

UNIVERSITY COUNCIL
PLANNING AND PRIORITIES COMMITTEE
ITEM FOR INFORMATION

PRESENTED BY: Christian Willenborg, Chair, Planning and Priorities Committee

DATE OF MEETING: January 30, 2025

SUBJECT: **Provisional Centre for Bioproduct Development and Commercialization**

ACTION: **For Information Only**

SUMMARY:

Dr. Bishnu Acharya, Saskatchewan Ministry of Agriculture Endowed Research Chair in Bioprocess Engineering, submitted a revised proposal to the Planning and Priorities Committee (PPC) for a Provisional Centre for Bioproduct Development and Commercialization on January 15, 2025.

Climate change, global warming and the adverse impact of non-biodegradable material and chemicals to our environment has shifted focus on the development of renewable and bio-based materials. The development of bio-based material utilizes renewable feedstock originated in land (forestry biomass and residue, agriculture biomass, municipal waste) and ocean (algae, aquaculture waste). The provinces in the Prairies region have abundant supply of agricultural biomass (such as wheat straw, flax and hemp stalk, starch after protein extraction, canola meal and other agro-processing by-products) that if used efficiently could provide renewable feedstock for the growing bioeconomy in Saskatchewan, Canada and around the world. The main objective of the Centre is to drive the innovation and commercialization of value added bioproducts in collaboration with different stakeholders such as Industry, Government and Farming Community and Associations.

CONSULTATION:

The proposal for a Provisional Centre for Bioproduct Development and Commercialization was brought forward at the April 30, 2024, Centres Subcommittee, followed by a presentation at PPC on May 15, 2024. After completing suggested revisions to the proposal by both committees, Dr. Acharya returned to PPC on January 15, 2025, where the committee had the opportunity to review the revisions, ask questions and participate in a fulsome discussion. PPC voted unanimously in favour of the proposal.

As per item 4.3 in the [Centres Policy](#), a progress report must be submitted to the Centres Subcommittee in January 2026 with a full proposal to be submitted and approved by January 2027.

ATTACHMENTS:

- Proposal and consultation information for the Provisional Centre for Bioproduct Development and Commercialization



MEMORANDUM

TO: Bishnu Acharya

FROM: Vicki Squires, Chair, Planning & Priorities Committee (PPC)

DATE: May 22, 2024

RE: **Proposal for a Provisional Centre for Bioproduct Development and Commercialization**

Thank you for attending the meeting of the Planning and Priorities Committee on May 15, 2024 to present the proposal for a Provisional Centre for Bioproduct Development and Commercialization. The Committee was supportive and appreciates the work being done to answer industry demand. However, they would like to see some revisions addressing the feedback below to aid in your success. Please consider these items and resubmit the proposal to Dr. Vicki Squires, Chair of PPC.

It is recommended that the following be included in the revised proposal:

- Letter of support from the College of Agriculture and Bioresources
- Consideration of existing provincial infrastructure for bioproduct development
- Start-up operation funding plan
- Clearly formed reporting structure
- Confirmation of the department's commitment for assignment of duties to be focused on managing the centre
- Advisory committee should comprise of representatives from the Colleges of Agriculture and Engineering, industry, and potentially provincial government
- Letters of support confirming industry demand and support for such a centre, and other stakeholders are suggested, but not required

PPC has chosen to defer the motion to approve the provisional centre until the proposal is resubmitted. PPC looks forward to seeing a revised proposal.

Thank you for your important work in this field.

Cc: Jafar Soltan, Associate Dean, Engineering
Angela Lieverse, Professor and Chair, PPC Centres Subcommittee
Jacquie Thomarat, Director of Governance



MEMORANDUM

TO: Bishnu Acharya

FROM: Angela Lieverse, Chair, Centres Subcommittee of Planning & Priorities Committee (PPC)

DATE: May 2, 2024

RE: **Feedback on the Proposal for a Provisional Centre for Bioproduct Development and Commercialization**

Thank you for attending the meeting of the Centres Subcommittee on April 30, 2024, to present the proposal for a provisional Centre for Bioproduct Development and Commercialization.

The Subcommittee commended the proposal. They agreed that it can go forward to PPC on May 15, 2024, for consideration. Following PPC's approval, the documentation would be submitted for information only to University Council at the next possible meeting.

The letter of support from Dean Simonson was received by the Governance Office on April 26, 2024, so was not included in the package submitted to the Subcommittee on April 30th. Thank you for getting it to us; the letter will be included in the materials for PPC on May 15th.

