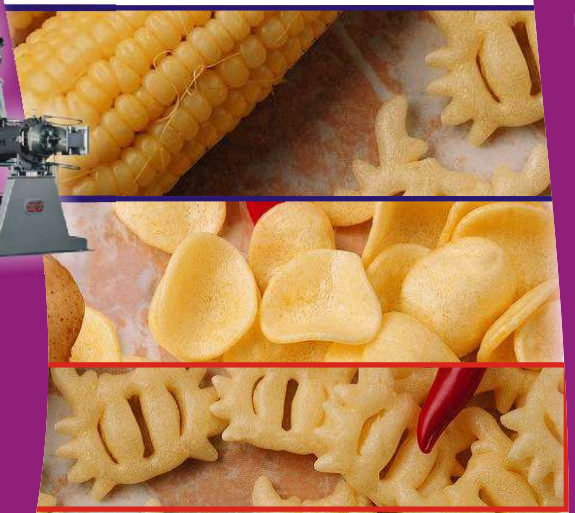
Kansas State University
GRAIN SCIENCE & INDUSTRY
Manhattan, Kansas, USA

Presents

Seminar on

EXTRUSION PROCESSING SCIENCE AND APPLICATIONS

June 17-18, 2010
Maharana Pratap University of Agriculture and Technology
Udaipur, Rajasthan



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About the Course

Description: This seminar will cover the scientific aspects, commercial applications and research and development trends related to extrusion processing. Theoretical topics such as chemistry of raw materials, phase transition behavior, rheology, mass and energy balance, etc will be covered to provide a fundamental understanding of extrusion technology. Commercial applications such as snacks and breakfast cereal, pasta, texturized vegetable protein, aquatic feed and petfood will be discussed. A substantial portion of the short course will focus on current R&D trends in India related to extrusion. Demonstration of processing of extruded products will be given using a lab-scale extruder.

Who can Attend: The seminar will be particularly useful for scientists, teachers and professors from academia (from disciplines such as food science, nutrition, human ecology, home science and engineering) and also small and medium-scale businesses that have interest in production of value-added food and feed products using extrusion. Industry participants can include food technologists, animal nutrition specialists, pet food producers, aquaculture, poultry and cattle feed producers and farmers, quality assurance managers, quality controllers, process engineers, packaging and machinery suppliers, retailers, food regulators, food distributors, food and feed ingredients manufacturer/ suppliers.

Feedback from Previous Year Participants:
More than 80% of past participants recommend KSU extrusion short courses to their colleagues in the food and feed industry. For more information on content, pictures and what participants said about previous KSU short courses, go to the website <grains.ksu.edu/extrusion> and click on 'Short Courses' link.

REGISTRATION INFORMATION

Early Bird Registration before March 31, 2010

- Registration Fee for is Rs. 6618/- (Inclusive of Service Tax)for Indian delegates.
- Registration fee is US$ 300 for foreign delegates.

Registration Fee after March 31, 2010

- Registration Fee is Rs. 7721/- (Inclusive of Service Tax)for Indian delegates.
- Registration fee is US$ 350 for foreign delegates.

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

Maharana Pratap Univ of Agriculture and Technology, Udaipur, Rajasthan

REGISTRATION FORM

Yes, I would like to enroll for the **Seminar on Extrusion Processing - Science and Applications June 17-18, 2010** in **Maharana Pratap Univ of Agriculture and Technology, Udaipur**

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

Schedule of the Program

Day 1: Extrusion Process and Hardware - Theoretical Understanding

07:30 - 08:00 am: Registration and Breakfast

08:00 - 08:30 am: Opening Remarks
Chief Guest Dr. S.S.Chahal, Vice Chancellor Maharana Pratap University of Agriculture and Technology

08:30 - 12:00 pm

- **Overview of Extrusion Technology** (Sajid Alavi, Kansas State University)
  A brief overview of extrusion technology and its basic principles, its evolution over the years and its applications in food, pet food, animal and aquatic feed and non-food industrial applications
- **Status of Extrusion Processing in India** (Suresh Itapu, Consultant, Wengers Inc.)
  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.

Extrusion Hardware (Brian Plattner, Wenger Manufacturing)

- 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 be discussed. The lecture will include a discussion on various types of cooking extruders including conventional single screw and twin screw extruders and some other designs as well. Principles of preconditioning of the ingredient mix, advantages of utilizing this important pre-processing step and advances in preconditioning technology will also be covered.

