

Characterization, modification and commercialization of lentil bran as a food ingredient

Dr. Mehmet Tulbek
 Alliance Grain Traders

SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$100,000.00	Completed	January 2014 – December 2015	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF)	\$200,000.00

Project Description

Lentils are a major food crop produced in Western Canada and utilized as a staple food in many countries globally. Lentils are processed as a value added crop and marketed as a prime product, such as split red lentils, in global food markets. As a result of processing, lentil hulls are produced as a coproduct and utilized as a feed ingredient. However lentil hulls are a rich source of dietary fibre, protein, and starch as well as phenolic compounds, such as tannins and other antioxidants.

Phenolic compounds originating from edible and non-edible plant parts possess antioxidant activity and display the capability to inhibit or delay the oxidation of lipids, proteins, and DNA by affecting the initiation or propagation of oxidizing chain reactions. Natural phenolic antioxidants can scavenge reactive oxygen and nitrogen species thereby preventing the onset of oxidative diseases in the body. A positive correlation between the consumption of phenolic-rich foods and a decrease of several chronic diseases has been shown to exist from epidemiological studies.

Leguminous seeds are generally rich in phenolic compounds, including condensed tannins. The antioxidant activity of phenolic compounds extracted from leguminous seeds has been investigated using several in vitro chemical assays. Lentils are a leguminous seed that have high levels of natural antioxidants. A number of studies have confirmed the high antioxidant potential arising from tannin constituents present in plant extracts.

The objectives of this research were to remove protein and starch and conduct purification trials on lentil bran to isolate phenolic compounds and tannins in a solution and dry fibre as an isolated dried fibre ingredient for use in bread and pet food applications.

During the second phase of this project, the AGT Foods R&D team worked on utilization of lentil fibre based on the purification observations conducted in 2014. Lentil fibre was purified in two major streams as lentil fibre (45% crude fibre) and high fibre lentil flour (15% crude fibre). These two streams were analyzed and utilized in dough rheological tests and in bread and pet food applications. In product formulations total phenolic, total flavonoid, and condensed tannin contents of these products were measured and lipid oxidation was measured in terms of shelf life.

Outcome

Results indicated that lentil fiber can be used at 2.5% in bread and cookies and up to 15% in canned pet food applications. Minor improvements were observed based on shelf life stability. Based on the results lentil fiber and phenolics may have limited low level antioxidant capacity which can influence product shelf life.

Research Objective

OBJECTIVE 1

To remove protein, starch and conduct purification trials on lentil brans to isolate phenolics, tannins in a solution and dry fibre as an isolated dried fibre ingredient in bread and pet food applications.