

Samuel K. Baidoo

Assistant Professor

Appointment 80% Research, 20% Extension

Research Area Swine Nutrition and Management

Appointment History 1999-present Assistant Professor

Graduate Program Affiliations

Animal Sciences – Senior Member

Professional and Honorary Societies

Member, American Society of Animal Science

Member, Sigma Xi, The Scientific Research Society

Member, Canadian Society of Animal Science

Member, American Association of Swine Practitioners

Five Most Significant Publications

Baidoo, S.K., Q.M. Yang, and R.D. Walker. 2003. Effects of phytase on apparent digestibility of organic phosphorus and nutrients in maize-soya bean meal based diets for sows. *Anim. Feed Sci. Tech.* 104: 133-141.

The study was designed to investigate the effects of phytase on phosphorus utilization and lactation performance of sows fed two dietary inorganic phosphorus contents in corn-soy bean meal diets. Total phosphorus content in the feces of sows fed the phytase diet decreased by 27.2% compared to sows fed the control diet.

Owusu-Asiedu, A., S.K. Baidoo, and C.M. Nyachoti. 2002. Effect of heat processing on nutrient digestibility in peas and supplementary amylase and xylanase to raw, extruded or micronized pea-based diets on performance of early weaned pigs. *Can. J. Anim. Sci.* 82:367-374.

The objective of the study was to investigate the effect of heat treatment (extrusion and micronization) on amino acid digestibility and effects of both heat treatment and exogenous feed enzyme (amylase and xylanase) supplementation on performance of early weaned-pigs fed pea based diets. The results indicated that compared to raw peas, extrusion and micronization improved amino acid digestibilities of amylase and xylanase supplemented pea-based diets and efficiency of feed utilization from 4.5 to 10.0 kg BW. However, feed intake and growth performance were not affected.

Owusu-Asiedu, A., S.K. Baidoo, C.M. Nyachoti, and R.R. Marquadt. 2002. Response of early-weaned pigs to spray-dried porcine or animal plasma-based diets supplemented with egg-yolk antibodies against enterotoxigenic *Escherichia coli*. *J. Anim. Sci.* 80:2895-2903.

The objective of the study was to determine if spray dried porcine plasma (SDPP) and spray dried animal plasma (SDAP) contained antibodies against common enterogenic *Escherichia coli* (EPEC) pathogens and if their growth stimulating effect in early weaned pigs was due to the presence of specific anti-EPEC antibodies. The results indicate that SDPP contains specific anti-EPEC antibodies, which is one of the factors responsible for its superior growth-enhancing effects. SDPP and egg yolk antibodies have similar growth promoting effect in early-weaned pigs.

Yin, Y.L., S.K. Baidoo, and J.L.L. Boychuck. 2002. Effect of replacing wheat or maize with micronized barley on starter, grower and finisher pig performance. *Asian-Aust. J. Anim. Sci.* 14:5-668-676.

The objective of the study was to determine nutritional benefit of micronized dehulled barley (MDB) for starter, growing-finishing pigs. From the results of the study, it was concluded that partial or total replacement for wheat or corn in starter pig diets with MDB could be successfully used for swine production.

Yin, Y.L., S.K. Baidoo, H. Schulze, and P.H. Simmins. 2001. Effect of supplementing diets containing hulless barley varieties having different levels of non-starch polysaccharides with β -glucanase and xylanase on the physiological status of the gastrointestinal tract and nutrient digestibility of weaned pigs. *Livestock Production Science* 71:97-107.

The objective of the study was to determine the effects of β -glucanase and xylanase inclusion, in feeds containing hulless barley, on performance and nutrient utilization in different parts of the gastrointestinal tract. The results suggest that NSP degrading enzymes are of benefit to early-weaned pigs fed diets based on hulless barley with high β -glucan content.

Refereed Journal Publications and Book Chapters (Last Five Years)

Authored or co-authored 14 papers in peer-reviewed journals.