The Subcommittee requested the following amendments:

- Determine the governance structure for the provisional period;
- Provide a budget;
- Describe the role of the managing director (i.e., faculty?);
- Identify and include key success factors to measure against in years one and two.

Thank you for your consideration of this feedback. The deadline for PPC materials is 12:00pm on May 9, 2024, to Jacquie Thomarat.

c: Jafar Soltan, Associate Dean, Engineering
Jacquie Thomarat, Director of Governance

CENTRE FOR BIOPRODUCT DEVELOPMENT AND COMMERCIALIZATION [CBDC]

Interim Director

Bishnu Acharya, PhD, P.Eng.

Saskatchewan Ministry of Agriculture Endowed Research Chair in Bioprocess Engineering
Associate Professor, Department of Chemical and Biological Engineering

Objectives and Goals

The climate change and global warming and adverse impact of non-biodegradable material and chemicals to our environment has shifted focus on the development of renewable and bio-based materials. The development of bio-based material utilizes renewable feedstock originated in land (forestry biomass and residue, agriculture biomass, municipal waste) and ocean (algae, aquaculture waste). The provinces in the Prairies region have abundant supply of agricultural biomass (such as wheat straw, flax and hemp stalk, starch after protein extraction, canola meal and other agro-processing by-products) that if used efficiently could provide renewable feedstock for the growing bioeconomy in Saskatchewan, Canada and around the world. The main objective of the Centre is to drive the innovation and commercialization of value added bioproducts in collaboration with different stakeholders such as Industry, Government and Farming Community and Associations.

Need for the Centre

The Saskatchewan 2030 growth plan states increasing crop production to 45 million metric tonnes; agriculture value-added revenue to \$10 billion by increasing canola processing to 75% and 50% processing of pulse crops while delivering on the climate change strategy. This processing facility will be producing a significant number of by-products such as air-classified pulse starch, canola meal, straws and fibers, valorization of which are critical to achieve the processing target sustainably. These by-products are great resources for producing high value chemicals, materials, and bioenergy. While Saskatchewan Food Centre including Canadian Feed Centre, Global Institute of Water Security, Livestock and Forage Centre of Excellence supports the development of food sector, there is a lack of pilot facility that supports the development of non-food applications.

It is expected by 2050, 50% of the consumer products will be bio-based. According to McKinsey Global Institute report, direct economic impact of Bio-Revolution in 10-20 years could reach to \$4 trillion per year, with half of this impact in agriculture and food, consumer products and services, and materials and energy production. Even though, Canada has huge opportunity, the growth of bioeconomy is slow. Canada's First Bioeconomy Strategy¹ published in 2020 emphasizes on creating an ecosystem that focuses on value chain creation, job training and skill development. Canada's bioeconomy is estimated to require 65,000 workers by 2029 as per BioTalent Canada report (2021)² with more than 50% expected in R&D and manufacturing sector. The report further states that the need for HQP will outpace the availability with

¹ https://www.biotech.ca/wp-content/uploads/2022/01/National_Bioeconomy_Strategy_EN-compressed.pdf

² <https://www.biotalent.ca/wp-content/uploads/BioTalent-Canada-LMI-National-Report-13OCT2021-1.pdf>

75% shortage in bio-manufacturing and bioprocessing area. Quoted from the report “*Candidates will need a wide variety and mix of skills, specializations and educational credentials, and many employers will find it difficult to find candidates who fulfill every qualification they’re seeking.*” The Centre will work towards filling this gap by developing trainees with the career-ready and entrepreneurship skills to grow the bioeconomy sector in Canada.

Sustainable entrepreneurship has been identified as a core element for successful transformation to the bioeconomy. In general, this has been addressed by providing entrepreneurship training in higher education without the bioeconomy context. It is now accepted that the entrepreneurship in bioeconomy requires discipline-specific training. The generalized approach has created a gap to understand how the entrepreneurial opportunities arise in the bioeconomy and the skills and competencies needed to act on such opportunities. The framework developed by Davidson³ that introduces the concept of external enablers (technological breakthroughs, socio-cultural and environmental developments, regulatory changes) to trigger entrepreneurial activity seems to align well with the bioeconomy context. Leveraging the well-developed Disciplined Entrepreneurship process, the Centre will document the process and steps of ongoing efforts to develop an understanding of a commercialization approach for value-added bioproducts specific to Canadian context. Because the use of bioproducts in a circular economy is new, there are a lot of unknowns in terms of the commercialization process to mitigate the risks and regulatory requirements. The proposed Centre will provide the HQP a discipline-specific training and opportunities to pursue entrepreneurship via existing programs or by collaborating with industries to explore the commercialization of the process and products.

