Feed Ingredient Course
June 25 to 29, 2018

Organizers
Universidad Politécnica de Madrid, Madrid, Spain
University of Illinois, Urbana-Champaign, USA

Co-sponsors
USSEC (St. Louis)
Fedna (Madrid)
Others to be announced

Program Directors
Professor Hans H. Stein, University of Illinois, USA
Professor Gonzalo G. Mateos, Universidad Politécnica de Madrid, Spain

Location
Campus of Universidad Politécnica, Madrid.
(Exact location to be announced after final registration.)
Course Objective

To describe commonly used feed ingredients in diets in terms of chemical composition, anti-nutritional factors, digestibility of energy and nutrients, recommended inclusion rates for pigs and poultry, and quality control. At the conclusion of the course, participants will have gained knowledge that will enable them to effectively evaluate and use feed ingredients that are available to the global feed industry.

Registration and contacts

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Guillermo Fondevila (guillermofondevila@gmail.com; phone: +34 653 626 017)

Cost of attending the course: 500 €
PhD students: Free of charge
Co-sponsors’ invitees: Free of charge

Payment Details

Please transfer your payment to the following bank account:

Account name: Fundación Española para el Desarrollo de la Nutrición Animal
Account number or IBAN: ES64 0182 4058 9100 0003 7276
Swift Code/BIC: BBVAESMM
Bank name: BBVA

Bank address:
Street: Avda. Reina Victoria, 66
City: Madrid
Zip Code: 28003
Country: Spain

Designation: Ingredient course.
Speakers and Instructors

Juan Acedo-Rico
Acedo-Rico & Asociados sl
Madrid, Spain

Gloria A. Casas
Universidad Nacional de Colombia
Bogotá, Colombia

Gonzalo G. Mateos
Universidad Politécnica de Madrid
Spain

Francesc Molist
Schothorst Feed Research
The Netherlands

Charles Martin Nyachoti
University of Manitoba
Canada

Markus Rodehutscord
Hohenheim University
Germany

Hans H. Stein
University of Illinois
USA

Rommel C. Sulabo
University of the Philippines
Los Baños, The Philippines

Birger Svihus
Norwegian University of Life Sciences
Aas, Norway

Ester Vinyeta
Nutreco BV
Spain
Program

Day 1. Monday June 25, 2018

9:00  Arrival of participants
Welcome, introduction, and overview. .................................Hans H. Stein and Gonzalo G. Mateos

Session 1: Chemical composition of feed ingredients and procedures for evaluating nutritional value.
Instructors: G. G. Mateos, R. C. Sulabo, C. M. Nyachoti and H. H. Stein

9:15  Nutrient composition and nutritive value. .........................................................Gonzalo G. Mateos
  -  Proximate analyses
  -  Amino acid profile and mineral content.

10:15  Fiber fractions in feed ingredients, definition and analysis. ......................Hans H. Stein

11:15  Coffee break

11:45  Nutrient digestibility and procedures for evaluation. ............................Rommel C. Sulabo

12:45  Lunch

14:00  Energy systems for pigs and poultry and methods for evaluation. ..........C. Martin Nyachoti

Session 2: Pulse crops. Overview over global production, types, nutritional composition, energy content, anti-nutritional factors, inclusion rates, and quality control.
Instructors: C. M. Nyachoti, H. H. Stein, G. G. Mateos

15:00  Global production of pulse crops. .................................................................Hans H. Stein

15:05  Field peas, split peas, and pea protein concentrate. ..................................C. Martin Nyachoti

16:00  Coffee break

16:20  Faba beans. ....................................................................................................Gonzalo G. Mateos

16:45  Lupins, lentils, and other legumes. ...............................................................C. Martin Nyachoti

17:15  Adjourn
Day 2. Tuesday June 26, 2018

Session 3: Oilseeds and oilseed meal: Overview over global production, processing technology, nutrient content, antinutritional factors, inclusion rates, and quality control.

Instructors: C. M. Nyachoti, G. G. Mateos, R. C. Sulabo, and H. H. Stein

9:00 Global production of oilseeds and oilseed meal. .........................................................Hans H. Stein

9:10 Soybeans and soybean derived products: full fat soybeans, soybean meal, soybean expellers. ............................................................................................................................Gonzalo G. Mateos

10:15 Added value soybean products: fermented and enzymatically processed soybean meal, soy protein concentrates, and soy protein isolate. .................................................................Hans H. Stein

10:45 Quality control of soy products. .............................................................................Gonzalo G. Mateos

11:15 Coffee break

11:45 00-Rapeseeds/canola seeds, 00-rapeseed/canola meal, 00-rapeseed/canola expellers. Conventional and high protein 00-rapeseed/canola. ............................................................................C. Martin Nyachoti

12:45 Lunch

14:00 Cotton seeds and cotton seed meal, peanut meal, sesame meal. .........................Rommel C. Sulabo

14:20 Sunflower seeds, sunflower meal, sunflower expellers, and sunflower protein concentrate. .................................................................................................................................C. Martin Nyachoti

14:40 Copra meal, copra expellers, palm kernel meal, palm kernel expellers. ...............Rommel C. Sulabo

15:00 Coffee break

Session 4: Fats and oils.