- Baidoo, S.K., Q.M. Yang, and R.D. Walker. 2003. Effects of phytase on apparent digestibility of organic phosphorus and nutrients in maize-soya bean meal based diets for sows. *Anim. Feed Sci. Tech.* 104:133-141.**
- Johnston, L.J., J.E. Pettigrew, **S.K. Baidoo**, G.C. Shurson, and R.D. Walker. 2003. Efficacy of sucrose and milk chocolate product or dried porcine solubles to increase feed intake and improve performance of lactating sows. *J. Anim. Sci.* 81:2475-2481.
- Leena, A., M.G. Kristy, **S.K. Baidoo**, R. Morrison, and J. Deen. 2003. Comparison of injuries in sows housed in gestation stalls versus group pens with electronic feeders. *J. Am. Vet. Med Assoc.* 223:1334-1338.
- Owusu-Asiedu, A., C.M. Nyachoti, **S.K. Baidoo**, R.R. Marquardt, and X. Yang. 2003. Response of early-weaned pigs to an enterotoxigenic *Escherichia coli*(K88) challenge when fed diets containing spray-dried porcine plasma or pea protein isolate plus egg yolk antibody. *J. Anim. Sci.* 81: 1781-1789.
- Owusu-Asiedu, A., **S.K. Baidoo**, and C.M. Nyachoti. 2002. Effect of heat processing on nutrient digestibility in peas and supplementary amylase and xylanase to raw, extruded or micronized pea-based diets on performance of early weaned pigs. *Can. J. Anim. Sci.* 82: 367-374.
- Owusu-Asiedu, A., **S.K. Baidoo**, C.M. Nyachoti, and R.R. Marquadt. 2002. Response of early-weaned pigs to spray-dried porcine or animal plasma-based diets supplemented with egg-yolk antibodies against enterotoxigenic *Escherichia coli*. *J. Anim. Sci.* 80:2895-2903.
- Yin, Y.L., **S.K. Baidoo**, and J.L.L. Boychuck. 2002. Effect of replacing wheat or maize with micronized barley on starter, grower and finisher pig performance. *Asian-Aust. J. Anim. Sci.* 14:5-668-676.
- Rahman, S., Y. Chen, Q. Zhang, S. Tessier, and **S. Baidoo**. 2001. Performance of a liquid manure injector in a soil bin and on established forages. *Can. Biosystems Eng.* 43:2.33-2.40.
- Yin, Y.L., **S.K. Baidoo**, L.Z. Jin, Y.G. Liu, H. Schulze, and P.H. Simmins. 2001. The effect of different carbohydrase and protease supplementation on apparent (ileal and overall) digestibility of nutrients of five hulless barley varieties in young pigs. *Livestock Prod. Sci.* 71:109-120.
- Yin, Y.L., **S.K. Baidoo**, H. Schulze, and P.H. Simmins. 2001. Effects of supplementing diets containing hulless barley varieties having different levels of non-starch polysaccharides with B-glucanase and xylanase on the physiological status of the gastrointestinal tract and nutrient digestibility of weaned pigs. *Livestock Prod. Sci.* 71:97-107.

- Yin, Y.L., **S.K. Baidoo**, J.L.L. Boychuck, and H.H. Simmins. 2001. Performance and carcass characteristics of growing pigs and broilers fed diets containing micronized barley, ground barley, wheat and maize. *J. Sci. Food Agric.* 81:1487-1497.
- Yin, Y.L., **S.K. Baidoo**, and J.L.L. Boychuck. 2000. Effect of enzyme supplementation on the performance of broilers fed maize, wheat, barley or micronized dehulled barley diets. *J. Animal and Feed Sciences.* 9:493-504.
- Jin, L.Z., R.R. Marquardt, and **S.K. Baidoo**. 2000. Inhibition of enterotoxigenic *Escherchia coli* K88, K99 and 987P by the *Lactobacillus* isolates from porcine intestine. *J. Sci. Food and Agric.* 80:619-624.

Awards (Last Five Years)

Department of Animal Science, Outstanding Graduate Faculty Award for Teaching, Counseling and Advising, 2002.

Dissertations and Theses (Last Five Years)

Name	Program	Degree	Thesis Title
Gaofeng He	Animal Sciences	Ph.D.	Dietary manipulation on nutrient digestibility and pig performance.

Proceedings and Invited Lectures (13)

- Baidoo, S.K.**, S. Noll, J. Jacobs, J.G. Linn, A. DiCostanzo, and C.J. Clanton. 2002. Environmental impact of animal agriculture. COAFES Priority Day Seminar, University of Minnesota, St. Paul, MN.
- Baidoo, S.K.** 2002. Swine Research Update to MN Pork Research Committee, Mankato, MN.
- Shurson, G.C., M.H. Whitney, M.J. Spiehs, **S.K. Baidoo**, and A. Renteria. 2000. The value of distillers dried grains with solubles in pig diets. Distiller's Grains Technology Council's Fourth Symposium, May 24-25, 2000, Louisville, KY.

