COVER SHEET FOR GRANT PROPOSALS
State Board of Education

SBOE PROPOSAL NUMBER: (to be assigned by SBOE)	AMOUNT REQUESTED: $75,000-

TITLE OF PROPOSED PROJECT: Developing all-natural low GI potato

SPECIFIC PROJECT FOCUS:

Glycemic response can be modulated by designing a food matrix that is more resistant to digestion. Traditionally, such modification can be achieved through chemical processing and genetic approaches, which raise more health concerns. The proposed all-natural techniques include three major approaches: (1) selecting potato varieties with the proper biochemical characteristics to respond to another two approaches, (2) incorporating some food ingredients to form a new food matrix, (3) applying various hydrothermal treatments to manipulate potato tissues. The modified potatoes, "all-natural low GI potato," will then be further processed to powder form for use as a food ingredient. The commercialized product will target several food markets including processed potato, health food, and gluten-free (or allergen-free) markets.

PROJECT START DATE: 9/1/2015	PROJECT END DATE: 8/31/2016
NAME OF INSTITUTION: University of Idaho	DEPARTMENT: School of Food Science
ADDRESS: 875 Perimeter Dr., Moscow, ID 83844	
E-MAIL ADDRESS: amylin@uidaho.edu	PHONE NUMBER: 208-885-4661

	NAME:	TITLE:	SIGNATURE:
PROJECT DIRECTOR/PRINCIPAL INVESTIGATOR	(Amy) Hui-Mei Lin	Associate Professor	Amy Lin
CO-PRINCIPAL INVESTIGATOR			

NAME OF PARTNERING COMPANY: J.R. Simplot	COMPANY REPRESENTATIVE NAME: Jeffri Bohlscheid
NAME:	SIGNATURE: 6/23/2015
NAME OF PARTNERING COMPANY: ConAgra Foods	COMPANY REPRESENTATIVE NAME: Jeremy Higley
NAME: Jeremy Higley	SIGNATURE:

Authorized Organizational Representative	Dr. John McIver Vice President ORED	
		AMD 6-24-15

SUMMARY PROPOSAL BUDGET

Name of Institution: University of Idaho

Name of Project Director: (Amy) Hui-Mei Lin

A. PERSONNEL COST (Faculty, Staff, Visiting Professors, Post-Doctoral Associates, Graduate/Undergraduate Students, Other)

Name/ Title	Salary/Rate of Pay	Fringe	Dollar Amount Requested
(Amy) Hui-Mei Lin/ Associate Professor of starch chemistry and health	$2,036	$643	$2,700
Bin Du / post-doctoral research associate	$26,667	$10,453	$37,100
	(8 months salary)		

% OF TOTAL BUDGET:	53	SUBTOTAL:	$39,800

B. EQUIPMENT: (List each item with a cost in excess of $1000.00.)

Item/Description	Dollar Amount Requested
Refractive Index Detector / record signals of molecules fractioned by HPLC	$13,000
Fraction collector / collect molecular fractions separated by HPLC	$3,000
Peristaltic pump / pumping mobile phase for a gel-permeation chromatography system	$2,500
SUBTOTAL:	$18,500

C. TRAVEL:

Dates of Travel (from/to)	No. of Persons	Total Days	Transportation	Lodging	Per Diem	Dollar Amount Requested
Moscow/Caldwell, ID (Aug. 2015)	3	3	$1,830	$900	$ 270	$3,000
SUBTOTAL:						$3,000

D. Participant Support Costs:

	Dollar Amount Requested
1. Stipends	
2. Other	
SUBTOTAL:	

E. Other Direct Costs:	Dollar Amount Requested
1. Materials and Supplies	
2. Publication Costs/Page Charges	
3. Consultant Services (Include Travel Expenses)	
4. Computer Services (PC & HPLC software)	$6,500
5. Subcontracts	
6. Other (specify nature & breakdown if over $1000) HPLC accessories ($800, reagents and standards ($3,000), biochemical reagents ($950), glassware and other lab supplies ($800), potatoes and potato products ($700), microscope usage fees ($950)	$7,200
SUBTOTAL:	$14,000
F.. Total Costs: (Add subtotals, sections A through E) **TOTAL:**	$75,000
G.. Amount Requested: **TOTAL:**	$75,000
Project Director's Signature: Amy Liu	Date: 6/23/15

