CLOSING THE CANADIAN SOY PROTEIN VALUE CHAIN GAP

SUMMARY

*We need to fill the gap and capture the potential of the Canadian soy value chain for the production of high protein soy products through domestic protein processing. When we have a dedicated flow of product for specific end uses the initial links on the value chain reap the benefits. Identifying these uses and traits is difficult, dynamic and unclear. However, if manufacturing is **not** here, we can't capture **value.***

We can encourage the development of such commercial facilities by offering ideas of products that are; truly different and businesses that are sustainable.

To do so we need technical innovation in primary and secondary processing. Technological advancements to process specific, desired products from mechanically crushed soybeans may be part of the puzzle, but we can't forget about price, strong product support, and the benefit of strategic relationships. Closing the gap will require great insight into both technical and business strategies. Patience and focus will be crucial for businesses wishing to close the gap and reap the rewards. There are four options for closing this gap:

1. *Attracting a large international player in the soy protein field;*
2. *Attracting a large or growing player in the food sector;*
3. *Diversifying an existing player in the domestic soy industry;*
4. *Developing a new strategic venture.*

The **purpose** of this overview is to identify how the Canadian soybean industry, can begin to close the protein production gap. How can more Canadian derived soy protein get in added value food ingredient markets? For the purpose of this report, the protein products in question are those defined as concentrates, isolates, or other, high protein dry ingredients with various food uses. The **gap** refers to the void in the Canadian soy value chain

for the production of these products on our soil. It is further defined as the gap in the ability to use our own soybeans directly and in coordination with an established genetics, identity preservation, handling system, and food manufacturing continuum.

Through domestic protein processing we will more fully begin to capture the value our industry is capable of providing.

This gap is not entirely void of activity. There are some recent examples of protein processing in Canada. Such processing is highly commended. Still, these facilities are not utilizing a tremendous amount of soybean, nor are they producing anything near to the equivalent of the Canadian utilization or potential utilization of protein. The lack of protein processing in Canada does not equate to a lack of protein usage. A myriad of protein products are available and being used in wide range of food products, however they are primarily US based. The gap remains. *How do we get more Canadian derived non-oil soybean components into food?*

There are certainly barriers to the use of soy protein as a food ingredient including, but not limited to, the undesirable allergenicity and flavour. Allergenicity may not be a barrier anyone can adequately overcome. Flavour is a barrier that can be overcome through breeding or processing and efforts, both public and private at home and abroad, are underway to do so. These challenges exist everywhere and; therefore do not explain the reason for the protein gap in Canada. Overcoming one of them, perhaps flavour through breeding to reduce lipoxygenase or processing to deactivate it without denaturing proteins, could be a unique product for an ingredient company. But one product idea is not enough to build an entire sub-sect of industrial value chain. The barriers to using protein in food are not the same as the barriers to isolating proteins.

What are the **barriers**? Penetrating established distribution channels, the strength of existing players, and the commoditized nature of even niche products are among them. These are issues that big, established players may

not be interested in (for practical or strategic reasons) or may not be able to address them within the existing structure of their operations.

These issues can be addressed by demonstrating that there are opportunities to do **something different** in terms of:

a) inputs (non-GMO, IP, tailored protein profiles);
b) processes (that do not begin with defatted meal and that permit fuller refining of the protein components); or
c) markets (in North America, Asia or Europe that are interested in highly specialized uniquely produced products) that are best accomplished done in Canada.

The case can be made for Canada as a home to such specificity if the attention of markets and companies can be drawn. We need to ensure that our efforts to close the gap benefits the entire industry. We need to remain **focused** on creating a dedicated flow of value, from germplasm development to food. We need to be able to use the IP system and/or strategic alliances to provide Canadian soybeans and soy products for specific end uses. This is not possible by relying on commodity beans or meal, emulating existing products, or waving at differentiation without being able to act on it.

We can close the gap for the benefit of the whole industry by connecting specific end uses and/or users with specific inputs and processes.

