Industry. IGP is designed to educate domestic & foreign business leaders and government officials about US grains and oilseeds through technical training and assistance programs in storage and handling, milling, marketing and processing. A \$4 million IGP Executive Conference Center located in the new Grain Science and Industry complex provides world-class meeting and instructional facilities.

## Questions or Special Needs?

KSU is dedicated to making short courses accessible to all persons. Please contact one of the following if you have a special dietary need or are physically limited:

Cathy McGlothlin ([cmcglath@ksu.edu](mailto:cmcglath@ksu.edu))  
Dept. of Grain Science and Industry  
Phone: 785-532-4070/Fax: 785-532-6080

OR

Dr. Yong-Cheng Shi ([ycshi@ksu.edu](mailto:ycshi@ksu.edu))  
Dept. of Grain Science and Industry  
Phone: 785-532-6771/Fax: 785-532-7010  
[www.grains.ksu.edu](http://www.grains.ksu.edu)

## Who Should Attend?

The course is designed for personnel who require a fundamental and practical knowledge of one of the key ingredients in foods. It will aim to better prepare individuals to utilize the technology to carry out their management tasks and product developments. Although primarily directed to the food and pharmaceutical industry, those in the paper, cosmetic, flavor and fragrance industries will also benefit, including those involved in:

- Marketing • Technical Management
- Product Development • R & D Laboratories

- Technical Service • Quality Assurance • Sales Personnel

## Short Course Description

This course covers the fundamental structure, chemistry, functional properties of starches and their utilization in food, pharmaceutical, paper and other industrial applications. Analysis of starch will be discussed. The course also reviews the various types of starches and factors that should be considered when choosing and using starches. The application of starches in many food systems is presented in depth. There will be a demonstration of food starches. The most current starches and new market opportunities will be presented. Question and answer panels will address participant needs.

## Learning Objectives

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

- Define what starch is, from both a chemical and a physical viewpoint
- Analyze how these properties and characteristics may be modified physically, chemically or enzymatically
- Determine what factors should be considered to most efficiently utilize starches in the development of food products
- Identify where and how starches are presently used in food and pharmaceutical applications; and how they can be adapted for use with the newer processing technologies that are being utilized to make new products



An International Grains  
Program Short Course

## Speakers

Thomas Luallen, President; *Starch Consultant*,  
STARQUEST F.O.O.D. Consulting LLC

Ody Maningat, Vice President,  
Applications Technology and Technical Services  
MGP Ingredients, Inc.

Paul A. Seib, *Professor Emeritus*  
Grain Science and Industry, KSU

Yong-Cheng Shi, *Professor*  
Grain Science and Industry, KSU

### Course Outline

#### Day One

Basic Starch Chemistry Symposium  
Introduction

- Sources of Commercial Starches
- Isolation
- Uses

Starch Composition and Structure

- Composition—amylose, amylopectin, minor components
- Molecular structure
- Actions of starch-degrading enzymes
- Amylose – lipid complex
- Granular structure – general features, double helices, crystalline structure

Functional properties

- Gelatinization

Methods to measure gelatinization;

Factors affecting gelatinization

- Retrogradation

Methods to measure retrogradation;

Factors affecting retrogradation

- Gelation and Starch Gels

Hands On session

Cooks, microscopic work

#### Day Two

Glass Transition

- Concept
  - Measurements
  - Significance
- Modifications of Starch
- Chemical Modifications
- Types of modification;  
Uses
- Physical Modifications
- Instant Starch; CWS
- Enzymatic Modifications
- Hands On session
- Cooks of modified Comparisons
  - Microscopic work
  - Hydration/instant

#### Day Three

Question and Answer Panel for Day 1 and 2  
Starch Application Symposium

The presentation will be punctuated with demos and audience participation.

General Food Starch Selection Rules:

- Application & Product parameters
- Process parameters
- Freeze/Thaw

- Interactions with Other Components

Ingredient selection versus application:

- Cultured Dairy Products
- Ice Cream
- Processed Meats
- Bakery & Snacks
- Beverage emulsion/Mouthfeel enhancement
- Encapsulation
- Soups & Sauces
- Dressings
- Fillings & Fruit Preparations
- Batters & Breadings
- Confections

Carbohydrate Nutrition: Resistant Starches

Uses of starch in pharmaceutical, paper, adhesive, and other applications

Question and Answer Panel

### Registration Form

Register me for the Starch: Chemistry, Properties and Applications Short Course scheduled for May 8-10, 2012, at KSU:

\$1,200 Early-bird Registration Fee (US)

\$1,300 Regular Registration Fee (US)

### Payment Options

• Purchase Order # \_\_\_\_\_

• Check or money order payable to:

### Grain Science and Industry

• VISA    MasterCard    American Express  
(circle one)

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card number

Expiration Date: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

First name for badge \_\_\_\_\_

Title \_\_\_\_\_

Company/Institution \_\_\_\_\_

Address \_\_\_\_\_

City, State \_\_\_\_\_

Zip, Country \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

Email \_\_\_\_\_

Return this form with your payment to:

Ms. Cathy McGlothlin  
1980 Kimball Avenue  
IGP Conference Center  
Kansas State University  
Manhattan, KS 66506-7000  
Phone: (785) 532-4070  
Fax: (785) 532-6080  
E-mail: cmcglath@ksu.edu



### Travel by air

American Airlines offers direct flights to Manhattan, KS from Dallas, TX and Chicago, IL.