INSTITUTIONAL AND OTHER SECTOR SUPPORT
(add additional pages as necessary)

A. INSTITUTIONAL / OTHER SECTOR DOLLARS

Source / Description	Amount

B. FACULTY / STAFF POSITIONS

Description
Supervisor: approximately 20% time will be devoted to this project

C. CAPITAL EQUIPMENT

Description

D. FACILITIES & INSTRUMENTATION (Description)

High performance anion-exchange chromatography with PAD detector (HPAEC-PAD). Original purchase cost of $75,000.

Institution: University of Idaho (UI)

Project Leading Faculty: (Amy) Hui-Mei Lin

Past Incubation Fund Award: This technique has not been proposed in the past.

Executive Summary: Idaho is the top potato producer in the US, and potatoes are an important food for Americans. However, potatoes are thought of as an "unhealthy food" because over-consuming some processed potato products generates a high glycemic response, which is known to be associated with obesity, Type 2 diabetes, and some chronic diseases. Nevertheless, glycemic response can be modulated through a designed food matrix that increases resistance to human digestive enzymes. Instead of having a high glycemic response, resistance to digestion generates undigested residues that function as dietary fiber and a prebiotic to promote gut health. Conventionally, such modification is achieved by chemical treatment and/or genetic modification, which introduces more health concerns. The proposed techniques emphasize green technologies that use food grade ingredients and control temperature history during processing. Potato used in this modification will be selected from Idaho varieties based on its biochemical characteristics that will better respond to modification. Modified potato, "all-natural low GI potato", will be further processed to powder form for use as a food ingredient. The products can be consumed after simple preparations, such as adding water to make mashed potatoes, or used as food ingredients to make other products, such as potato chips, fries, crackers, and soups. Funds are requested to generate preliminary data for the potential commercialization partners. Commercialized products will target processed potato, health food, and allergen-free (gluten free) food markets, and potential clients include retail, food service and ingredient suppliers.

"Gap" project objective and total amount requested: *Our objective is to produce "all-natural low GI potato" (GI: glycemic index or glycemic impact) with moderate glycemic impact and gut health promotion through a unique combination of three approaches: potato variety selection, product formulation, and new processing techniques.* To achieve this goal, there is a gap between current technology (chemical & genetic modification) and consumers' desire (all-natural). Funding in the amount of $75,000 is requested to provide salary dollars, instrument and lab supplies for generating preliminary data.

How resource commitments reflect the priorities of the home institution: UI is the state's land-grant research university. The fundamental research of carbohydrate chemistry leading to the commercialized application of healthy potato products proposed here is consist with UI's mission to enhance the scientific, economic, social, legal, and cultural assets of our state and develop solutions for complex problems.

Evidence that project will have a potential impact to the economy of Idaho: Idaho is the top potato producer in the US, yielding over 14 billion pounds of potatoes each year. Processed potatoes have surpassed fresh potato consumption and composed 64% of total U.S. potato use during the 2000s. Since 2005, the U.S. potato industry has also enjoyed a trade surplus. Potato chips and dehydrated potato products are important among exported potato goods, contributing an average value of $260 million from 2005 to 2009. The proposed techniques will generate a broad spectrum of processed potato products including potato chips, dehydrated potato products, potato starch, flour and others, which we anticipate will greatly increase Idaho's revenue from potatoes. In addition to growing the current processed potato market, broadening potato use in health food and gluten-free markets will also benefit Idaho economically. The potato used in producing "all-natural low

GI potato" will be selected from Idaho's varieties after screening their biochemical characteristics. We expect, with the proposed technologies, expanding markets and increasing demand for Idaho potatoes.

