

# STRATEGIC RESEARCH PROGRAM LIPID QUALITY AND UTILIZATION 2018-2023

## Introduction

Saskatchewan has a significant crop industry, producing high quality canola, flax, mustard, camelina (*Camelina sativa*), carinata (*Brassica carinata*), hemp and essential oil crops mainly for export as primary commodities. Additionally, oil is also a significant component of other crops like cereals and pulses.

New value added processing technologies have increased production economics of bioproducts, functional foods, nutraceuticals, and biofuels. Further increases in efficiencies and economics will be found by using these bioprocessing technologies to sequentially extract and fractionate seed components and develop a more complete seed utilization and processing strategies. Key target compounds have been identified in Saskatchewan crops and further work is needed to complete pre-commercialization work on processes for isolating these compounds. At the same time research into new target compounds from other Saskatchewan crops will be examined.

Some processing of canola, flax, mustard, essential oils, and other crops occurs in Saskatchewan and there is an opportunity to significantly increase value added uses of these crops by developing new processing technologies to extract novel products from oilseeds and other crops (e.g., functional foods, nutraceutical, and bio-products).

Research and development in lipid quality and utilization has been identified as a key component to increasing value-added processing in Saskatchewan. The program will focus on innovation in research to strengthen utilization of plant-based oils, fats, waxes, and other lipid based compounds derived from the fractionation of lipids from seed crops in Saskatchewan. A key thrust of this program will be developing technology packages to cost-effectively extract multiple compounds from seed for food and industrial uses.

## Goal

The long-term and strategic goal of this program area is to enhance value-added processing of crops grown in Saskatchewan through innovative process research in lipid quality and utilization.

## Research and Program Activities

The research focus of SRP Chair-LQU will be on lipids and lipid based compounds from Saskatchewan crops. In achieving the program goals, the chair will use a collaborative approach with food and bioproduct industry, plant breeders and other researchers with relevant expertise, as necessary. The Chair's major focus will be on the following:

- Assessment of quality and composition of Saskatchewan oilseed crops.
- Investigate extraction, clarification, and functionality of lipids from oilseed and other crops.
- Assessment of fractionation of oilseeds, functional lipids and essential lipid derived components from oilseed and other crops.

- Investigate material properties and characteristics of oils and lipid fractions.
- Utilization of lipids as components of food, functional foods, and nutraceuticals
- Develop technologies for utilization of oilseeds to produce bio products and industrial products.
- Collaboratively investigate the utilization of other bio-active molecules encountered through the fractionation of oilseed crops.
- Research the oxidative stability and preservation of oilseed meals, oils and lipid fractions.
- Teach graduate and undergraduate classes while not exceeding 10% of the time commitment.
- Supervise graduate students.
- Collaborate with industry to ensure commercial relevance of research and to support the growing value added industry arising from oilseed and lipid utilization.
- Conduct other research to address emerging needs of the Saskatchewan oilseed processing industry.
- Identify technologies with possible commercialization potential and advantageous applications for Saskatchewan processors.
- Develops methods for authentic verification of oils produced by Saskatchewan crops.

### **Program Outputs**

- Proprietary technology and knowledge in novel applications (e.g. new products, extracts, and processes) for oilseeds and lipids derived from Saskatchewan crops.
- Scientific knowledge and understanding of factors affecting oilseed processing, lipid quality, functionality and utilization.
- Quality attributes and methodologies for assessing lipid quality in Saskatchewan crops. This includes the study of authenticomics of oilseeds.
- Improved preservation techniques for oilseed meal, oil and lipid fractions.
- Scientific and peer reviewed manuscripts on lipid quality and utilization.
- Undergraduate and graduate level classes further developing oilseed processing and lipid quality and utilization.
- Building stronger industry collaborations and integrating companies into projects
- Delivery of industry focused workshops.

### **Desired Outcomes**

- More diverse utilization of plant based lipids derived from SK commodities.
- Increased value and viability of the Saskatchewan food, feed, industrial and bioproduct industries.
- Highly qualified people (HQP) in lipid quality and utilization.
- Enhanced investment into Saskatchewan bio-based processing industries.
- Deployment of novel technologies for Saskatchewan processors.

- Technology for verification of the origin of oils produced by Saskatchewan crops through authenticomics.