

## Developing and Sustaining International Agriculture Experiences in Animal Science Curricula

**246 The nuts and bolts of student exchange programs.** John C. Forrest\*, Terry S. Stewart, Bud G. Harmon, and Michael H. Stitsworth, *Purdue University*.

Exchange programs prepare animal sciences students to participate in the emerging global economy. Purdue's successful international undergraduate exchange developed from a long history of international programs and faculty exchanges. Emphasis on student exchanges during the last decade stems from recognition that economic development of the agricultural sector depends upon a better understanding of the cultures that drive international trade. The first formal undergraduate animal agriculture exchange program developed out of a faculty sabbatical to Australia. Prior to that several animal sciences students participated in general agricultural exchange programs sponsored by International Programs in Agriculture.

Exchange programs that provide the most beneficial experiences for students are well organized by participating institutions. When possible equal numbers of students from each university should be recruited. A great economic deterrent to recruitment was overcome when university administrators allowed students to pay tuition to their home institution while participating in exchanges, and revenue remains constant for both institutions. Mentors with a strong interest in students and knowledge of the programs at the collaborating institution help programs go smoothly at both ends of an exchange. This is especially important in initial exchanges. When exchanges are ongoing, students tend to form networks between universities that are beneficial to new students.

Exchanges take many forms, from formal funded programs that generally include one full semester of courses at a host university, to summer work experiences. In some cases a work experience is either preceded or followed by a semester of resident instruction. Exchanges with developing countries generally require funding to allow students from those countries to participate, host families often help offset housing costs for students coming to the US, and provide cultural understanding beyond the normal university experience. Exchanges with developed countries are fostered by agreements that allow students to pay tuition at their home campus. Scholarships and other financial assistance are often provided to assist students with travel and extra expense of living in a foreign country.

**Key Words:** Student exchange programs, International exchange programs, International Animal Agriculture

**247 The Linkage Project: a partnership in international educational development.** M. D. Kenealy\*, *Iowa State University, Ames*.

The Linkage Project was developed to create a model for US and international universities to align curricula to improve access to undergraduate and graduate programs for international students. The project proposal was driven by the need for increased globalization of education. If universities throughout the world are to capitalize fully on available knowledge and methodologies, they must prepare students who can move seamlessly through educational systems worldwide. Representatives of seven agriculture or veterinary medicine disciplines from Iowa State University (ISU) and National Agriculture University of Ukraine (NAUU)

partnered for a four-year effort funded by the United States Information Agency. Disciplines represented were: agricultural education, agricultural engineering, agronomy, animal science, economics, forestry, and veterinary medicine. Procedural steps were: 1. year one: one month exchanges of faculty counterpart teams from each discipline to study educational programs at the cooperating institutions and develop aligned bachelor of science (BS) programs; 2. year two: exchanges to finalize curricular proposals at ISU, open forums at NAUU to promote new BS programs to faculty and administration, and curricular implementation; 3. year three: on-site evaluation of the first year of implementation of BS programs and initiation of development of new master of science (MS) programs at NAUU; 4. year four: final adjustments and implementation of MS programs at NAUU. Faculty and students from the two universities involved in the Linkage Project benefited from accomplishment of the primary project objective of aligning curricula to enhance the process of student exchange, transfer, and graduate enrollment. Secondary benefits included internationalization of faculty and students, increased awareness of education on a global scale, and new opportunities for research partnerships. Additionally, the project positioned NAUU as a lead institution and model for preparing agricultural students for the changing economic system of the countries of the former Soviet Union.

**Key Words:** International, Curriculum

**248 Developing/funding of exchanges of faculty and other international symposia related to teaching and research.** J. F. Keown\*<sup>1</sup>, <sup>1</sup>*University of Nebraska, Lincoln, NE*.

The Institute of Agriculture and Natural Resources at the University of Nebraska is a member of the Mid America International Agricultural Consortium. This Consortium consists of the Agricultural Colleges located at the University of Missouri, Iowa State University, Kansas State University and Oklahoma State University. The main focus of this group is to work with Mexican Institutions to further research, teaching and extension with Mexican Universities, Governmental Research Centers, private industry and producer groups. The sole focus of this group is to work in the agricultural sectors of livestock and meats, biotechnology, wheat, maize, natural resources and current women's issues. This group has formed "sister university" relations with several Mexican Universities, held symposia in Mexico in the biotechnology, conservation tillage, exploring women's issues and by-product feeding. This consortium in previous years has spent considerable time and effort working overseas with USAID grants. With the reduction in USAID funding, the consortium took a different mode of action and decided to work mainly with Mexico. The Board of Directors, comprised of the Agricultural Deans at all five universities, changed due to the importance of the agricultural exports that flow to Mexico from this five-state region, as well as the increasing number of Mexican workers currently working in this five-state region in the meat packing, construction and general agricultural areas. The consortium feels that an exchange of scientific knowledge and of students and faculty will enhance economic development of both countries.

**Key Words:** MIAC, Mexico, Consortium

## ADSA Dairy Foods: Dairy Products—Chemistry and Physical Properties

**249 Methods to Prepare Glycomacropeptide from Cheese Whey.** Takuo Nakano\* and Lech Ozimek, *University of Alberta*.

Glycomacropeptide (GMP) found in cheese whey (or sweet whey) is a biologically active compound, and thought to be a potential ingredient for dietetic foods and pharmaceuticals. Thus, much attention has been given to the development of techniques to isolate and purify this glycopeptide. The objective of this study was to develop techniques to prepare GMP from sweet whey under a laboratory scale. We have developed the following techniques: 1) gel chromatography on Sephacryl S-200 in 0.1 M sodium acetate at pHs 7.0 and 3.5; 2) cetylpyridinium chloride treatment, and gel chromatography on Sephacryl S-200 in 0.1 M sodium acetate (associative condition) and on Sephadex G-75 in 6 M guanidinium chloride (dissociative condition); and 3) deproteinization with trichloroacetic acid and gel chromatography. In all the techniques

used, we obtained high purity GMP with amino acid composition having a trace (< 1 residue/ peptide) of phenylalanine (amino acid that does not occur in GMP). These techniques are useful to prepare GMP as a research chemical. The purified GMP may be used as a standard in chromatography and electrophoresis, and may also be used to test various known or unknown biological activities of this glycopeptide.

**Key Words:** Glycomacropeptide, Cheese whey, Purification

**250 Scale up and mass balance of affinity purification of native  $\beta$ -lactoglobulin.** Harit K. Vyas\*, J. M. Izco, and R. Jimenez-Flores, *Dairy Products Technology Center, Cal Poly*.

The process of affinity purification of  $\beta$ -lactoglobulin in its native form using all-trans-retinal immobilized on Celite R-648<sup>TM</sup> was scaled up and applied to fractionate industrial sweet whey. Three different ways