The Market Opportunity:

a. The project will address society's need for healthy foods with an emphasis on moderating glycemic response and promoting gut health. The project will also address the need from potato industry for generating a healthy image of processed potatoes. Consuming carbohydrates, especially starchy foods, has become an unhealthy concept in some consumer's minds and has generated big economic impacts on the carbohydrate-based snack market in the recent years. Economics of the potato industry heavily rely on processed potatoes; development of healthy processed potatoes is urgently needed to maintain and grow the market.

b. Describe applications and markets for the technology, include market size and demand projections. *Markets for these technologies include industries and consumers of: processed potatoes, healthy/functional foods, and allergen-free (including gluten-free) foods*. Over 60 percent of potato sales are for processed foods such as, French fries, chips, and dehydrated potatoes, which total volume was $54.7 million in 2010. Annual personal consumption of potatoes was estimated at 112.9 pounds, with 30.8 pounds of the total coming from processed potatoes. The proposed modified potatoes will alleviate customers' concerns about glycemic impact and related health issues, such as obesity and Type-2 diabetes. Instead, promotion of gut health

will encourage the consumption of processed potatoes. It is predicted that the processed potato market will not only stop declining, but experience growth. The global functional, allergen-free, organic and other healthy foods market is predicted to push through the $1 trillion mark for the first time in 2017. About 30% of food companies are invested in healthy foods, and health and wellness continue being mainstream in food industry. The proposed modified potato, in addition to moderate glycemic response, will benefit gut health as dietary fiber and a prebiotic. It could be used in a wide range of foods, and the potential health benefits will include: improved glycemic and isnulinaemic response, improved blood lipid profile, increased satiety, reduced energy intake, increased micronutrition absorption and other synergistic interactions with other dietary components. In addition, potato doesn't contain gluten or other known allergen, which further increases the health level in consumers' minds. Additionally, with the growing population of gluten-sensitive consumers, it has generated a new market for healthy potato products. In our opinion, the proposed "all-natural low GI potato" will hit both the traditional processed potato market and the hot growing healthy food market.

c. Describe the product, its potential market audience, the competition, and barriers to market entry. The proposed product is all-natural modified potatoes, processed with food-grade ingredients. Chemical and genetic modification will be completely excluded from these techniques. The modified potatoes could be used as they are, or they could be further processed to powder for use in a broad range of foods. The "all-natural low GI potato", as opposed to many traditional processed potatoes, will have moderate impact on glycemic response and promote gut health as a prebiotic

and/or dietary fiber. Its competitors will be resistant starch and dietary fiber produced from other sources and techniques. However, potato has its unique processed potato market that will not be replaceable by a single ingredient made from other crop resources. Thus, the "all-natural low GI potato" will have an opportunity to take a portion of other food markets, but will have nothing to lose. The barrier for promoting the proposed product will be the consumer's preconception of "modification", commonly associated with the usage of chemicals and genetic modification. A strategy in overcoming these barriers will be communicating with consumers through media, packaging, and educational programs. All of our potential commercialization partners are experienced and have the resources to overcome this challenge.

The technology and Path to Commercialization:

a. Describe the technology and the current state of the technology. *The proposed technology is a three step approach that will be used to produced "all natural low GI potato" with moderate glycemic impact and gut health promotion.* The first step will be screening Idaho developed varieties of potato. Each potato variety differs in their molecular architecture; candidates with proper biochemical characters will be selected for creating a new food matrix. Secondly, a new food matrix will be formulated by incorporating food grade ingredients into tissues to change the biochemical properties, and thus their digestibility. Lastly, new processing conditions will be implemented to change the physical status of potato tissues. The unique combination of these three approaches: potato variety selection, product formulation, and new processing techniques are novel to the potato industry and

are expected to result in high quality of potato products with better glycemic performance. The technologies are in their initial stages, however, the concept of the techniques is supported by scientific evidence from fundamental research, and are ready to move to the next stage for generating preliminary data.

