Designing Vegetable Proteins to Fit Market Needs

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ABSTRACT

The needs and wants of the market are discussed as well as the regulatory practices that frequently inhibit the fulfillment of the market's requirements. The advantages and shortcomings of the various types of protein ingredients are described, and appeals are made to the soy protein-producing industry to protect the integrity of traditional products by recommending extension of meat and other products in such a manner as to preserve their traditional character. Improved technical service offered to the food processors can bring added assurance to the consumer of a continuing supply of quality traditional products. The soy protein industry must continue the development of their own products so that broader application is possible. The inherent nutritional and functional values of soy proteins are such as to make a new generation of textured products, and improvement in the functional properties of concentrates and isolates a very realistic goal. Compatibilities of soy proteins with other proteins and ingredients are discussed; suggestions are made that the inherent synergism in many of these combinations is an untapped developmental area that will enable us to design protein ingredients for specific applications and thus benefit the consuming public, as well as the food processing industry.

Our particular task in this paper will be to use information heard up to now to benefit the consumer. Let us look quickly at the background against which we are to examine the question of "designing vegetable proteins to meet market needs." What are the circumstances we face?

For many countries, the economic climate is not good; it shows the food industry, and thus the consumer public, faced with steadily rising prices and with an outlook for relief not at all favorable. The degree to which this is true varies of course from area to area. Unfortunately, the effects are compounded, for not only are the costs of key ingredients steadily rising, but all too often processing costs are rising at a disproportionally higher rate. The knowledge that the production and processing of ingredients is an energy intensive exercise also brings us no comfort, for these are costs not likely ever to go down.

Some countries are especially hard hit, particularly those which have been exporters of meat and fish products. Their own consumer demands have risen for such products, thus decreasing their export volume and aggravating an often precarious balance of payments situation. This vicious circle often makes it difficult to purchase the prime ingredients necessary to produce the quality products that their consumers demand. With this kind of an economic climate, certainly the need for full exploitation of the benefits of all ingredients, including soy proteins, is an urgent priority.

The regulatory climate has been discussed in detail in other papers but permit me a brief comment, as this important element affects the marketing scene considerably. Any unreasonable restriction on the use of raw materials is a cost burden for the food processor, which, in the final analysis, is paid for by the consumer.

Some countries prohibit the use of some, or all, soy proteins in meat and other products. Many of the same countries exhibit a protectionist attitude toward dairy products, which while understandable, does not really help the dilemma of their consumers. Such practices result in the sale of milk proteins and other dairy products at subeconomic price levels, thus artificially stimulating a demand resulting in further overproduction and subsidies.

Unfortunately, there are countries with regulations framed in favor of milk proteins, to the exclusion of all other alternatives. This does a disservice to the consumer, and also removes the element of free choice. Of course, the consumer is not fully aware of the regulatory situation, and is only vaguely aware of the large number of possibilities readily available that could improve the quality of many food products, without necessarily increasing their costs.

Another key marketing circumstance is the growing consumer awareness of nutrition. And this awareness is intensifying and spreading to many parts of the world. Thus, in much of the world today nutrition *will* sell; the public is more knowledgable, interested, and thus receptive to the nutritional improvements of food products. Take, for example, the current concern about obesity and cholesterol. These concerns have lead to the domination of margarine over butter, to the increasing sale of low fat cheeses, to the booming yogurt market, low fat milk, diet drinks, and a plethora of other dietary foods. We also see evidence of consumer awareness in reducing consumption of coffee, milk and eggs. Some of these actions are misguided, but it does illustrate the power of the consumer once he is aware.

A final point on that subject: the consumer certainly has the right to know what he is eating, and the soy processing industry should even more energetically support regulations and labeling laws that tend to inform, and thus protect the consumer. In some countries regulations governing the processor are strict, but inspection and labeling laws are lax or nonexistent. It would appear sensible to end restrictions on the use of protein ingredients of equal quality and leave the choice to the consumer through the simple expedient of clearly putting the ingredients on the label.

After this brief review of the primary conditions of the market place, we then ask ourselves are there any perceived consumer needs wherein vegetable proteins could play a role? I think we would all agree that there are, and that consumer concern about nutrition, deteriorating quality, and the absence of products that have a rightful place in the market are problems to which we must address ourselves.