It isn't enough to show the current and potential market demand, as this demand can be met with existing supplies from US players and emerging international players at prices and with attributes that limit new and "me too" competition. It isn't enough to build new facilities around one or two current ideas. We need to develop facilities that offer something:

- ⇨ that truly is different:
- ⇨ that can be built to react to emerging opportunities; and;
- ⇨ that will be around for the long haul despite the hills and hurdles that will certainly emerge.

We must be truly different in the products made. We must be positioned for long term.

Finding true innovation is difficult. With so much variety in functionality and composition existing in soy protein product listings, finding a single new trait is not enough upon which to build a business or with which to capture any market share. Even if one were to identify a handful of unique functional or compositional traits that existing players were not offering, the other players could surely follow suit and capture that market by offering services, full lines, and prices that could not be matched. Thus, an entirely unique method of production resulting in unique products that could not be easily or quickly replicated by others is the preferred path to follow. To this end, we need to focus on developing or implementing engineered solutions that fit our scope and needs.

First, technologies for the **primary processing** of soybeans (crushing or milling) must be considered that are at a scale to permit batch and small runs. Such facilities would be based on management intensive operations that compliment and build on the IP system. This is further supported by the opportunity in offering products that cater to niches based on labels (organic, non-GMO, chemical free) which would also require mechanical, intensive primary processing.

Technological considerations will be required in **secondary processing**. Innovation is needed to produce an array of high protein products from meal or flour which is not fully defatted. Innovation in drying that limits intensive heating and is cost efficient is needed. Innovation is required to produce fine particles that flow easily and can be easily used in food manufacturing (blended with grain flour, dissolved readily, etc.). Innovation is required to limit enzyme activity without denaturing protein excessively. Innovation is required to reduce or limit the taste and odour associated with bean components. Innovation is required to separate specific proteins or protein sub-units or other soy compounds (isoflavones etc.). This total innovation package is not

something which can be purchased on the shelf; it is a puzzle that will require patience, money, staging, and time to put together.

Technological advancements to process desired products from mechanically crushed soybeans may be part of the puzzle.

From a protein production basis, there is an opportunity to make what isn't being made in ways that aren't being used commercially. Products with different levels of specific proteins, protein components (enzymes, sub-units, isoflavones) etc. may offer a promising area for development. This development can be addressed though process development and through germplasm development and breeding. In either case, we must focus on capturing the value of this development by encouraging the production of **intellectual property**, or harnessing the value producing power of existing intellectual property.

Identifying specific end uses, ideas, and technology is difficult, multifaceted, evolving, dynamic and unclear. But, one thing is clear; if the ability to manufacture is not here, the ability to capture that value won't be here either. In order to build a more successful soy protein chain that transfers more benefit to farmers and that capitalizes on our strengths, we need to have protein processing presence. It is this appetite for more that we in the industry want to satiate.

Even with technology to produce unique products, in domestic markets the **price** of these products must be in line with existing products. Analyses have shown that the protein levels of various soy products are a truly reliable indicator of the value/price of those products. Premiums seem to be elusive under current market conditions. That is not to say that there is no room for premium prices on premium products, but any premium price must reflect less than the actual value added in order to reach and keep customers. Premiums may also be most attainable by targeting the premium markets which may not always be domestic. Certainly our experience with the export of IP beans has

taught us that it is feasible and smart to export your premium products to the markets that will pay for them.

Either way this requires that any innovation on technology or products is accompanied by strong and accurate **service** provision, education, and technical assistance to buyers and users. This lends itself well to two key components:

- ⇨ teamwork; and;
- ⇨ relationships.

Teamwork involves having a core network, internal or external, of experienced people with insight into business decision issues, technical issues, and practical manufacturing issues. Building strategic relationships with users and distributors involves moving away from a sales position and into a partnership position for the equal benefit of both firms.