b. Describe how the technology contributes to the product and market need and its intellectual property (IP) status. We propose to develop "all-natural low GI potato" with more health benefits including: moderating glycemic performance and promoting gut health. This targets one of the most criticized health issues of potato products, will likely maintain a big portion of the current processed potato food market, and has the potential to increase potato sales in healthy & functional and allergen-free food markets. The techniques have not been previously disclosed to the public, and the IP generated from this project will be further protected through registration of the products as low-GI potato.

c. Identify who developed the technology and with what funding. The technology will be developed in the PI's laboratory. The PI's start-up funding from UI, federal funding from the USDA, and industrial gifts have been, or will be used to conduct the fundamental and applied studies that will lead to the proposed product.

d. Identify the concrete steps to bring technology to market. The biochemical characteristics of Idaho potatoes will be screened for selecting the best candidate. Selected potato will be modified using the proposed techniques. Powders will be produced from modified potato. The modified potato powders' nutritional and technical properties will be measured, and examples of usage of modified potato powders will be demonstrated. Commercialization partners are expected to

recommend changes to our formulation to best suit the target markets. Commercialization partner(s) are also expected to license the technology and use the modified potato powders to produce various potato products.

Commercialization Partners: We currently have two commercialization partners: *J. R. Simplot Corporation, and ConAgra Foods Lamb Weston*.

J. R. Simplot is one of the largest privately held food and agribusiness companies in the world. It produces more than 3.0 billion pounds of frozen French fries and formed potato. A Simplot representative has visited UI several times and the PI has visited them and met part of their research team. Simplot has actively involved in the discussion about potato resistant starch and has supported the PI in developing other federal grant proposals related to modulating glycemic response of potato from different approaches.

ConAgra Lamb Western is the largest potato company in North America, with annual sales of approximately $2 billion. It manufactures French fries, potato specialties and dehydrated potato products. Their representative has visited and supported the PI in providing potato materials for the research related to glycemic response of potato products.

Specific Project Plan and Detailed Use of Funds:

Research team: The team includes the PI, a visiting Ph.D. (Dr. J. Ng), a Ph.D. researcher (B. Du), a graduate student, an undergraduate student, and commercialization partners. The PI has invited Dr. J. Ng to visit the team in August, 2015 for six weeks to initiate the project. Dr. Ng is currently a post-doctoral researcher at The New Zealand Institute of Plant & Food

Research (Palmerston, New Zealand) and has been working on potato tissue related research projects for a few years. Another Ph.D. scientist, B. Du, will join the team in October, 2015 (Years 1 & 2) to develop the proposed techniques. Du is finishing his doctoral program in Hong Kong Baptist University (Hong Kong, China) and is working on food polysaccharides. The PI will recruit a graduate and an undergraduate student to perform technical and nutritional quality analysis and product development in Years 2 & 3. Commercialization partners will supply potato materials, participate in discussion, provide feedback, and may perform work (scale up) when needed.

Specific tasks:

(1) Establish a database of Idaho Potatoes: Potatoes of various Idaho varieties will be examined for their physical and chemical properties to identify the candidates with the capacity to form a proper matrix.

(2) Modification: Food grade ingredients will be incorporated into raw potato materials with various hydrothermal treatments to modify the biochemistry of carbohydrate molecules and physical status of potato tissues.

(3) Post-modification processing: Modified potato materials will be further processed to powder form using several techniques in order to use them as a food ingredient.

(4) Application/New Product Development: The powders will be utilized to develop several new products such as potato soup, potato crackers, and others to demonstrate their potential uses in a range of food products.

(5) Examine technical properties: Pasting, gelling, baking and other technical qualities will be examined to provide information for potential applications.

(6) Assess nutritional properties: We will measure the modified potato's impact on glycemic response in vitro, followed by clinical trials.

Detailed use of funds: The requested funds of $75,000, and its details are listed below:

(1) Faculty salary (total $2,700): summer support ($2,036) with fringe benefit ($643, 31.6%).

(2) Post-doctoral associate salary (total 37,100): part of the salary ($26,667, 8 months, 11/1/2015-6/30/2016) with the associated fringe benefit ($10,453, 39.2%). The rest of the salary will be supported by the PI's other funds.