The proposed Centre for Bioproduct Development and Commercialization will complement to the existing facilities in the Province and the University to provide a sustainable agro-processing and generation of new value-added industries. The goal of CBDC will be:

- Promote development of clean technology and green processes for the generation of high value bioproducts.
- Train high quality personnel to contribute to the growing value-added sector in the Prairies.
- Enhance the overall sustainability of food production by utilizing agriculture biomass and agro-processing by-products for developing high value bio-based material, chemical and energy.
- Support growth of existing industries and new start-ups.
- Develop collaboration between industries and other stakeholders for the common goal.

The Centre will build upon existing capacity in the College of Engineering, College of Agriculture, College of Arts and Sciences and other Centers in the University and in the province.

Industry Demand

Bioprocessing and bioproduct development for non-food application is an emerging area for which limited support are available to industries in the Prairies and in general in Canada. The Centre will support the

³ Davidsson, P. (2015). Entrepreneurial opportunities and the entrepreneur-ship nexus: A re-conceptualization. *Journal of Business Venturing*,30(5),674–695.

activities of companies such as Red Leaf Pulp, Prairie Clean Energy, Blue Goose Biorefineries, KF Hemp, Blue Sky Hemp, Pacific Ridge Corporation, TuniStrong Technologies Inc., Titan Clean Energy Projects, NULIFE Green Tech., Spectrum Technologies, Pyro Green Gas Inc., Hey Golding Inc., Tidewater Renewables Inc., Sask Mustard, Canola Processors (Cargill, Richardson, Viterra, Milligan Biofuels), Oat processors, Pulse processors. The Centre will be working closely with Agriculture Associations funding partners, Government of Saskatchewan, NRC, AAFC and other stakeholders. **The Centre will leverage resources at Saskatchewan Food Industry Development Centre, Prairie Agriculture Machinery Institute (PAMI), and Saskatchewan Research Council (SRC) to collectively support** the expansion of the existing industries and attract new industries to invest in Saskatchewan.

Rationale/Necessity for Seeking Provisional Status

The creation of CBDC with provisional status will allow us to formalize our discussions with various stakeholders identified above and understand their level of participation and contribution to the Centre. This will also give an opportunity to work on our goals and refine ideas for the full proposal.

Preliminary Memberships

Associate Members: Dr. Ajay Dalai, Dr. Venkatesh Meda, Dr. Oon-Doo Baik, Dr. Lope Tabil, Dr. Lifeng Zhang, Dr. Jafar Soltan, Dr. Catherine Niu, Dr. Chris Zhang, Dr. Kerry McPhedran, Dr. Darren Korber, Dr. Michael Nickerson, Dr. Yongfeng Ai, Dr. Martin Reaney, Dr. Rex Newkirk, Dr. Scott Wright, Dr. Ramaswami Sammynaiken, Dr. Lee Wilson.

Affiliate Members: The affiliate members will be from the other centers in the University, and Research Scientist at NRC, AAFC, and Food Centre.

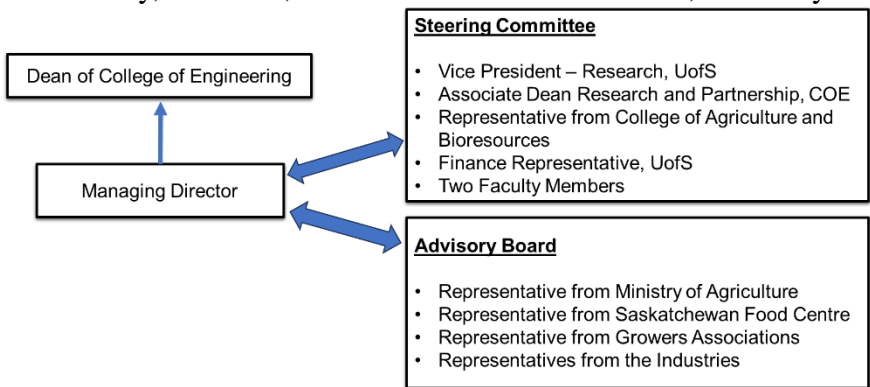
External Partners

Advisory Board Members

- **Internal:** Managing Director, & Associate Dean of Engineering for Research and Partnership
- **External:** Industry and community representatives from following organizations – Richardsons, Cargill, AGT Foods, CO-OP refinery, Vieterra, Saskatchewan Food Centre, Ministry of Agriculture, Innovation Saskatchewan, AgWest, Growers Association.