Instructors: G. G. Mateos, C. M. Nyachoti

15:20 Animal fats (tallow, lard, poultry grease, fish oil), plant oils (maize oil, soybean oil, palm oil, copra oil), and technical fats. ........................................................................................................Gonzalo G. Mateos

15:45 Quality control of fats. ........................................................................................Gonzalo G. Mateos

16:15 Energy assessment of fats and oils. ........................................................................C. Martin Nyachoti

16:45 Inclusion rates and influence of lipid sources on feed quality. ..............................Gonzalo G. Mateos

17:15 Adjourn
Day 3. Wednesday June 27, 2018

Session 5: Cereals and cereal co-products: Definition of products. Nutrient evaluation.

Instructors: R. C. Sulabo, M. Rodehutscord, G. A. Casas, C. M. Nyachoti, B. Svihus, and H. H. Stein

9:00  Global production of cereal grains and cereal grain co-products. .........................................Hans H. Stein

9:10  Nutritional composition of maize, wheat, barley, triticale, rye, and oats. ..........Markus Rodehutscord

9:50  Sorghum and sorghum co-products, including sorghum DDGS. .......................Rommel C. Sulabo

10:20 Digestibility of energy and nutrients in wheat, triticale, barley, and rye fed to growing pigs. .................................................................................................................................Markus Rodehutscord

10:50 Coffee break

11:20 Digestibility of nutrients and concentration of ME in corn, wheat, triticale, and rye fed to poultry. .................................................................................................................................Markus Rodehutscord

11:50 Rice and rice co-products: brown rice, broken rice, rice bran, and others. ..............Gloria A. Casas

12:30 Bakery meal, cookie meal, confectionary products. ......................................................Hans H. Stein

12:45 Lunch

14:00 Maize and wheat co-products including DDGS, gluten feed, gluten meal, germ meal, middlings, and others. .................................................................................................................................Hans H. Stein

15:00 Oats and oat co-products. ............................................................................................C. Martin Nyachoti

15:20 Coffee break

15:40 Use of cereal grain co-products in diets for poultry. ......................................................Birger Svihus

16:40 Cassava meal, cassava co-products, and other tubers. ..............................................Rommel C. Sulabo

17:15 Adjourn
**Day 4. Thursday June 28, 2018**

**Session 6: Mineral sources and ingredients in pig and poultry diets. Digestibility and phytase application.**

Instructors: H. H. Stein, M. Rodehutscord, C. M. Nyachoti

9:00  Calcium sources and utilization: Plant and mineral (limestone, calcium carbonate, dicalcium and monocalcium phosphate) origin. ...............................................................Hans H. Stein

9:30  Phosphorus sources and utilization: mineral, animal and vegetable sources. The role of phytic acid. .........................................................................................................................Markus Rodehutscord

10:00 Phytase effects on P availability in pigs and poultry. .................................................C. Martin Nyachoti

10:30 Coffee break

11:00 Calcium and phosphorus digestibility by pigs. .................................................................Hans H. Stein

12:00 Calcium and phosphorus digestibility by poultry. ........................................................Markus Rodehutscord

13:00 Lunch

**Session 7: Animal proteins.**

Instructors: R. C. Sulabo, F. Molist

14:15 Meat and bone meal, poultry meal, fish meal. .............................................................Rommel C. Sulabo

15:00 Co-products from the dairy industry: skim milk powder, whey powder, whey permeate. ..............................................................................................................................Fransesc Molist

15:30 Coffee break

15:45 Blood meals, blood plasma, and blood cells. ..............................................................Rommel C. Sulabo

16:15 Intestinal co-products. .............................................................................................Rommel C. Sulabo

16:30 New proteins: Insect protein, algae protein, single cell protein, lemlna meal. .............Fransesc Molist

17:15 Adjourn
Day 5. Friday June 29, 2018


Instructors: J. Acedo-Rico, E. Vinyeta, H. H. Stein

9:00 Feed mill equipment, technologies, and quality of final products. ................................Juan Acedo-Rico

9:45 Feed milling cost analysis. Influence of feed formulation. ..................................................Juan Acedo-Rico

10:15 Coffee break

10:45 Use of feed technology to improve the nutritional value of feed for poultry. ....................Ester Vinyeta

11:30 Use of feed technology to improve the nutritional value of feed for pigs. .........................Hans H. Stein

12:15 Course evaluation and certificates. .................................................................Gonzalo G. Mateos and Hans H. Stein

13:00 Adjourn