(3) Capital purchase (total $ 13,000): a refractive index detector ($13,000) for characterizing molecules.

(4) Equipment (over $1,000; total $5,500): A computer ($1,500) and software ($5,000) for recording and analyzing signals from HPLC. A fraction collector ($3,000) and a peristaltic pump ($2,500) for collecting molecular fractions.

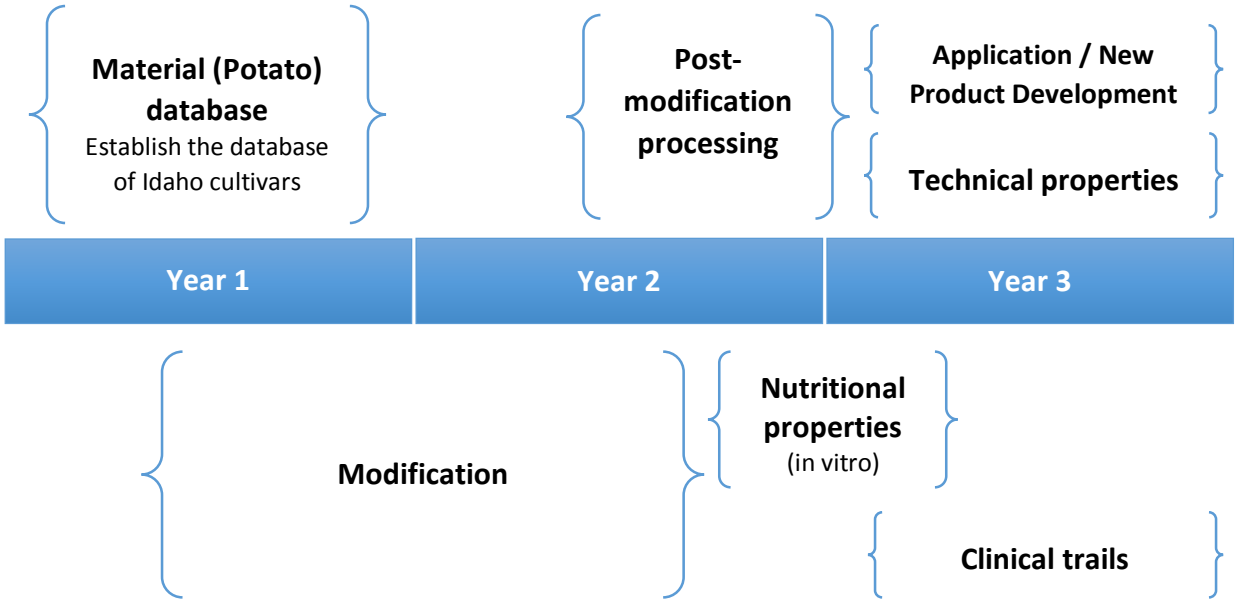
(5) Material and lab supplies (total $7,200): The requested fees for materials and lab supplies are itemized below:

HPLC accessories:	$800
Reagents and standards:	$3,000
Enzyme and biochemical reagents:	$950
Glassware and other lab supplies:	$800
Microscope usage fees:	$950
Potatoes and potato products:	$700

(6) Travel (total $3,000): The PI has requested $3,000 for traveling with two research staff to Caldwell, ID for visiting a commercialization partner (J.R. Simplot).

The proposed timelines:

The project timelines includes screen potato varieties, develop the proposed technology (modification), produce powder form product, assess nutritional and technical quality, and demonstrate the application. During Year 1, we expect to complete the variety selection and produce preliminary data of the proposed technology. It will take additional two years, working with the industry collaborators to bring the new products to market.



Institutional and Other Sector Support: The PI's academic year salary is supported by UI. The cost of Dr. J. Ng's visit is supported by The New Zealand Institute for Plant & Food Research (Palmerston, New Zealand). The partial salary of a post-doctoral researcher, equipment, lab supplies, travel expenses (to conference), and student staff will be supported through the PI's start-up and industrial gift funds. Some equipment (HPAEC, microplate-reader, and others) have been supported by the PI's start-up fund. One ongoing funded project will provide supplemental financial support for reagents, chemicals, and other lab supplies. Details are listed in Appendix 2.