Proposed Governance Model

The Managing Director will be responsible for the day-to-day operation of the Centre including managing budget, supervising staffs, and developing partnerships



with the stakeholders. Managing Director will report to the Dean of Engineering. The Steering Committee

will provide guidance to the Managing Director in making decision on the core activities of the Centre including annual budget, equipment purchase and expansions. Managing Director will have 5 years term and can take position for two terms. A vice-Director will be appointed by the Steering Committee on the beginning of 4th (or 8th) year of the Managing Director. The two-year overlap will support smooth transition. The service could be built into the assignment of duties for the Director in consultation with the Department and the College. The Advisory Committee will provide guidance on the research themes and support Managing Director in building partnerships. A research and administrative staff and technician will be hired to support the research activities at the Centre.

During the provisional period, the Managing Director will be reporting to the Dean and Associate Dean of Research and Partnership of Engineering. A biannual report will be submitted describing the activities and outcomes. The steering committee and the advisory board will be developed for full Centre stage.

Anticipated and Secured Financial and Other Resources

The discussion is being carried out with the College of Engineering Associate Dean Research and Partnership for allocating space in bioprocessing area (1A48) for the Centre. The plan is to apply for CFI-Infrastructure Funds (40%) for renovation and purchase of equipment. Initial discussions were made with the Innovation Saskatchewan, Value Added Division of Ministry of Agriculture, and other key stakeholders on providing the supporting funds (40%). The equipment supplier will be providing the remaining 20%. A stakeholder meeting is planned to discuss the Centre and their contributions. In the first phase, the Centre will focus on space and pilot equipment with capabilities for fiber processing and high pressure and temperature operations for activities such as extraction, and fractionation.

It is anticipated that the Centre will generate revenue by providing contracting services to industries. Additionally, partnership with industries for funding through ADF, IRAP, Innovation Saskatchewan and Federal funding programs will be other revenue sources. An administrative staff, a technician, and a research staff will be hired for the operation of the Centre. Additional staffs will be hired depending on the work volume. When the Centre is fully functional, the total expense for the operation is estimated at \$250,000, where \$200,000 will be for the salary of the staffs and \$50,000 for the maintenance of the equipment.

During the provisional period, a research associate funded from existing research funds of managing director will be hired and be responsible for supporting the research and outreach activities.

Proposed Timeline for Submitting the Required Documentation for Obtaining Formal Approval

The plan is to submit the full proposal for approval in April 2026 to have the full Centre status starting January 2027. During this time, the proposal will be developed for CFI, and further consultation will be undertaken to generate support for the Centre.

The key success factor that will determine the transition from provisional to full Centre will be acquiring the funding or confirmation of support, acceptance from industries in engaging with the Centre for their research needs.

Stakeholders Consulted

University: Dr. Baljit Singh, Dr. Jafar Soltan, Julian Demkiw, Tonya Wirchenko, Alix Hayden, Dr. John Root, Dr. Scott Wright, Dr. Jerome Konecsni, Dr. Rex Newkirk, Dr. Ramaswami Sammynaiken, Dr. Ajay Dalai, Dr. Suzanne Kresta, Dr. Tate Cao, Mrs. Lisa Leis.

Government: Dr. Godwin Pon (Value Added Division), Mr. Kevin Chung (Innovation Saskatchewan)

Externals: Dr. Jay Robinson (Global Agri-food Advancement Partnership), Dr. Benjamin Scott (Global Institute of Food Security), Dr. Mehmet Tulbek (Saskatchewan Food Centre)

Industry: Red Leaf Pulp, Prairie Clean Energy, Richardsons

Current Research Activities that Will Move to The Provision Centre

Mission: The bioprocess engineering within the Saskatchewan Ministry of Agriculture Research Chair Program focuses on developing innovative process and technologies for food and bioproduct processing and the conversion of low-value and underutilized biomass to high value bioproduct for food, material, chemical and energy applications.

The research program is divided into four research theme which collectively advances the knowledge of bioprocessing and aligns with the focus of industries and the province of Saskatchewan. These research themes are a) Biorefining of agricultural biomass for developing cellulose, lignin and hemicellulose based bioproducts; b) Synthesis of bioplastic and biofoam for food and non-food packaging materials; c) Assessing the feasibility of biomass for bioenergy and biofuels; d) Develop new processing technologies for producing functional food and feed from agricultural biomass.

