Taking Soy Further

In part two of his soy market feature, Henk Hoogenkamp looks at the future of soy.

by Henk Hoogenkamp

It is realistic to say that the current world production capacity of soy protein concentrate and soy protein isolate is close to, or even exceeds 1MM ton. Please observe that listed approximate quantities are the theoretical equivalent manufacturing capacities of SPI and SPC for the entire food and feed chain.

This includes applications in, for example: meat, bakery, infant nutrition, health, sport, weight management, calf milk replacers, piglet feed, pet food and aqua marine.

It can be calculated that in 2005 slightly more than 400.000 metric tonnes will be produced as soy protein isolate.

Meeting Demands

In line with the population growth, world soy protein production must increase with a minimum of 30 per cent over the next 20 years, to adequately feed the rapidly growing number of people with basic and supplemental food systems.

China's affluent consumers are transforming the global food ingredient business by pushing demand for food commodities, as well as functional food ingredients. It is very likely that the manufacturing of functional soy protein ingredients will continue to rise sharply and it is expected that China will become world's largest manufacturer in 2007.

Besides the above-mentioned companies, there are also soy protein manufacturing plants in countries including France, Russia, South Africa and India. For example Skathisoyas India is blending defatted soy flour and soy protein isolates to produce 'soy protein concentrate'. These blends and many more increasingly compete with the original US sources of functional soy proteins. Proliferation of both manufacturing technology and market knowledge has really changed the landscape of the soy protein industry in recent years (see tables 1 and 2).

Table 1: Approximate Theoretical Manufacturing Capacity for All Soy Protein Concentrates (65%) and Isolates (90%)

Company	Capacity (MT)
Solae	450,000
ADM	250,000
China	220,000
Solbar	45,000
Soyprotec	8,000
Cargill	5,000
Protient	3,000

Turning Commodity

Increasingly, premier soy protein ingredient companies such as Solae, Cargill, Solbar and ADM are highlighting health related benefits like cardiovascular diseases, high blood pressure, some cancers and type 2 diabetes. Additionally, obesity is rapidly becoming one of the world's leading causes of death. Approximately a staggering 1.7 billion people (=26% of the world population) need to lose weight. Some 300 million of those (=18%) need to lose at least 15 kilos. As a side note, come to think of it, at the onset of the third millennium there are on

Table 2: Estimated Production of SPI or (F)SPC at Various Plants

Solae	Memphis Louisville Leper (Belgium) Arhus, (Denmark) Gibson City Remington Bellevue Other (Alpha-brand) Fuji JV (Japan) Brazil Brazil PM China JV China JV (liquid basis)	140,000 MT 25,000 25,000 35,000 40,000 30,000 20,000 5,000 20,000 30,000 10,000 20,000
ADM	Decatur Europoort (Netherlands) China	80,000 90,000 10,000
Solbar	Ashdod China	40,000 5,000
Cargill	Sidney OH China PM	5,000
Hamlet	Denmark	35,000*
Soyprotec	Haifa	20,000
Yuwang	China	40,000
Sinoglory	China	20,000
Crown	China	20,000
Others	China	70,000
Protient	St. Paul MN	3,000

*Specially fermented upgraded soy flour for animal nutrition.

planet earth more overfed people than hungry people!

Soy protein might have answers and solutions to a number of degenerative diseases in addition to pro-active health by formulated nutraceutical foods (a.k.a. wellness foods or functional foods), which can create substantial high-profit business. The latter is especially encouraged by the growing stature of proteins as a healthy diet. To continue momentum, protein ingredient companies are participating and sponsoring various medical research projects, as well as focusing on new technologies such as flavour-improved soy protein isolates, together with inherent specific physical properties.

Adding Value

Most of the growth potential of the soy protein market can be found in added value applications such as wellness or nutraceutical foods, including sports nutrition and for people who want to grow old healthy. The magnitude of this impact is proven by the fact that the total world market for soy protein isolates usage in food and nutraceutical applications (i.e. excluding processed meat, poultry and fish) has more than doubled since 2000. There is no question that the importance of the food and nutraceutical segment is quickly becoming commercially mainstream and definitely lucrative.

The food and health applications of soy protein isolates can be further broken into the subcategories mentioned in table 3.

Soy Competition

However, especially the marketing companies of functional soy protein ingredients need to realise that – although growth in wellness or nutraceutical food applications is very impressive — they still are dependent on the sales of functional soy proteins as fat and water binders in processed meat products.

Especially Solae LCC has been somewhat blinded lately by the initial successes of soy protein isolate in the 'premium-value' nutraceutical category, and ignored the 'traditional' soy protein markets for muscle foods. This unfortunate situation will take extraordinary efforts to rebuild sales & technology support team confidence and to regain lost market share.

Inconsistency of strategic positioning by senior management in recent years with regard to market segmentation have somewhat damaged this soy protein company as a trustworthy partner and as a result has assisted both in-kind and out-kind competition from functional ingredients such as wheat protein isolate, modified food starch, hydrocolloids and dextrin carbohydrates and fibres.

Combined with this there has been a huge surge of Chinese manufactured functional soy protein ingredients which have drawn these soy proteins into commodity environments with price depending on product availability. Some soy protein companies need to make up their mind in which market segment they wish to excel. Simply moving in and out depending on market conditions will have a detrimental effect on the long-term image in terms of cost efficiency, as well as technological superiority. It goes without saying that true-costs calculations are significantly influenced the rapidly growing planted acres of GM-soy beans (see table 4).