Appendices:

Facilities and Equipment:

The PI has a **Starch Chemistry Laboratory** consisting of a three room modern 1558 ft^2 analytical facility, housed in the Agricultural Science Building on the Moscow campus of the University of Idaho. The laboratory is currently staffed by a full-time M.S. technician and two M.S. graduate students, other staff (a Ph.D. student, an M.S. student, and a postdoc researcher) will be joining in fall 2015. The lab houses numerous analytic systems, such as high performance anion-exchange chromatography coupled with pulsed electrochemical detection (HPAEC-PED), high performance size-exclusion chromatography coupled with a Refractive Index Detector and a Flourescence Detector, a Rapid Visco Analyzer (RVA), Texture Analyzer, Particle Size Analyzer, polarized light microscope, microplate reader, and others. The lab also routinely performs biochemical assays such as the activity of α-amylase and other enzymes. We also provide analytical service to characterize carbohydrate molecules for breeders. The staff offices (238 ft^2) are located in the same building on the same floor as the Starch Chemistry Laboratory. Staff working on the projects are provided with office space that includes a desk, chair, and Internet access in the shared office.

Biographic Sketch and Individual Support:

(AMY) HUI-MEI LIN

Associate Professor of Starch Chemistry and Health

School of Food Science, University of Idaho (UI)
Phone: 208-885-4661; E-mail: amylin@uidaho.edu

EDUCATION

Ph.D., 2006, National Taiwan University (NTU), Taipei, Taiwan
[2005-2006, visiting student, Iowa State University (Ames, IA)]
M.S., 1995, National Taiwan University, Taipei, Taiwan
B.S., 1993, National Taiwan University, Taipei, Taiwan

PROFESSIONAL EXPERIENCE

2014 – Present	Associate Professor of Starch Chemistry and Health, School of Food Science, UI
2014 – Present	Adjunct Faculty, School of Food Science, Washington State University, Pullman, WA
2011 – 2014	Managing Director of Strategic Planning and Research Communication, Whistler Center for Carbohydrate Research, Purdue University, West Lafayette, IN
2011 – 2014	Research Assistant Professor of Carbohydrate Chemistry and Nutritional Functionality, Department of Food Science, Purdue University, West Lafayette, IN
2008 – 2011	Postdoctoral Research Associate, Department of Food Science, Purdue University, West Lafayette, IN
2006 – 2007	Postdoctoral Research Associate, Department of Food Science and Human Nutrition, Iowa State University, Ames, IA

PROFESSIONAL MEMBERSHIPS & AFFILIATIONS

- Pacific Northwest Section of American Association of Cereal Chemists (AACC) International
- American Society for Nutrition (ASN)
- American Chemical Society (ACS)
- American Association of Cereal Chemists International (AACCI)
- Institute of Food Technologists (IFT)
- Health Food Society of Taiwan
- Taiwan Association for Food Science and Technology

HONORS AND AWARDS

- Australian Institute of Food Science's best paper published in a peer review journal (2013)
- Faculty Member of Phi Tau Sigma Honor Society for food science and technology (since 2013)
- Young Investigator Award, International Conference on Food Factors (2011)

- Outstanding Volunteer, Institute of Food Technologists (IFT), Carbohydrate Division (2010-2011)
- Award of Academic Research Thesis in Doctor of the College of Bio-Resources and Agriculture at NTU, Taipei, Taiwan (2006)
- "Superior Presentation" of the oral/poster section of the XIV International Starch Convention, Krakow, Poland (2006)
- Member of Sigma Xi, International Honor Society for Scientific and Engineering Research, NC, U.S.A. (since 2006)

SELECTED PEER- REVIEWED/REFEREED JOURNAL ARTICLES
(** means corresponding author, IF: 5-Year Impact Factor*)

