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ASSOCOM-INDIA PVT. LTD.

A-416, Ansal Chambers - I, 3, Bhikaji Cama Place New Delhi - 110 066
Tel. 91-11-26185872, Telefax: 91-11-26185872
e-mail: info@assocom-india.com Url.:www.assocom-india.com

EXTRUSION PROCESSING

PRODUCT DEVELOPMENT AND COMMERCIALIZATION

March 21-24, 2007, Hotel Taj Residency, Hyderabad, India

Organized by



In association with



A. P. FOODS



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About the Course

This course is an extension to the previously conducted short courses on extrusion technology. The main focus of this short course is new product development and financial aspects of setting up an extrusion-based business. In order to bring first-time participants up to date with extrusion technology, introductory topics including extrusion and dryer hardware will be covered on the first day. Program for the first day will also provide a thorough review for participants who have attended previous short courses on extrusion, but registration for the same is optional for these participants. The remainder of the short course will cover in-depth a variety of extrusion products ranging from snacks and breakfast cereal to pet food and aquatic feed. Recipes for each kind of product will also be shared with participants. A substantial portion of this short course will also be devoted to capital costs, financing, government regulations, and food safety and sanitation issues. Participants will also be provided a 'hands-on' demonstration of the capabilities of extrusion technology in a modern, commercial-scale extrusion-based snack processing facility.

The agenda of the short course has been designed by experts from the Department of Grain Science and Industry at Kansas State University (U.S.A.), Wenger Manufacturing (U.S.A.), Acharya N.G. Ranga University, United Soybean Export Council (formerly American Soybean Association), A.P. Foods, and other India-based industries and institutions.

Special U.S. Extrusion Short Course!! Kansas State University will organize its annual 'Extrusion Processing: Technology and Commercialization' short course from August 7-10, 2007 in Manhattan, Kansas, U.S.A. Participants in the full 4-day program of the Hyderabad short course will get a 20% discount in the registration fees for the U.S. short course. The U.S. short course complements the India short course nicely, and consists of an in-depth overview of extrusion technology, products and hardware by speakers from U.S. industry and academia, and also involves learning the commercial aspects of an extrusion-based business and hands-on sessions on modern pilot-scale processing equipment. Details of the U.S. short course including course brochure will be released shortly, and can be obtained from Assocom-India.

Who can Attend : MD's, CEO's, Food Technologist, Quality Assurance Managers, Quality Controllers, Process Engineers, Packaging and Machinery Suppliers, Retailers, Food Regulators, Academics, Food Distributors, Food Ingredients, Manufacturer/suppliers.



AGENDA

Day 1 - 8:30 am: Registration

Session 1 : Introduction to Extrusion Technology (8:30 - 11 am)

- **Introduction to Extrusion Technology**, Dr. Sajid Alavi, Asstt. Prof. Dept. of Grain Science & Industry, Kansas State University

Overview on the history and development of extrusion, evolution of extruded products like pasta, snacks, breakfast cereal, petfood and aquatic feed, the basic principles behind the technology and its current status.

- **Status of Extrusion Technology in the World**, Doug Baldwin, Director-Sales & Marketing, Wenger Mfg

Extrusion technology has been widely used in North America and Europe over the past several decades and is an important method for production of various processed food and feed products. This lecture will provide an overview of the status of this technology world-wide and some exciting new applications

- **Extrusion Processing in India**, Dr. Suresh Itapu, Sr. Technical Director Asia - Human Nutrition, ASA-IM

As compared to North America and Europe, extrusion technology for food and feed products has started to gain wide-spread use in India only lately. This lecture will provide an overview on the present status of extrusion in India.

11 - 11:15 am: Tea Break

Session 2 : Hardware and Processing (11:15 am - 1 pm)

- **Mixing of Raw Material and Fortification**, Dr. Malikarjun Rao, General Manager, A.P. Foods

Adequate and optimal mixing of raw ingredients is an important first step for obtaining a finished product of uniform quality. This lecture will describe the mixing process and mixer designs.

- **Preconditioning of Raw Material**, Rob Strathman, Wenger Mfg.