Funding (Last Five Years) – \$231,338

- National Pork Board.** Critical review on botanical extracts as alternative production enhancers in swine production systems. 2004-05. \$18,500.
- National Pork Board.** Effect of Stocking Density on the welfare and performance of grow finish pigs. J. Deen (PI). 2004-05. \$58,006.
- Zymetrics, Inc.** Evaluation of Phytase (Quantum Tm) in low phosphorus diets for young pigs. 2004-04. \$52,838.
- National Pork Board.** Evaluation of the effect of group size and structure on welfare of gestating sows in pens with Electronic Sow Feeders. J. Deen (PI). 2003-04. \$66,551.
- National Pork Board.** Enhancing sow welfare high fiber. L. Johnston (PI). 2002-04. \$78,940.
- USDA.** Restoring Native Perennial Legumes for Forage, Feed and Food. D. Wyse (PI). 2002-04. \$100,000.
- AES/Rapid Response Ag Fund.** Restoring Native Legumes/plants to preserve perennality and viability in MN agriculture. Peterson, P. (PI). 2002-04. \$295,000.
- USDA AG RES SVC.** Comparison of sow gestation housing. 2002-03. \$15,000.
- National Pork Board.** A Perspective Observational Study of Periparturient Sow Mortality. J. Deen (PI). 2002-03. \$22,779.
- National Pork Board.** Comparison of housing systems. J. Deen (PI). 2002-2003. \$63,633.
- National Pork Board.** Factors affecting sow mortality. J. Deen (PI). 2002-03. \$20,276.
- National Pork Board.** Emerging technologies in swine manure mgmt. 2002-03. \$35,000.

MPPA. Biological and economic performance of pigs housed in hoop barns. L. Johnston (PI). 2001-03. \$11,250.

Calsporin Ltd, Japan Probiotics for pregnant and lactating sows and young pigs. 2000-01. \$15,000.

MN Department of Agriculture. Dietary manipulation on manure characteristics. 1999-2000. \$95,000.

Graduate Student and Post-doctoral Supervision - Current Advisees

Claudia Ariza-Nieto Ph.D. Animal Sciences

Minho Song M.S. Animal Sciences

Courses Taught (Last Five Years)

Designator	Name	Cr	% Effort	Term	Years
AnSc 4609	Analysis of Livestock Prod Systems	2	33%	Fall	2001, 2003
AnSc 8311	Animal Bioenergetics	3	30%	Fall	2001
AnSc 8340	Concepts & Dev in Swine Nutr.	2	30%	Fall	2001, 2002
AnSc 8312	Protein Metabolism	4	50%	Fall	2002
AnSc 2401	Animal Nutrition	3	10%	Fall	2003

Service

Member, Minnesota Nutrition Conference Planning Committee.

Member, Allen D. Lemay Swine Conference Nutrition Workshop Committee.

Member, Swine Center Steering Committee.

Reviewer, *American J. of Animal Science*, *Canadian J. of Animal Science*, *American J. of Animal Welfare*, *J. of Swine Health and Production*.

Panel member, Animal Production and Protection Grants, USDA, Washington, D.C.

Reviewer, Canadian NSERC, Collaborative Research and Development Grant.

Service to National and Regional Research Committees

Member NCR-42 Committee

Member, S-1012 Committee

Extension Activities (Last Five Years)

Program Team Involvement and Goals

The major programs include:

Training Programs for Swine Farm Workers, Contributor

Audience: Minnesota pork producers and swine farm workers

Goal: Improve the production expertise of workers in commercial swine operations.

Minnesota Pork Producers Training Program

Audience: Minnesota pork producers

Goal: Train new and current staff for pork producers on breeding and gestation management, farrowing management, nursery management, ventilation and other swine production practices.

Farrowing Management, Contributor

Audience: Minnesota pork producers

Goal: Provide farrowing management information directly to pork producers.

Model Swine Ventilation Room Demonstration Project, Contributor

Cooperative effort by a multi-state team, faculty from IA, MN, NE, SD

Audience: Minnesota pork producers and industry professionals

Goal: Give producers and their employees the opportunity to learn about ventilation and temperature systems, and to practice setting controls, inlets and fans using a model swine ventilation training room on wheels for hands-on demonstration and practice.

Southern Minnesota Swine Discussion Group, Contributor

Audience: Southern MN pork producers

Goal: Discuss issues of importance to the swine industry and develop, plan and coordinate educational outreach programs and research activities in southern MN to address the concerns of area swine producers.

Product Development (selected materials developed)

- Swine Nutrition DDGS Information Packet for Producers and Allied Industry. Co-author
- Swine Farm Workers Training curriculum 4-5 hrs/wk for 3-5 wks + 1 “hands-on” session
- Model Swine Ventilation Room – A portable training room designed for hands-on demonstration and practice of properly ventilating swine buildings. Developed in cooperation with faculty from Iowa, Minnesota, Nebraska and South Dakota.