Ingredient Functionality (Sajid Alavi)

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

12:00 - 1:00 pm: Luncheon

01:00 - 3:00 pm:

Drying Theory (Doug Baldwin, Wenger Manufacturing)

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

Extruder Performance, Rheology and Flow (Sajid Alavi)

- 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. This topic will focus on theoretical understanding of how an extruder works, and describe the flow of dough through the screw channels inside the extruder and in the die.

03:00 - 03:30 pm: Tea Break

03:30 – 06:00 pm:

Instrumental/ Analytical Approach to Troubleshooting (Sajid Alavi)

- This topic will introduce the several lab instruments that are available for testing raw ingredients as well as finished products. These include the phase transition analyzer,

differential scanning calorimeter, rapid visco analyzer, texture analyzer and X-ray microtomography, and play a critical role in monitoring ingredients consistency and product quality. Use of instrument-based analytical approach to off-line trouble shooting will also be discussed.

- **Phase Transition Analyzer** (Brian Plattner)
  Phase transition analyzer or PTA is a relatively new but highly useful instrument based on principles of capillary rheometry. The PTA is being widely adopted by industry and research institutions to study the softening and flow behavior under pressure of varoius raw materials used in extrusion, analyze final product characteristics, and provide solutions for processing and product development issues. Case studies in utilization of the PTA will be presented.

- **Extrusion Control Systems (**Michael Bachelor, Bachelor Controls)
  Food/ feed processing businesses in general, and extrusion systems in particular, are incomplete without control and management systems for batching, lot tracking and process automation. This lecture will provide a description of data acquisition and control systems related to extrusion-based production systems, from raw material batching to final product shipping.

06:00 – 07:00 pm: Interactive Session

This session will be for interaction of speakers with course participants on their individual needs with regards to research and development, and technical training. Appetizers and beverages will be provided. Course certificates will also be distributed in advance.

Day 2: Food and Feed Applications

07:30 - 08:00 am: Breakfast

08:00 - 12:00 pm:

- **Extrusion Processing of Expanded Snacks and Breakfast Cereal** (Brian Plattner)
  The breakfast cereal and savory snacks industry in the U.S. alone has more than $30 billion in annual sales. This segment is fast emerging in India as well. many kinds of breakfast cereal and snacks are cooked, formed and expanded using extruders. This lecture will provide an understanding of how these important food products are processed by extrusion.

- **Extrusion Processing of Petfood, Aquatic Feed and Animal Feed** (Sajid Alavi)
  Utilization of extrusion processing for manufacturing petfood, aquatic feed and animal feed. Topics will also include an overview of the pet food industry worldwide and specialty pet food products. Use of extrusion in the production of aquatic feed is increasing rapidly in India and has a huge potential for further growth. Processing technologies for aquatic feed and also animal feed will be covered, including a comparison of conventional pellet milling, expanders and extrusion processing.

- **Quick Cooking Pastas, Rice and Dal Analogs and Other Novelty Products** (Doug Baldwin)
  Pre-cooked pasta and some other quick cooking products specific to the Indian market such as rice and dal analogs are made by a special low shear and high moisture extrusion forming process. This lecture will discuss the processing of these products and quality aspects of the finished product. Other novelty extruded products such as co-extruded foods will also be discussed.

Food Processing Research at Maharana Pratap University of Agriculture and

- **Technology** (N.S. Rathore, MPUAT)
  An overview of the cutting edge research in food processing being conducted by scientists in the College of Dairy and Food Science Technology at MPUAT.

12:00 – 1:00 pm: Luncheon

01:00 – 3:00 pm:

- **Role of Extrusion in the Second Green 'Revolution'** (Praveen Bargale, Central Institute of Agricultural Engineering)
  The Indian Government plans to usher in a second 'Green Revolution' with emphasis on value-addition of agricultural commodities through food processing. The ambitious Vision 2015 plan envisions doubling food processing levels from its current level of 10 per cent to 20 per cent, and increasing value addition from 26 per cent to 35 per cent. It will also bid to see India's share of global trade rise from 1.5 per cent to 3 per cent over the period. This is being done by providing tax incentives, increasing funding and improving technology and infrastructure in the sector. This lecture will focus on the important role extrusion processing will play in this effort and the various research and development programs sponsored by the government to enhance the technological capabilities of Indian processing industry.