- **Amy Hui-Mei Lin***, Byung-Hoo Lee, and Wei-Jen Chang. 2015. Small intestine mucosal α-glucosidase: a missing feature of in vitro starch digestibility. Food Hydrocolloids. (Accepted in March, 2015) (IF 4.355)
- Julian D. la R.-Millan, **Amy Hu-Mei Lin**, P. Osorio-Díaz, E. Agama-Acevedo, B. R. Hamaker, L.A. Bello-Perez, 2014. Influence of annealing flours from raw and pre-cooked plantain fruit on cooked starch digestion rates. Starch-Stärke, DO-10.1002/star.201400136 (IF 1.583)
- **Amy Hui-Mei Lin***, Zihua Ao, Roberto Quezada-Calvillo, Buford L. Nichols, Chi-Tien Lin, Bruce R. Hamaker. 2014. Branch pattern of starch internal structure influences the glucogenesis by mucosal Nt-maltase-glucoamylase. Carbohydrate Polymers. 111:33-40 (IF 4.330)
- B.-H. Lee, **Amy Hui-Mei Lin**, B. Nichols, K. Jone, D.R. Rose, R. Quezada-Calvillo and B. Hamaker. 2014. Mucosal C-terminal maltase-glucoamylase hydrolyzes large size starch digestion products that may contribute to rapid postprandial glucose generation. Molecular Nutrition & Food Research, 58(5) 1111-1121 (IF: 5.100)
- B. Lee, L. Bello-Perez, **Amy Hui-Mei Lin**, C. Y. Kim, B. Hamaker. 2013. Importance of location of digestion and colonic fermentation of starch related to its quality. Cereal Chemistry, 90(4)335-3423 (IF 1.388)
- M. Diaz-Sotomayor, R. Quezada-Calvillo, S. Avery, S. K. Chacko, L. Yan, **Amy Hui-Mei Lin**, Z. Ao, B. Hamaker, B. L. Nichols. 2013. Maltase-glucoamylase modulates gluconeogenesis; Sucrase-isomaltase dominates starch digestion glucogenesis. Journal of Pediatric Gastroenterology and Nutrition, 57(6) 704-12 (IF 2.737)

  Note: The diagram was selected as the cover of the Journal
- Sushil Dhital, **Amy Hui-Mei Lin***, Bruce R. Hamaker, Michael J. Gidley, and Anbuhkani Muniandy. 2013. Mammalian mucosal α-glucosidases coordinate with α-amylase in the initial starch hydrolysis stage to have a role in starch digestion beyond glucogenesis. PLoS One 8(4), e62546 (IF 4.015) Note: Australian Institute of Food Science's best paper published in a peer review journal (2013)
- **Amy Hui-Mei Lin***, Byung-Hoo Lee, Buford L. Nichols. Roberto Quezada-Calvillo, David R. Rose, D. R. Naim, Bruce R. Hamaker. 2012. Starch source influences dietary glucose generation at the mucosal alpha-glucosidase level. Journal of Biological Chemistry, 284(44):36917-36921 (IF 4.863).

- **Amy Hui-Mei Lin***, Bruce R. Hamaker, Buford L. Nichols. 2012. Direct starch digestion by sucrase-isomaltase and maltase-glucoamylase. Journal of Pediatric Gastroenterology and Nutrition, 55 Suppl. 2, S43-45 (IF 2.737)
- **Amy Hui-Mei Lin***, Buford L. Nichols, Zihua Ao, Roberto Quezada-Calvillo, Stephen E. Avery, Lynn Sim, David R. Rose, Hassan Y. Naim, Bruce Hamaker. 2012. Unexpected high digestion of cooked starch by the Ct-maltase-glucoamylase small intestine mucosal α-glucosidase subunit. PLoS One 7(5):e35473 (IF 4.015)

Current Support

- New faculty start-up support, University of Idaho, $100,000, 2014-2017
- Endowment support for potato research, Best American Foods, $34,000, 2014-2015
- Identifying how potato skin waste produced in Idaho modulates postprandial glycemic response, UDSA/Idaho State Department of Agriculture/ 2015 Idaho Specialty Crop Block Grant Program, $83,030, 2015-2017
- Investigating susceptibility of selected resistant starch to mammalian mucosal α-glucosidase through and in vitro enzymatic system, Ingredion Corporation, $10,000, 2015
- Starch digestibility, Mayfal International Corporation, $15,000, 2015-2016

Provide documentation of other sector resource commitments: See attached letters of support from J.R. Simplot, and ConAgra Lamb-Western.