Most modern extrusion equipment for food products involve a preconditioner prior to the actual extruder. This lecture will describe the principles of preconditioning of the ingredient mix, advantages of utilizing this pre-processing step, and various designs of preconditioners.

1 - 2 pm: Luncheon

Session 2 : Hardware and Processing (continued) (2 - 6 pm)

- **Extrusion Hardware**, Doug Baldwin, Wenger Mfg

This topic will cover the hardware aspects of the extrusion system with special focus on various screw designs. Most extruders are equipped with segmented screws which allow flexibility in the screw profile that can be adapted to different products. Raw material delivery systems, dies and knife types will also be discussed. This lecture will also include a discussion on various types of cooking and forming extruders including single screw, twin screw and conical twin screw extrusion systems.

- **Extruder Performance, Rheology and Flow**, Dr. Sajid Alavi

Understanding of the flow of dough through the screw channels inside the extruder and in the die. Rheology is the knowledge of flow characteristics of dough based on its viscosity and the shape and dimensions of the screw and die, and plays an important role in studying the performance of any extruder.

4:15 4:30 pm: Tea Break

- **Drying Theory**, Rob Strathman

Theory and principles behind drying which is an important post-processing step, and design of various types of continuous dryers for food applications.

- **Toasting and Coating of Snacks and Cereals**, Dr. Narpinder Singh, Prof., Guru Nanak Dev University

Toasting is an important post-processing step for flavor and texture development in breakfast cereal. Also many ingredients like lipids, flavors, sugars, spices and vitamins are added in a post-processing coating step. The lecture will focus on principles of toasting and coating.

Day 2 - 8 - 8:30 am: Registration

Session 1 : Ingredients in Extrusion Processing (8:30 10:30 am)

- **Functionality of Various Flours as Ingredients**, Dr. D. K. Bhatt, Asst. Professor, Institute of Food Technology

Grain ingredients like corn, oat, wheat and soy flours and their derivatives are the basic components of most extruded products. This lecture will focus on the composition of different flours and role each plays in the extrudability of dough and quality aspects of final product like flavor, expansion, binding. Flour ingredients and product ideas specific to India will also be discussed.

- **Recipe Formulation - Effects of Starch, Protein, Sugar, Lipid and Fiber**, Dr. Sajid Alavi

Formulation of recipe for an extruded product has to take into account the relative proportions of various basic components such as starch, protein, sugar, lipid and fiber to get the optimum product in terms of nutrition, palatability, processability, expansion, binding and costs. This lecture will cover the various considerations that go into formulating a recipe for extruded products.

10:30 - 10:45 am: Tea Break

Session 2 : Product Development - Food (10:45 - 1)

- **Textured Soy Protein and Other Soy-Based Products**, Rob Strathman

Textured proteins are widely used as meat extenders and meat analogs throughout the world. This presentation will focus on the process required for texturizing proteins via extrusion and the wide variety of products that can be made including fibrous soy, high moisture meat analogs, chunk textured soy, structured meat analogs, and high protein snacks. Typical recipes for textured soy products will be shared. The extrusion of full fat soy as a food and feed ingredients will also be discussed.

- **Pasta Products**, Dr. P. Prabhaskar, PhD, Scientist, CFTRI
Pasta is made by a form of extruder called the pasta press, and the process involves very low shear and relatively higher moisture. This lecture will discuss the processing of pasta, ingredient considerations and quality aspects of the finished product. Typical recipes for pasta products will be discussed.

1-2 pm: Luncheon

Session 2 : Product Development Food (continued) (2 - 3:30pm)

- **Breakfast Cereal and Snack Products**, Doug Baldwin
Many kinds of breakfast cereal and snacks are products cooked and expanded using extruders. This lecture will provide an understanding of how these important food products are processed by extrusion. Typical recipes for breakfast cereal and snack products will be shared.
- **Nutritional Products** Dr. Sajid Alavi
Processed foods, including extruded products, are usually high in calories, have a high glycemic index and are low in nutritional value. However, increasing consumer consciousness and advancements over the past few years have led to development of extruded food products which are more nutritious. This topic will cover the challenges of delivering a highly nutritious product using extrusion, and will also describe some nutritious products, including fabricated rice and dal analogs, and their recipes.