High End

Traditional soy protein applications and especially in emulsified meat products are becoming more price competitive, and soy protein companies are therefore focusing on developing premium or higher value applications for their existing soy protein ingredients.

A possible solution to the very difficult decision of how-to strategically position functional soy protein ingredients, is to 'de-cost' the low-end of the markets (in general calf milk replacers and emulsified meat products), and to 'turbo-charge' the high-end of the soy protein applications for the high premium foods & nutraceutical categories. Table 5 presents a breakdown of application segmentation of SPI & FSPC in processed muscle foods.

Table 3: Food and Health Applications of SPI

Infant Nutrition	40%
Clinical nutrition	22%
Weight management	18%
Sport nutrition	5%
Other, incl. soy milk	15%

Near but yet so Far

Looking back, it is almost certain that the soy protein companies are disappointed about how the vegetarian market has developed. For years the US dominated soy protein industry has taken ownership of this obvious market for soy protein applications. It is fair to say that the premier soy protein companies invested considerable efforts in product development and technology support. However, these activities very often had the single purpose of increasing soy protein formula inclusions to the highest possible levels.

Fortunately, since the early 1990s, entrepreneurial driven companies have proven that the answer for using soy protein in meat analogs was not high inclusion levels but rather part of using a unique blend of other types of protein products such as those derived from wheat, pea, and lupine. Most probably the soy protein industry has overplayed their hand in trying to develop the vegetarian category. The fact is that entrepreneurial companies have been largely responsible for taking the strict veg-

Table 4: Estimated SPI World Food & Meat Market Share (2005)

Solae	40%
ADM	10%
Fuji	3%
Solbar	2%
Chinese*	41%
Soyprotec	1%

* Incl. JV operations

Table 5: Application Segmentation of SPI & FSPC in Processed Muscle Foods	
Emulsified Meat Systems	54%
Ground Muscle Meats	15%
Whole Muscle Meats	10%
Fresh Poultry, incl. bone-in	8%
Fish, incl. canned tuna	9%
Dry Fermented Sausage	4%

etarian category into meatless and further into lifestyle products. In nearly all successful new-generation meat-free or lifestyle foods, soy protein inclusion levels have been reduced considerably. Ever since, the meat analog market continues to grow and there is no end in sight yet.

Into Dairy

How quickly a landscape can change is proven by the dairy industry. For a great many years the soy protein companies considered the dairy protein industry as their number one 'enemy'. It is weird to see that the same dairy protein industry came from leftfield when they recently introduced a meat-free product made from cheese-curd, algae and other binders. This connotation produces a juicy dairy-fiber that is almost identical to white chicken meat (Valess by Campina, 2005). The strong consumer response of this product proves that the soy protein industry cannot claim a market segment by eliminating or restricting innovative product concepts by out-kind technologies. Who would have thought the dairy industry to 'counterattack' with a meat analog made from milk?

Milk Moves

In as much as soy protein companies continue to target milk protein applications as potential growth areas; the truth is that the global interest in using milk proteins such as caseinates, whey protein and its bio-active peptides, continue to outgrow soy protein applications in relative terms. For some reason the premier soy protein marketing companies don't seem to be able to convince their customers to decide for soy protein as the unique choice even though these functional and nutritional alternatives are more stable and predictable in pricing and in the current economic environment offer great potential to reduce formulation costs.

Modern consumers insist that, unlike what soy protein marketing companies want them to believe, they are pragmatists. Over and over, consumer research shows that convenience and taste still outrank nutrition as the top priority for most people and as such consumers have no intention of giving up their favourite foods. As it happens, milk protein ingredients are significantly higher in price but they still outperform soy protein ingredients in premium applications in terms of organoleptical properties and perceptional protein nutritive quality.

Allergic Reaction

As a related example that may serve a possible backlash against the use of soy protein when the US and EU food safety officials will publish verification guidance over ingredients associated with food allergies. Inclusion of such ingredients, including soy protein, must be listed on the ingredient label, otherwise the product would be considered adulterated and/or misbranded.

To list potential allergens on consumer packing is expected to have an adverse impact on the sales of some functional protein ingredients. It is certain that alternative solutions of innovative functional ingredients are near market introduction to allow food and meat processors to provide customers the pleasure of looking at an 'allergy free' label.

These examples show that the soy industry cannot take their markets for functional soy protein ingredients for granted. The processed food and meat industry is evolving quickly and soy protein companies need to constantly fine-tune and, if necessary, change strategy to continue delivering value to their customers. Other issues affecting soy protein sales are detailed in table 6.

Table 6: Key Issues Affecting Soy Protein Sales to the Processed Meat Industry
• Profit erosion
• Average pricing continues to be below expectation
• Declining value delivery in Emulsified Meat Systems (EMS)
• Increased non-value business, especially for EMS applications
• (non) GM-debate
• Analysis - Paralysis
• Technology proliferation

Intelligent Segmenting

It is obvious that the soy protein marketers need to learn to segment various markets more intelligently, while providing the processed meat and food industry more value by focusing on R&D, technology advancement modification, and promotional activities.

Whatever way it is sliced, the total processed meat market still is a formidable market for functional soy protein ingredients. It is estimated that the total world market of all functional soy protein for food and meat applications, approximately 65%, is sold to processed meat companies. From this quantity, about 70% is used in emulsified meat products. These figures signal the importance of processed muscle foods as a major market for the functional soy protein industry. No doubt about it!♦

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