Jeffri Bohlscheid, PhD
J.R. Simplot Company
P.O. Box 1059, Caldwell, Idaho
83607-1059
208 454-4641 Business
509 592-5340 Cell
208 454- 4685 Fax

Idaho State Board of Education
Higher Education Research Council
Idaho Incubation Fund Program

Re: Letter of support for "Developing all-natural low GI potato" proposal

Dear Council Members:

The J. R. Simplot would like to support the "Developing all-natural low GI potato" proposal submitted to you by Dr. Hui-Mei (Amy) Lin of the University of Idaho. Her research efforts are strongly aligned with the interests of the J. R. Simplot Company in developing increasingly more nutritious products from potatoes. As a major processor of one of the most important agriculture crops in the state, we are keenly aware of the need for supporting these critical efforts to support the state economy.

The J. R. Simplot Company is committed to supporting Dr. Lin's efforts. We will provide potato samples as needed, as well as provide active guidance and assistance to project. From our position as long term potato processor we can provide key insights to needs and opportunities of the project's objectives and goals from an industry perspective. Depending upon the progress of the project we may also be able to provide technical assistance with scale-up of processes in our technical center pilot plant.

Glycemic response, resistant starch and gut health are important wellness aspects associated with high carbohydrate foods such as potatoes. Technological advances to increase the health promoting characteristics of potato-based product are therefore important to the Simplot Company. Strong preliminary data generated from the proposed research will provide the basis for the initiation of a commercialization partnership with us and the opportunity to develop new food products for existing and evolving market channels.

Sincerely,

Jeffri Bohlscheid, PhD
Senior Principal Scientist, J. R. Simplot Co.

ConAgra Foods Lamb Weston
Technical Center
2005 Saint Street
Richland, WA 99352
TEL: 509-375-5830
FAX: 509-375-5819

June 23, 2015

Dear Selection Committee Members,

I am writing to recommend full funding by the Idaho State Board of Education/Higher Education Research Council/Idaho Incubation Fund Program for the grant proposal entitled "Developing all-natural low GI potato". This research is valuable to the potato industry as it addresses the opportunity to produce potato-based foods with a low glycemic response/index, and thus improve the perceived healthfulness of these products.

While potatoes offer a good source of fiber and potassium, many potato-based foods are still perceived to be unhealthy in part due to their high carbohydrate content and associated high glycemic response. Evidence of this can be found in efforts to severely limit the frequency of which potatoes can be a component of school lunches. As noted by the authors of this grant proposal, a high glycemic response is associated with chronic diseases such as obesity and type-2 diabetes. Thus, strategies to lower the glycemic response of potato-based foods could be very helpful in decoupling them from a diet perceived as unhealthy. Moreover, minimally processed and "all-natural" foods are generally perceived as better-for-you, thus technologies to lower the GI of potato-based foods would be most beneficial if they are considered as minimally processed and/or "all-natural". A deeper understanding of ingredient and processing technologies to lower the glycemic response of potato-based foods offers multiple benefits, including:

- Enhanced profitability and sustainability for potato growers and processors
- Enhanced appeal of potato-based foods to a broader consumer base
- Promotes the healthy image of potatoes and potato-based foods

In conclusion, ConAgra Foods Lamb Weston strongly supports the development of ingredients and processing technologies to lower the glycemic response of potato-based foods. Such advances have the potential to dramatically improve the perceived healthfulness of these products and expand their appeal to a broader consumer based. We strongly support and encourage full funding of this research.

Kindest Regards,

Christian D. Rhynalds

Christian D. Rhynalds
Vice President – Research and Innovation