It is worth noting that business opportunities to produce soy protein products may naturally lend themselves to production of other types of **complimentary** products. For examples, protein extraction technologies may be adaptable to other types of grains or pulses. Protein production may be built into the overall design of a food facility (meat processing or soy milk production). Oil separation may lend itself nicely to the coming of age of the bio-product and vegetable oil based chemical industry. Again, the opportunities in the future may be many, but they can only be captured if the infrastructure and vision is acted upon in Canada.

The ability to capture the value of these opportunities depends on being an **established** player before they emerge. However, there are challenges: cash flowing such an investment in the near term is very challenging without the big opportunity upon which to rely, especially in this low margin, highly competitive sector. Waiting for the opportunity can result in casualties along the way. But those with the ability to be patient will find it worthwhile. Why will companies do this? Because they have a vision of what may be, and they recognize the need for up-front investment.

Closing the gap will require great insight into both technical and business strategies.

Thus, we understand that as an industry, we would like to see additional soy protein processing occurring in Canada. The question is how - how do we encourage the development of such commercial facilities. Who will be the **leaders** in closing this gap? There are not a lot of players in this industry: a few major international players in the present primary soy protein business; a handful of players currently involved in the handling or processing of Canadian beans; a number of regional farm groups keen to move up the value chain; a variety of food companies, of varying scale and size, using or adding value to soy products. Although our pool is not deep, it is broad and it provides us with a number of four main areas upon which to cast our investment attraction bait.

Option 1 – Attracting a Large International Player in the Soy Protein Field

This option is about attracting a major multinational firm already involved in the production, marketing, or utilization of soy protein. One of these companies may find benefit in establishing a facility here for various reasons including, but not limited to: the business climate in Canada, the ability to build on our IP system, the nearness to domestic markets, the ability to offer innovation without undermining existing brand images, the access to European and Asian markets, etc.. Such a facility would require less of a focus in technical innovation than has been described above as the need to be different may not be as pressing because the support, and market penetration has already been established. Nonetheless, such a facility could eventually offer future differentiation opportunities for the protein producer as well as farmers, handlers, and researcher along the chain. However, these future benefits are not necessary and would not likely be the entire foundation of a decision to locate here.

Option 2 – Attracting a Large or Growing Player in the Food Sector

This option revolves around convincing a firm, foreign or domestic, to move more aggressively into the production of soy protein to compliment existing businesses, vertically integrate, or establish greater North American presence, in the case of a foreign food company. Those companies already using soy or other proteins in large amounts would be ideal candidates. The best companies will see the value in not only taking a more careful look at its ingredients, but also the potential to expand the array of ingredients available to them or to others.

Option 3 -Diversification of an Existing Player in the Domestic Soy Industry

In this option, an investment into protein processing would be made by a firm with current ties to the production or handling of beans. As previously described this would require not only unique products (likely developed through innovative technologies) but also solid support and marketing resources, which can be achieved in various ways: by building on existing export contacts, by working closely with an existing end user, or by partnering with a major player already in the food or protein market. Such strategic relationships can be difficult to develop, especially at the onset of investment decisions. However, they can form with hard work and or can be introduced later and nurtured through the developmental process. In this scenario, we need a domestic company with vision, and, ideally, an upfront partner.

Option 4 – Developing a New Strategic Venture

In this option, we consider a model which allows for a new player to participate in filling the gap. Such a new player could be a co-operative, a joint venture between new or existing firms, a spin-off or other alternative. The requirement and challenges may not be much different than in some other options. But more than the others, it relies heavily on strong relationships and/or partnerships. At minimum, strong interest and communication must be established with some end users before investment could be soundly established. Starting from scratch, although not impossible and in some ways

attractive (complete capture of value, avoidance of corporate decision making, etc.) it is very difficult, expensive, and risky. For this reason, a team approach is a possible option to bring intelligence and savvy together from individuals, firms, and researchers with reduced risk and increased likelihood of success for each.

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