Summaries of each research themes, progress, and plans for next year are discussed below:

[Theme 1] Biorefining of agricultural biomass for developing cellulose, lignin and hemicellulose based bioproducts: Lignocellulosic biomass such as wood and agriculture residue are composed of mainly cellulose, hemicellulose, and lignin. The structure of biomass significantly varies between the types and the geographical origin. The effectiveness of the process for the separation of macromolecules and their yield varies with the biomass source. These variations greatly affect the understanding of the biomass-process-bioproduct relationship, which has been a subject of continuous investigation. Additionally, higher amounts of mineral substances as compared to wood can affect the quality of the product and the synthesis steps that will require a trade-off between the cost of purification and value of final product. Specific projects includes a) Study the effect of the common fractionation process and conditions on the resulting structures of cellulose, hemicellulose, and lignin for different types of biomass; b) Evaluate the synthesis of high value cellulose based intermediate products; c) Evaluate the synthesis of high value lignin based intermediate products; d) Evaluate the synthesis of high value hemicellulose based intermediate products; e) determine environmentally friendly methods for handling the waste by-products; f) Conduct the techno-economic and life cycle analysis to determine the economic feasibility and environmental impact of the product and/or process.

Progress: A number of project has been developed in this area of planned research.

- In a project with Red Leaf Pulp, our research is supporting the optimization of the wheat straw pulping process, and application of by-product streams. Based on our research output, Red Leaf Pulp are conducting their pilot scale study. The project is funded by NSERC-Alliance program.
- In a project with Richardson Milling Limited, we have demonstrated the feasibility of extracting high value chemicals from oat hulls with potential application in food, chemicals, and materials. We are collaborating in a ADF proposal and also looking for places to conduct pilot scale study for validating the process and generating samples for product development. The project is funded by Mitacs-NSERC program.
- In the ADF project that focuses on the fractionation of flax biomass, we are working on optimizing the pulping conditions and characterization of by-products to understand the effects of operating conditions on their properties. The project is funded by ADF program.
- In a project with TuniStrong Research Inc., we have demonstrated a process for production of completely bleached white tunicate pulp. This has been the bottleneck in the production of tunicate-based cellulose nanomaterials. The project is funded by Mitacs-Accelerator program.
- In collaboration with University of Prince Edward Island, we have conducted a comprehensive work on the synthesis of chitin from lobsters' shells. This is first of its work, where a detailed optimization work on the

demineralization and deproteination of the lobster shell to produce chitin has been carried out. The project is funded by Ocean Frontier Institute – Phase II.

[Theme 2] Synthesis of Bioplastics and Biofoams for Food and Non-food Packaging: The growing environmental issues with non-biodegradable petroleum-based plastics has led to the research and development of bioplastics. The government around the world also responded by developing policies to promote biodegradable plastics. However, challenges remain for bioplastics to meet the performance of the petroleum-based plastics. In other cases, bioplastic materials that are designed to match the mechanical and physico-chemical properties of petroleum-based plastics do not degrade completely under normal composting conditions. This has led to studies attempting to develop bioplastics with appropriate mechanical and physico-chemical properties and biodegradability. It covers the research related to the synthesis and characterization, biodegradation, development for packaging and smart applications, techno-economic and life cycle assessment, and policies related to the development of bioplastics. Specific project includes a) Study the interaction of polymer (starch, chitosan, protein, PLA, PHA) with filler material (cellulose, lignin) on the properties (mechanical, thermal, gas barrier, moisture absorption, density, biodegradability, UV protection) of the bioplastics and biofoam; b) Develop green chemical modification methods for the filler or polymer to improve the compatibility and overall properties of bioplastics; c) Fermentation of agriculture biomass to produce biopolymers; c) Design and develop materials with smart properties; d) Develop research capabilities for studying the biodegradability of the bio-based material; e) Carry out the techno-economic and life cycle assessment on the development of bio-based materials.

Progress: A number of project has been initiated to develop bioplastics using bio-based polymer (starch/chitosan/PLA/PVA) with cellulose nanocrystals as a filler material. We were able to develop a composition of these bio-based materials to develop bioplastic with smart properties such as tunable optical appearance and antimicrobial nature while obtaining higher mechanical and water barrier properties. A number of projects has been developed in this area of research:

- In a project with Titan Clean Energy Projects, we are synthesizing and conducting a comprehensive characterization of biochar filled composites with polylactic acid, and low-density polyethylene polymers. Based on the properties of the composites, we will then focus on the application. The project is funded by Mitacs-Accelerator program.
- In a project funded by SRI which focuses on the use of pulse starch in aerogels and biofoam materials, we have synthesized the aerogel and studied the effect of air classified pulse starch and isolated pulse starch on the properties of aerogel. While isolated starch showed better properties, we are further investigating how we can improve the properties of air-classified pulse starch.
- ADF and Discovery grant projects on use of starch, chitosan, cellulose nanomaterials, canola protein for bioplastic development is underway.
- In collaboration with TuniStrong Technologies Inc., we are investigating the application of biochar, lignin, and cellulose nanomaterials as a filler in concrete as a way to achieve carbon sequestration. This project is funded by Mitacs-Accelerator program.
- In collaboration with University of Guelph, we developed a formulation for 100% bio-based composite material with hemp fibers and studied its mechanical, thermal and water related properties.
- A laboratory has been set up to carry out extrusion and characterization for mechanical properties, melt-flow index, impact analysis, and biodegradability.

[Theme 3] Assessing the feasibility of biomass for bioenergy and biofuels: The abundant supply of biomass, including agricultural biomass, could be an alternative source for renewable power generation to meet the 2030 mandate of phasing out the traditional coal-fired electricity and achieving 90% non-emitting electricity. The overall objectives of this research area are to establish the grading system for agriculture biomass, develop innovative

technology for pre-treatment and conversion to heat, electricity, biogas, renewable hydrogen, and bioethanol. A number of processes including torrefaction, hydrothermal carbonization, pyrolysis, gasification, combustion, anaerobic digestion, and fermentation will be investigated, and their technical feasibility and carbon footprint will be determined.

Progress: following project has been developed in this area –

- We are supporting Prairie Clean Energy in developing the energy pellets from flax biomass. We also collaborated with PCE and Mitsubishi in understanding the biogas production potential of agriculture biomass. Based on our results, Mitsubishi is conducting pilot studies. The project is funded by Mitacs-Accelerate program.
- In a project funded by ADF, we are characterizing a wide range of biomass available in Saskatchewan for energy applications including flax straw, hemp straw, canola straw, wheat straw, oat hulls, pea hulls. We are investigating the combustion properties of the raw, torrefied and steam exploded biomasses. The project is funded by ADF.
- We are investigating the feasibility of producing renewable natural gas from flax, hemp, and canola straw. The project is currently supported by my discovery grant.

[Theme 4] Develop new processing technologies for producing functional food and feed from agriculture

biomass: The research is focused on developing high value food and feed products from agriculture biomass and agro-processing waste utilizing green extraction methods (sub-critical water extraction, green solvent treatment) and biotechnology. The specific objectives are a) Optimization of extraction process and characterization of extracts; b) Investigate the effectiveness of polyphenols for antimicrobial, antioxidant, and food additives properties; c) Demonstrate the efficient pre-treatment methods to depolymerized agriculture biomass to produce fermentable hydrolysate; d) Demonstrate the microbial process for lipid and protein; e) Techno-economic and life cycle assessment to determine the economic feasibility of the process.

Progress:

- We have made significant progress in the development of Canola Meal Extracts as a replacement of yeast extracts in microbial fermentation. We have shown its effectiveness in a fungus (*Mortierella Alpina*) and currently working with other microbial species. The project is funded by ADF and SaskCanola.
- We are working on developing process for hydrolysis of air-classified pulse starch for its use in microbial fermentation to produce ethanol and lactic acid.
- In collaboration with Richardson Innovation Centre, we investigated the use of hemicellulose extracted from oat hulls as a functional ingredient in bakery products. The project is funded by Mitacs-NSERC program.
- We submitted a US Provision patent on the extraction process and the composition of the Canola Meal Extracts.

