Increasing faba bean use in pet food and aquaculture feeds

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
$145,035.70	Active	March 2018 – February 2023	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF); Western Grains Research Foundation	$416,193.70

Project Description

To determine the maximal inclusion limit of faba bean meal and optimally fermented faba bean meal in dog food; to determine the optimal inclusion of protein concentrate from unfermented and fermented faba bean meal for salmonid fish.

Outcome

Progress has been made in determining the safe inclusion of faba bean meal in dog food and faba bean protein concentrate in fish feed.

In dogs, a short-term seven-day feeding study using two different varieties of faba beans, both fermented with Candida utilis and unfermented, as novel pulse ingredients was compared to commercial grain-containing diets. The study demonstrated acceptability/palatability with no adverse health effects at an inclusion rate of ~30%. The longer-term, 28-day feeding study found similar results. All values remained within clinical norms. No adverse impact was noted on the health of dogs in either study.

In fish, semisolid fermented of faba bean meal can be air classified into course (starch) and fine (protein ~56%) concentrates. Scanning electron microscopy indicated that starch granules swell during fermentation possibly aiding air classification. Optimizing a cofermentation method of Candida utilis and Lactobacillus plantarum has reduced Anti-Nutritional Factors (ANFs). We have found good reduction of ANFs at 48-hour cofermentation, and it appears that co-fermentation is a better option. We are also developing an assay to detect vicine, convicine, and their toxic breakdown divicine and isouramil, which is essential in assessing the outcome fermentation.

Finally, the project expanded through an NSERC Alliance on Genetic Code Expansion (GCE) technology to the development bioprocesses to enabling cost-effective reduction of ANFs, awarded in August 2020, is well underway.

Research Objective

OBJECTIVE 1

To determine the maximal inclusion limit of faba bean meal and optimally fermented faba bean meal in dog food.

OBJECTIVE 2

To determine the optimal inclusion of protein concentrate from unfermented and fermented faba bean meal for salmonid fish.