

Protein Processing Facility Assessment

Summary

Protein Industries Canada is an industry-led, not-for-profit organization created to position Canada as a global source of high-quality plant protein and plant-based co-products. During its initial five years of establishment, Protein Industries Canada has been able to create a culture of collaborative R&D, industry-led investment, IP creation, talent development and SME scale-up opportunities for new products from Canadian crops. Many of these projects are at the crucial stage of scale-up whereby the commercial manufacture of these ingredients requires detailed pilot scale optimization for viability. As Protein Industries Canada and its members move forward in their mandate to develop the plant ingredient processing sector, they have identified a gap in the infrastructure for pilot plant scale development and pre-commercial tolling manufacturing.

Selected Protein Industries Canada member companies were contacted and asked for their input and scale-up needs. A total of nine members representing companies of various sizes and stages of ingredient development were interviewed. In general, all interviewees expressed a need for enhancing the infrastructure for pilot plant and pre-commercial processing.

Protein Industries Canada seeks to identify a scale-up facility required to serve Canadian ingredient manufacturers on a contract basis as they transition from proof of concept to commercial production. In general, two to three years are typically required for companies to establish commercial processing facilities; there is a need for pre-commercial production scale equipment in a contract facility.

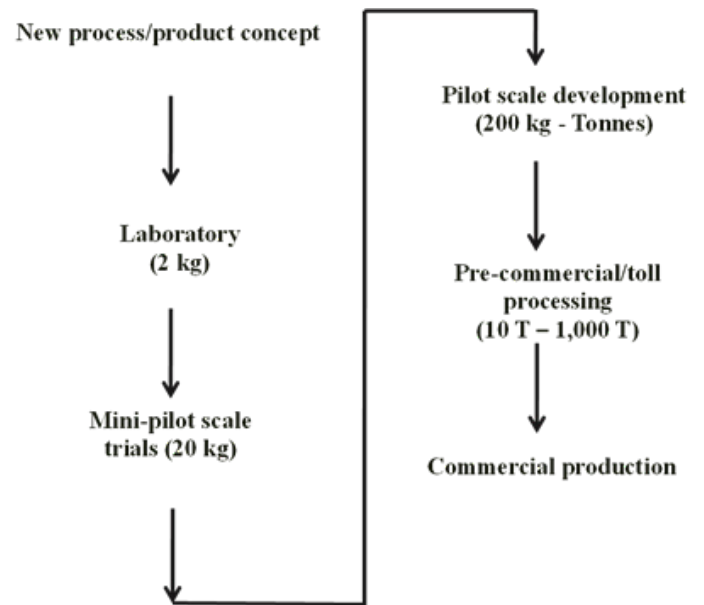
There is some existing infrastructure for mini-pilot and limited pilot scale dry and wet processing, as well as solvent extraction in Canada, and Protein Industries Canada frequently receives requests from companies to use facilities in the United States and Europe. Client interviews indicated these organizations offer good support; however, they also indicated there are limitations for running scale-up projects due to limited scale equipment, short process run intervals (i.e. eight- to 12-hour days), and not having a team/facility dedicated to only plant protein processing. Protein Industries Canada could



consider working with one or more of the current development organizations to establish a separate entity within the facility. Otherwise, the establishment of a new facility should aim to complement and work collaboratively with the existing R&D service providers.

A detailed report commissioned by Protein Industries Canada provides an initial vision of the plant protein scale-up facility (designated as PSUF in the report). The envisioned greenfield scale-up facility is a protein and carbohydrate pre-commercialization plant focused on growing the Canadian ingredient industry. The facility would offer pilot and toll processing scale services specializing in proteins, starches and fibre, as well as pressing/crushing and solvent extraction. Critical aspects identified during consultation with companies include an industry focus, offering ancillary services (lab, mini pilot), allowing education opportunities, availability of engineering consulting, and operating 24/7.

The PSUF would consist of a dry processing pilot plant, dry processing tolling line, wet processing pilot plant and wet processing tolling line, solvent extraction plant, raw material warehouse and receiving dock, finished goods warehouse and shipping dock, three R&D labs, two analytical labs, and an administration area. It would offer ancillary services including analytical labs, QC/RA (quality control/regulatory approval) support, logistics and warehousing for staging the weekly project activity. The PSUF organization would be industry focused and work with small and medium-sized companies involved in commercializing their ingredients. Large companies are also anticipated to use the PSUF for new technologies that they do not have in their pilot plant, for new materials, or to scale new processes or ingredients without interrupting commercial production.



A major advantage of a PSUF will be increased speed to market for Canadian ingredient manufacturers and allowing small and medium-sized companies to commercialize their ingredients without investing in infrastructure.

In order to support the Canadian infrastructure to enhance expertise in protein and co-products, the facility would collaborate with Canadian universities and colleges, as well as government research centres, to provide training and workshops. The PSUF technical staff would also participate directly with educational institutes in the development of highly qualified personnel (HQP), critical to addressing the skills and talents needs of the Canadian industry.

Ideally, the PSUF would be established as a collaboration between the federal, provincial and municipal governments and the Canadian plant ingredient industry. Government funding would be required to cover most of the construction of the facility and purchase of equipment. Funding, however, would also be raised from the industry, as well as equipment suppliers, who may contribute through the donation of equipment and/or reduced pricing. The estimated cost to build a greenfield facility is \$75 to \$100 million CAD.

It is anticipated the overall business of the PSUF would operate as a not-for-profit organization that may be aided with annual funding from the federal and provincial governments to cover any shortfalls in its annual operating finances.

If not all processing areas are required initially, the facility could be constructed in a modular approach. In addition, a formal relationship with one or more of the existing organizations should be investigated. Potentially, the PSUF could establish a team at such facilities to conduct pilot plant scale ingredient processing trials. In such case, the pilot plant facilities at the PSUF may be reduced or modified in scope.

Due to the intermittent nature of development and pre-commercialization activities, there may not be sufficient demand from Canadian companies to utilize all pilot and toll processing areas in the PSUF on a consistent basis. Although preference should be given to Canadian companies, business from clients outside of Canada will be needed to maintain the services of the PSUF. The offering of the facility's services to non-Canadian companies will also be a tool for attracting new plant ingredient companies to invest in constructing new commercial processing plants in Canada and utilize Canadian commodities.