Summary of all research projects and funding received

	Project Title	Project start (month / year)	Expected completion (month / year)	Funding agency (and file number where applicable)	Total funds approved
1	Agricultural and organic waste to value added bioproducts	May 2022	April 2027	NSERC-Discovery	\$ 195,000
2	Black Liquor from Straw Pulping Process: Characterization, Treatment and Valorization to Adhesive and Bioplastics	June-21	May-24	NSERC - Alliance	\$ 208,500
3	The Feasibility of flax biomass fractionation and conversion to high value products	Jan-22	Dec-24	ADF	\$ 325,000
4	Synthesis of arabinoxylan and furfurals from oat hulls	Jul-22	Jun-24	Alliance-Accelerate	\$ 120,000
5	Combustion studies of flax straw pellets	Sep-22	Aug-25	Mitacs - Accelerate	\$ 180,000
6	Development of biochar filled plastic composite materials	Sep-22	Aug-24	Mitacs - Accelerate	\$ 60,000
7	Production of high-quality CNC from tunicates	Sep-22	Dec-24	Mitacs - Accelerate	\$ 240,000
8	Comparison of wrapping materials for biomass bales	Jan-23	Dec-23	Industry	\$ 206,750
10	Feasibility of biomass power generation in Saskatchewan	Apr-23	Mar-26	ADF	\$ 175,000
11	Canola meal extracts for microbial fermentation	Apr-23	Mar-26	ADF + SaskCanola + NSERC/Mitacs	\$ 630,000
12	High temperature and pressure reactors and analytical tools for processing and synthesis of bioproducts from biomass	Apr-23	Mar-23	CFI-JELF	\$ 374,001
13	Valorization of oat hulls	April-24	March – 27	ADF + Richardson	\$337,500
14	Value-added processing of pulse starches from seeds to industrial products through multi-disciplinary approaches - Biofoam from starch after protein extraction.	Sept 21	April 2025	Sask. Strategic Research Initiative	\$192,500
15	Bio-ReFuM (Applied and accepted for full proposal from USask)	April-25	March-31	NSERC-CREATE	\$1,650,000

Proposal for Provisional Centre

16	Centre for Bioproduct Development and Commercialization (Applied- EOI)	April-2026	March-2027	CFI-IF	\$4,000,000
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Summary of HQP

name of graduate student (supervised and co-supervised)	degree pursued
Bashu Gautam (Co-supervised)	Ph.D.
Yomi Wilfred (Co-Supervised)	Ph.D.
Kehinde Falua (Supervised)	Ph.D.
Nirpesh Dhakal (Supervised)	Ph.D.
Sumana Majumder (Co-Supervised)	Ph.D.
Ali Hashemi (Co-supervised)	Ph.D.
Shivangi Jha (Co-Supervised)	Ph.D.
Amin Babaeighazvini (Supervised)	Ph.D.
Raj Dahal (Co-Supervised)	Ph.D.
Michael Kozma (Co-supervised)	Ph.D.
Mohamed Aboughaly (Supervised)	Ph.D.
Anupriya Senthilkumaran (Co-Supervised)	M.Sc.
Anamol Pokharel (Supervised)	M.Sc.
Aishwarya Gurung (Supervised)	M.Sc.
Rasoul Haji Khanmirzaei (Supervised)	M.Sc.
Ashutosh Dalai (Supervised)	M.Sc.
Rawan Wattan (Co-supervised)	M.Sc.
Ravan Wahid (Supervised)	M.Sc.
Mehdi Masoudi (Supervised)	M.Eng.
Dafchahi Mostafa (Supervised)	PDF
Amin Babaeighazvini (Supervised)	PDF
Piyali Dhar	PDF
Onu Onu Olughu	PDF
Bahareh Vafakish	PDF
Susan Crush	Research Assistant
Zahra Rezazadeh Taloukolaee	Research Assistant
Maia, GABOURG	Research Assistant
Rahman Mostafizar (Supervised)	Research Assistant
Ravi Patel (Supervised)	Research Assistant

May 29, 2024

Dr. Vicki Squires
Chair, Planning & Priorities Committee (PPC)
University of Saskatchewan

Dear Dr. Squires,

Subject: Confirmation of Commitment for Managing the Provisional Centre for Bioproduct Development and Commercialization

I am writing to formally confirm the Department of Chemical and Biological Engineering's commitment to assigning Professor Bishnu Acharya to manage the newly established Provisional Centre for Bioproduct Development and Commercialization.

Professor Acharya's role within our department has been primarily focused on research, with minimal undergraduate teaching responsibilities. To support the successful development and operation of the Provisional Centre, Professor Acharya will dedicate a significant portion of his research time to managing the Centre's activities. His extensive experience and expertise in bioproduct development and commercialization make him an ideal candidate for this critical role. As the Centre progresses and its needs evolve, we will ensure that Professor Acharya's duties are adjusted accordingly.

Our department is fully supportive of this initiative and will accommodate any necessary changes to his assignment of duties to align with the Centre's requirements. We are confident that under Professor Acharya's leadership, the Provisional Centre for Bioproduct Development and Commercialization will achieve its goals and significantly contribute to the University's strategic priorities.

Please feel free to contact me if you require any further information or clarification.