3:30 3:45 pm Tea Break

Session 3 : Product Development - Petfood and Feed (3:45 - 6pm)

- **Petfood**, Rob Strathman, Wengers Mfg
Extrusion is widely used in North America and Europe for production of petfood, and this application is relatively nascent in the Indian context but has a huge potential. The lecture will discuss the capability of extrusion technology to produce highly palatable pet food because of the high temperature and high shear nature of the process, ability to handle a large amount of meat ingredients, addition of lipids and other palatability enhancers before, during or after the process, and use of pre-conditioning. The lecture will also provide information on various ingredients and typical recipes.
- **Animal Feed**, Dr. Sajid Alavi
This topic will provide an overview of various technologies for producing animal feed including cattle feed, poultry feed and aquatic feed. Some of the technologies that will be covered include pellet mills, extruders and expanders.
- **Aquatic Feed** Dr. Vijay Anand, Technical Director - Feed, ASA-IM
Extrusion is widely used in many parts of the world for production of aquatic feed. These applications are increasing in India and have a huge potential for further growth. The lecture will provide information on the processing of aquatic feeds such as shrimp feed, and the growing Indian market for the same. It will also include information about the ingredients utilized, other considerations which are involved in these applications, and some real-life examples of aquatic farming in India.
- **Poultry Feed**, *to be announced*
An overview of use of extrusion processing in the poultry feed industry.

Day 3 - Session 1 : Economics of Extrusion Processing (8:00 - 10:30 am)

- **Capital Costs Involved in Extrusion Processing**, Doug Baldwin
Extrusion technology is very commonly used in the food industry world-wide but has not been widely utilized in India. One of the reasons for this is the nascent market for breakfast cereal and snack products and the capital costs involved. This lecture will cover the capital costs and economics with regards to extrusion technology and advantages of this technology over conventional processes.
- **Financing for Food and Feed Manufacturers**, Mr. Tushar Pandey, Country Head - Government Initiative Development & Knowledge, Yes Bank Limited
As the food and feed processing sector is demonstrating increased growth, there are several financing options available to new manufacturers for setting up plants, purchasing equipment and other costs. This lecture will cover various financing options available for new and existing manufacturers in this area.

10:30 10:45 am: Tea Break

Session 1 : Economics of Extrusion Processing (continued) (10:45 -

- **12:30 pm)**
Indian Market for Processed Foods and Marketing Considerations, Mr. Dalbir Singh Wariah, General Manager R&D - Snacks, ITC Ltd. - Food Division
This lecture will discuss the size of the growing Indian market for processed foods such as breakfast cereal, snacks, textured proteins and pasta. Marketing issues for such products will also be discussed.
- **Government Policies and Regulations**, Dr. Nepal Singh, Consultant, ASA-IM
There is a renewed thrust by the Indian government towards promoting the food processing sector in order to add value to agricultural commodities. This will eventually benefit the farmers, leading to a second 'Green Revolution'. This lecture will cover some of the recent initiatives and policies of the Government of India to promote the food processing sector. Food and drug laws and regulations including will also be discussed.

Session 2 : Panel Discussion (12:30 - 1:30 pm)

Panel discussion on technical issues in extrusion processing. Participation by speakers as well as attendees will be encouraged.

1:30 2:30 pm: Luncheon

Session 3 : Trouble Shooting, Food Safety and Other Issues (2:30 - 6 pm)

Extrusion Trouble-Shooting, Rob Strathman

Operation of an extrusion system is not an easy task and a lot of experience is required for handling different ingredients for making a variety of products. There are several common situations that arise from time-to-time that can lead to poor product quality or even necessitate the shutting down of the extruder, if corrective measures are not taken immediately. This topic will cover trouble-shooting those situations.

- Some real-life examples and solutions will be provided.
- **Food Safety and HACCP**, *to be announced*
This topic will cover issues related to proper record keeping, maintaining a hygienic environment in the processing plant and ensuring safety of the final packaged product. Good Manufacturing Practices (GMPs) and Hazard Analysis and Critical Control Points (HACCP) programs will also be discussed.
- **Fortification**, Dr. R. Sankar, Sr. Manager, Global Alliance for Improved Nutrition
Extruded food products especially breakfast cereal are important carriers for essential micro-nutrients like vitamins. Vitamins are also added in petfood and aquatic feed. The lecture will describe various aspects of vitamin fortification in extruded products. The ongoing efforts by the Flour Fortification Initiative (FFI) group will also be discussed.