- **Extrusion Processing of Traditional Indian Foods-Overview** (Kavita Waghray, Osmania University)
  A variety of traditional foods indigenous to the Indian sub-continent are or can be processed by extrusion processing. These include fry-and-expand snacks (third generation products), sev (chick-pea based fried savory snacks) and soy badi (soy-based texturized protein products). This lecture will provide an overview of the potential of extrusion in making traditional Indian foods.

03:00 – 03:30 pm: Tea Break

03:30 – 05:30 pm:

- **Use of Extrusion Processing in Child Nutrition Projects** (Lakshmi Devi, Acharya N.G. Ranga Agricultural University)
  Extrusion is a high temperature, short time process which can give nutritious and tasty products with improved starch and protein digestibility. It can be applied in the production of infant weaning mixes as well as nutritious ready-to-eat snacks for children. This lecture describes use of extrusion technology and its future potential in products designed for infants and young kids, including those distributed through the Integrated Child Development Services (ICDS) scheme of the GoI.

- **Extrusion Processing of Fruit and Vegetable Based Ingredients** (Shashi Jain, MPUAT)
  Research is ongoing in industry and academia, both in India and internationally, for incorporation of healthy ingredients in ready-to-eat snack products. Fruit and vegetable based dehydrated powders and pomaces are a group of such ingredients that have great potential and also pose unique challenges for inclusion in extruded foods. The lecture will cover ongoing research and development efforts in this area.

05:30 – 06:00 pm: Tea Break and Move to College of Home Science

06:00 – 07:00 pm: Product Display, Lab Demo in the College of Home Sciences and Conclusion

A variety of extruded products will be displayed. Also production of expanded snacks will be demonstrated on laboratory-scale twin screw extruder.

LODGING :

You may book directly at:-

Hotel Name	Single	Double	Phone Number
1. M. P. U. A. T. Guest House	Rs. 100/-	Rs. 200/-	
Maharana Pratap Univ. of Agriculture and Technology, Udaipur, Rajasthan			
2. Hotel Hilltop Palace	Rs. 4000/-	Rs. 4800/-	0294-2432245-46-47
5, Ambavgarh, Fatehsagar, Udaipur - 313 001, Rajasthan			
3. Udai Niwas Hotel			
Gangaur Ghat Marg, Near Jagdish Temple, Udaipur - 313001, Rajasthan			
4. Hotel Rajdarshan	Rs. 4200/-	Rs. 3000/-	0294-2526601 - 05
18, Pannadhai Marg, Udaipur -313001, Rajasthan			

Note : Airport is 24kms , Railway Station 4 Kms , Bus Stand 3 Kms

About Udaipur

Udaipur sits right at the heart of Rajasthan. Call it the Venice of the East or The City of Lakes, the romance of Rajputana still lives in Udaipur. Founded by Maharana Udai Singh II in 1568, Udaipur has been witness to valor and bravery for centuries.

PLACES OF INTEREST IN UDAIPUR

- **City Palace:** Overlooking Lake Pichola, the City Palace is mesmerizing in marble and granite. Marvel at its stunning architecture in several structures that have been symmetrically added over the years by the Maharanas.
- **Lake Pichola:** Maharana Udai Singh planned to make Pichola Lake the centerpiece of Udaipur City, and so it is. The lake stretches 4 km long and 3 km wide. Boat trips present truly beautiful moments to cherish.
- **The Lake Palace:** This Royal Summer Palace perched on the Jag Niwas island is a poetry in white marble. Converted into a heritage hotel, its magnificent reflection on the lake is the ultimate romantic backdrop to the city of Udaipur.
- **Sahelion Ki Bari:** Maharana Sangram Singh built this 'garden of the maidens'. It's a fairytale with lotus pool, fountains, flowers, glass mosaics and is a delight in itself.

EXCURSIONS

Ranakpur Temples, Jaisamand Lake, Kumbhalgarh fort, Chittaurgarh Fort, Nathdwara (Srinathji Krishna Temple), Eklingji (Jain Temple).

CLIMATE

Summer Temperatures: Max 38.3ºC Min.28.8ºC Winter Temperatures: Max 28.3ºC Min. 11.6ºC Rainfall: 61 cms.

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