Sincerely,



Oon-Doo Baik, Ph.D., P.Eng.
Professor and Head

Department of Chemical & Biological Engineering
College of Engineering, University of Saskatchewan
Room 3B48.5, Engineering Building, 57 Campus Drive
Saskatoon, SK, S7N 5A9, Canada
Tel: (306)966-5320



October 08, 2024

Dr. Bishnu Acharya
College of Engineering

Re: Letter of support for a provisional Centre for Bioproduct Development and Commercialization

Dear Bishnu

Thank you for the opportunity to comment on the proposal for a provisional Centre for Bioproduct Development and Commercialization. I reviewed the proposal and recognized many strong, existing and potential linkages with people and activities in the College of Agriculture and Bioresources.

As you know, especially given your partial appointment in the Department of Food and Bioproduct Sciences (FABS) in this college, the College of Agriculture and Bioresources (AgBio) is highly invested in bioprocessing research. There are no fewer than 6 full-time faculty members in this college whose research programs are dedicated to processing of bio-materials. Processes can include a range of unit operations, with the goal of creating new ingredients, a new process or new consumer goods. Often, specific processes are explored in an effort to improve a material's functionality, and the new material or operation(s) might find applications in the food, feed, non-food or industrial markets.

AgBio has a number of facilities that are dedicated to processing of bio-materials. The [Canadian Feed Research Centre](#) has the largest volumetric capacity with various pieces of [equipment](#). Other facilities include the [Bioprocessing Pilot Plant](#), the Meat Processing Pilot Plant and the Fermentation Lab in the Department of Food and Bioproduct Sciences. Each facility has a wide range of equipment to perform various operations on different bio-materials. In addition, researchers maintain and operate other specialized equipment within lab space that is dedicated to their research programs.

AgBio (and indeed the university) encourages the efficient use of equipment and space, and this should motivate us to seek synergies and find ways to limit duplication. Depending on the specific research that is planned within the provisional centre, it is possible that there will be equipment within AgBio labs that could help to support this work. AgBio is happy to collaborate and welcomes researchers from across campus to access shared equipment within the college.

Commercialization of technologies evolving from research in AgBio continues to be a priority. Recently, Ms. Sara Lui (Sara) was hired as a Product Development Specialist in FABS, with the mandate of helping to transfer newly developed ingredients, products and processing technologies to industry. Sara will also engage directly with industry to help resolve specific challenges. This position is intended to be a shared resource, and it would be available to you. It would seem that there may be opportunities for Sara to participate in and support the commercialization activities within the proposed centre. I encourage you to reach out to Sara to explore ways that she can be involved.

Historically, faculty members within the College of Engineering have collaborated with colleagues in AgBio. There have been jointly conducted research projects, and colleagues reciprocate in serving on student advisory committees in each college. However, a structure that is able to integrate the people and formalize the sharing of infrastructure has not yet been established. AgBio recognizes the value of interdisciplinary work, and faculty in the College of Engineering have always been good partners. In discussions with the College of Engineering's Associate Dean Research and Partnerships, Dr. Jafar Soltan, we agree that an administrative entity that encompasses the full scope of the capabilities of personnel and bio-processing infrastructure within both colleges would be valuable. Such an administrative structure could also help to demonstrate the entirety of the capabilities at USask within this scope and could help to attract more research and personnel, among other benefits. Plans are actively underway to bring together this network of bioprocessing researchers to initiate a multi-college bioprocessing strategy which will formulate a vision for interdisciplinary bioprocessing research on campus. The motivation for such a multi-college initiative is consistent with the intended goals of the [Agriculture Signature Area](#): to create greater awareness of the collective research capabilities and strengths on campus, to support researchers working within the Agriculture Signature Area and to promote growth and expansion of research in agriculture. This strategy is expected to identify gaps in existing USask capacity and will also be useful in attracting additional support from provincial government and industry sources, as it will clearly identify where additional infrastructure is needed.

The College of Agriculture and Bioresources supports the development of the provisional centre with the expectation that during the next two years, proponents of the centre will participate in the development of the multi-college bioprocessing strategy described above. It is likely that the team developing the bioprocessing strategy will also propose an administrative structure to support the goals of the strategy. The proposed administrative structure may include something different or more than a fully approved Centre for Bioproduct Development and Commercialization. I hope that proponents of the provisional centre and members of the Planning and Priorities Committee of Council will consider the recommendations within the forthcoming bioprocessing strategy when the provisional centre is recommended/considered for full approval.

Please let me know if you have any questions, comments or concerns. I wish you the best of luck with the provisional centre.

Best regards



Trevor Crowe, PhD, P.Eng., PAg
Associate Dean, Research and Graduate Studies

Copies:

Dr. Jafar Soltan

Dean Angela Bedard-Haughn