Overview of Hands-On Lab Session for Day 4

Discussion and planning with participants for the following day's lab session with pilot-scale extruder.

Day 4 - 7 - 8:00 am: Breakfast

8:00 - 9:30 am: Travel to A.P. FOODS extrusion plant in Hyderabad

9:30 10 am: Short tour of A.P. FOODS facilities

Session 1 : Hands on Lab Session on Pilot-Scale Extruder (10 am 12 pm)

Soy Based Expanded Snack Products - I (Sajid Alavi / Wenger Mfg./ A.P. FOODS)

Expanded snack products will be produced on a commercial-scale single screw extruder. Different recipes involving soy flour, wheat flour, corn flour and bengal gram flour will be evaluated. Participants will be encouraged to play an active role in the process.

12 noon 1 pm: Luncheon

Session 2 : Hands on Lab Session on Pilot-Scale Extruder (1 - 4 pm)

Soy Based Expanded Snack Products - II (Sajid Alavi / Wenger Mfg./ A.P. FOODS)

Effect of process conditions (screw RPM, barrel moisture content, etc.) on expansion and texture of expanded snack products will be studied. Participants will be encouraged to play an active role in the process.

- **Summary and Discussion of Hands-on Lab Sessions**

This short session will be used to summarize and discuss the lab sessions with the participants.

REGISTRATION FORM

Yes, I would like to enroll in the following: **Short Course on Extrusion Technology, March 21-24, 2007, in Hyderabad, India.**

March 21-24, 2007

March 22-24, 2007

Name: Last (family) _____ First _____ Middle initial _____

e-mail _____

Job Title _____

Company _____

Company Mailing Address _____ City _____

State/Province _____ Zip/Postal Code _____ Country _____

() ()

Company Telephone _____ Company Fax _____

Credit Card Payment

Visa
 Mastercard
 Amer. Ex.
 Discover

Security (CID) Code* Exp. Date

*Signature and the security code are required to protect against fraud. For most cards, the security code is a three-digit number listed after the account number on the back of the card (in the white signature panel area). However, American Express cards will have a four-digit security code on the front of the card directly above the account number

Signature* of Card Holder (Your payment cannot be processed without a signature)

Name of Card Holder (Please Print Clearly)

Billing Address of Card Holder

Name of the Bank

7%* Charges will be Extra if payment made by the credit card

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Phone :
+91-11-26185872

Fax :
+91-11-26185872

Online :
www.assocom-india.com

E-mail :
info@assocom-india.com

REGISTRATION INFORMATION

Early Bird Registration before January 31, 2007

- Full Registration Fee (March 21-24, 2007) for is Rs. 6000/- for Indian delegates.
- Registration fee excluding first day (March 22-24, 2007) Rs. 5000/- Indian delegates.
- Registration fee is US\$ 150 (Foreign Delegates)

Registration Fee after January 31, 2007

- Full Registration Fee (March 21-24, 2007) for is Rs. 7000/- for Indian delegates.
- Registration fee excluding first day (March 22-24, 2007) Rs. 6000/- Indian delegates.
- Registration fee is US\$ 200 (Foreign Delegates)

Note : Please add Service Tax 12.24 to registration fee

Registration fee should be sent through demand draft in favor of "Assocom-India Pvt. Ltd." payable at New Delhi.

- Course fee must be paid before start of the program.

VENUE

Hotel The Taj Residency
Road No. 1, Banjara Hills, Hyderabad, Andhra Pradesh
INDIA

Hotels in Hyderabad for Direct Booking	Hotels in Hyderabad for Direct Booking
Taj Banjara , Road Number 1, Banjara Hills, Hyderabad - 500034 Tel: 2339-9939, 2339-9999, 5566-9999 Fax: 2331-6858, 2339-2218	Hotel Golkonda Masab Tank, Hyderabad - 500028 Tel: 5511-0101, 2332-0202, 2332-0303 Fax: 5511-0102, 2332-0404
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