Program Delivery Events

Programs are delivered in a variety of formats including, workshops (classroom and on-farm), lectures, seminars, conferences, interactive discussion groups, and county and regional meetings. Ongoing interactions with producers also occur by phone and e-mails. Many specialists are enlisted by both the Minnesota Pork Producers Association and the National Pork Board to help with educational efforts at the Minnesota Pork Congress and the World Pork Expo. Faculty activities range from staffing a booth, interacting with producers, presenting educational seminars and designing and conducting workshops. Some examples include:

- Breeding and Gestation Management Training Workshops
- Farrowing Management Training Workshops
- Nursery Management Workshops
- Model Swine Ventilation Workshops

Program Evaluation and Measurable Impacts

- Improved production expertise of swine farm staff in commercial swine operations.
- Increased awareness of current research to swine industry professionals.

Extension Scholarship

Proceedings (16)

Baidoo, S.K. 2002. Nutritional impact on sows in different housing systems. Alternative Swine Days, NCROC, University of Minnesota, Morris, MN.

Baidoo, S.K., G. He, and Q.M. Yang. 2002. Insulin in swine diets. Proc. 63rd Minnesota Nutrition Conference and Pre-conference Symposium. Eagan, MN. Sept. 17-18, 2002.

Dritz, S., M. Tokach, R. Goodband, and **S.K. Baidoo.** 2002. Nutrition for optimal profitability. Allen D. Leman Swine Conference. College of Veterinary Medicine, University of Minnesota, September 14-17, 2002.

Marquardt R. R., S. Li, and **S.K. Baidoo.** 2001. Control of diarrhea in young pigs using therapeutic antibodies. Allen D. Leman Swine Conference, College of Veterinary Medicine, University of Minnesota. Vol. 28:227-239.

Nyachoti C.M. and **S.K. Baidoo.** 2001. Control of consideration for improving dietary amino acid utilization. Allen D. Leman Swine Conference, College of Veterinary Medicine, University of Minnesota. Vol. 28:240-249.

- Marquardt, R.R., A. Owusu-Asiedu, **S.K. Baidoo** and Nyachoti, C.M. 2001. Performance of young pigs fed diets containing pea proteins and egg yolk antibodies. Proc. 62nd Minnesota Nutrition Conference and Minnesota Corn Growers Association Technical Symposium, Bloomington, Minnesota. pp. 292-306.
- Baidoo, S.K.** 2001. Sow nutrition for productivity and longevity: Any new ideas? Allen D. Lemman Swine Conference. Vol. 28:223-226.
- Marquardt, R.R., A. Owusu-Asiedu, **S.K. Baidoo**, and C.M. Nyachoti. 2001. Performance of young pigs fed diets containing pea proteins and egg yolk antibodies. Minnesota Nutrition Conference. Vol. 62:292-306.
- Shurson, G.C., M.J. Spiels, M.H. Whitney, **S.K. Baidoo**, L.J. Johnston, B. Shanks, and D. Wulf. 2001. The value of distiller's dried grains with solubles in swine diets. 62nd Minnesota Nutrition Conference and Minnesota Corn Growers Association Technical Symposium, Bloomington, MN. September 11-12, 2001. pp. 22-52.
- Baidoo, S.K.** 2000. Increasing sow longevity: Body condition and feeding. Allen D. Lemman Swine Conference, University of Minnesota. Vol. 27:143-149.
- Shurson, G.C., M.H. Whitney, M.J. Spiels, **S.K. Baidoo**, and A. Renteria. 2000. The value of distillers dried grains with solubles in pig diets. Concepts in Pig Science 2000, 2nd Annual Turtle Lake Pig Science Conference, Stillwater, MN. May 3-5, 2000. pp. 47-62.
- Baidoo, S.K.** 1999. Environmental impacts of swine and poultry nutrition. 60th Minnesota Nutrition Conference, Bloomington, MN.
- Baidoo, S.K.** 1999. Nutritional impact on manure management. Allen D. Lemman Swine Conference, Brooklyn Park, MN.
- Baidoo, S.K.** 1999. Environmental impacts of swine and poultry manure. Manure Management Symposium, Saskatoon, Saskatchewan, Canada.
- Baidoo, S.K.** 1999. Enzyme use in hullless barley diets for swine. Eastern Nutrition Conference, Niagara Falls, Ontario, Canada.
- Baidoo, S.K.** and G. Dusel. 1999. Processed peas for young pigs. Eastern Nutrition Conference, Niagara Falls, Ontario, Canada.