Canola Protein

Agricultural Utilization Research Institute

Minnesota Overview

Canola, or rapeseed, is a member of the genus Brassica, which also includes members such as broccoli and Brussels sprouts. The term canola (Canadian oil low acid) was given to rapeseed oil. Land dedicated to growing canola has grown significantly over the past decade. Over the last four years, about 20 million acres of land in western Canada and 1.5 million acres in the northern U.S. states are used for growing canola. Minnesota's average price for canola in 2016 was $17.60/cwt, slightly higher than the national average of $16.40/cwt.

Canola grown in this region is mainly for the production of canola oil. Canola oil is very healthy, high in Omega-9 monounsaturated fatty acid and low in saturated fatty acids. The meal remaining after extraction of oil is usable as animal feed. The meal is high in protein, and could be a good source of protein ingredient for food use.

Nutritional quality

The average protein content of canola is 20 percent. The nutritional quality of canola protein, in terms of PDCAAS, is comparable to that of soy protein. The essential and sulfur-containing amino acids, methionine and cysteine, in canola protein exceeds the nutritional requirements for both children and adults, while soy protein and casein both fall short of the requirements for infant nutrition and only casein meets the requirements for higher age categories.

Currently available protein ingredient forms

Canola meal, mostly used as animal feed, generally contains 37 to 41 percent protein. Protein from the meal is extractable in a number of ways, including alkaline pH and salt extraction. Each extraction uniquely impacts protein composition, functionality and digestibility. Unlike canola meal, canola protein flour, obtained via extraction and separation, are intended for human consumption. BNC is the only company that has been successful in developing commercial canola protein ingredients, utilizing unique, patented aqueous extraction processes.

Potential functionality and applications

In general, canola protein offers good functional properties, including water-binding capacity, solubility, emulsification, foaming and gelation, compared to other oilseed proteins. Cold-pressed canola flour is useful in sauces, sausages and baked goods. Canola protein can be an emulsifier for mayonnaise in the form of hydrolyzed canola meal. In their purified form, canola proteins also have potential as gelling agents. The napin fraction of canola protein appears to be better suited as a foaming agent over a wide-range of pH than cruciferin. Entrepreneurs interested in canola protein ingredients might want to consider different fractions and isolates for various applications.

Canola Facts

- Fairly high in protein
- Assist in diversification of crops
- Helps limit spread of disease and pests
- Genetically modified crop
- Grows in drier areas
- Costly processing steps
- Tolerance of a variety of soils

Advantages

Canola is better suited for areas with drier and shorter growing seasons than corn and soybean. Adding canola to crop rotations can diversify crops. Including canola in three-or four-year crops rotations can also limit the spread of disease and pests over time. For farmers interested in introducing canola crop rotation, the monetary and labor-related risks are minimized due to recently developed herbicide-resistant varieties. Utilizing canola protein, a byproduct of oil extraction, generates another source of income for canola producers. Using certain extraction methods, canola protein can be used in clean-label foods, increasing the market value.

Barriers

Canola is a genetically modified crop, thus manufacturers seeking to claim non-GM on their label cannot use canola protein ingredients. In Europe and Canada, canola ingredients are labeled as possible allergens. Removal of phenolic compounds is necessary. Phenolic compounds, extracted with the proteins, are problematic, as they impart a dark color and bitter, astringent flavor. Additional processing steps could increase the costs of production, while protein functionality may increase its value.

Further processing issues may include the variability of yields, the impact of growing conditions, and the negative impact that methods used to maximize oil extraction may have on protein extractability, functionality and nutritional quality.

Feasibility

Growing canola in Minnesota is a natural fit due to its preference towards cooler climates and a tolerance for a variety of soils. Reductions in canola price would potentially decrease the cost of canola protein production. The feasibility of commercial production, however, is dependent upon several factors, including antinutritive content, functionality, nutritional quality, consumer acceptance and most importantly, advancement in processing technologies.

The production of a high-value ingredient would compensate the reduced profit for lower oil yield, which may result in higher profit. Overall, the future of canola protein production is promising if advancement in extraction processes and functionalization is pursued.

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