Actually, these are more like opportunities than problems, so let's look at a few examples: (a) improve the quality and nutrition of cured meat, poultry and fish products; (b) improve the enrichment of snack foods, and, in general, replace "junk" in some foods with nutritious ingredients; (c) introduce new confectionary products that are nutritious and not simply "sweets;" (d) broaden the

range, and increase the quality of institutional and catering products; (e) improve the quality of less expensive processed meat products; (f) expand the number of prepared fish products; (g) improve the shelf-life of bakery products. To design proteins to fulfill these consumer needs, we have at our disposal the nutritional and functional resources of soy proteins. While hardly new to this audience, permit me to review briefly.

Soy flours alone with over 50% protein not only add nutrition to many formulations, but perform certain limited functions, depending upon whether or not a full-fat, or a defatted variety is used.

Lecithinated flour harmonizes dough systems, accelerates proofing, retains moisture, and thus freshness, and contributes to the strengthening of the overall structure while improving the nutritional value of the system. These flours can also be used broadly in breading, batters, and as a component in doughnuts; they are good in sweet baked goods, and confectionary as well.

Textured soy flours have probably received more publicity than any other ingredient in recent years. Developed in the fifties, they are indeed prominent today, but have yet to fulfill the glorious prediction of market analysts. Without question, one reason for this is that they were often misused, and their good properties strained beyond limits. In other words, some processors felt that if 6% extension was good, 12% would be twice as good. However, when used wisely, textured soy proteins can indeed solve problems facing the food processor and consumer. Improved use technology tells us that the advantages of textured flour can be heightened with the addition of a small amount of isolate, and of course there are other similar expediences.

More recently, a second generation of textured products based on concentrates appeared on the market, largely as a response to demands for improved structure, texture and flavor, particularly for canned products and flavor sensitive fresh products. Textured concentrates will see more development, but need closer rapport between food processors and the soy protein industry to speed such developments.

Standard granular concentrate is a very important ingredient used widely for the food processing and animal feed industries. The undesirable oligosaccharides are removed, enabling this product to be added to various formulations because of its good nutritional properties and bland flavor profile. One should, however, expect only limited functionality from this product.

Soy isolate has the best functionality of all soy proteins. In the market today we find many types of isolates. Some can be used for a wide spectrum of applications, but more recently new isolates have been designed for specific functions. Generally, one can expect from isolates strong emulsifying, binding, gelation, and heat-setting properties. It is also possible to obtain a broad range of viscosity levels. Today, one can achieve quite accurately the specific level of functionality required.

This brief review has dealt only with soy proteins. It is certainly not our intention to ignore the many other fine protein ingredients that are available in abundance, or to imply that soy proteins should be considered over all others. On the contrary, all the milk proteins, sodium caseinate, nonfat dry milk, milk whey and concentrates, blood plasma and a large variety of other vegetable proteins are ingredients which harmonize well with soy proteins. We know for example that when sodium caseinate is combined with certain soy isolates, a synergistic effect is achieved, resulting in a product that is functionally superior to either of these ingredients used alone. In short, there are great ingredient resources at our disposal, certainly not limited to soy proteins. And in view of the sometimes serious marketing situation that prevails, all ingredient resources must be exploited to benefit the consumer.

How do we do this? Well, in the same way we have progressed in the past through painstaking development work. Our field of attention must be expanded to include a rich area of product development too long neglected, namely, the study of the properties of protein combinations. Similar work has been done with polysaccharides and gums in the stabilizer and emulsifier field, and while we do know the nutritional advantages of combining proteins, too little work has been done in exploring the synergistic functional interactions between protein ingredients.

For a start, one could encourage a new attitude toward selection of ingredients – it need not always be either soy isolate or sodium caseinate for example, but instead which combination will do the job best? There is a vast opportunity to improve products and lower costs by mixing protein ingredients, their composition dictated by functional and nutritional requirements with a sharp eye on the regulatory constraints. Actual ingredients selection should be made using available product knowledge, creative imagination, and the technical assistance of the ingredient producers.

When using any of these ingredients, there is a certain unofficial rule that should be reaffirmed. This rule should be followed by the ingredient processing industry in promoting their products, and those sales intermediaries that actually contact the users. Simply stated, they should urge cooperation in preventing abuse of the power of these proteins.

When protein power is abused, it leads to disaster. For example: the sale of textured flour rises in direct proportion to the increase in meat prices, indicating a certain grudging acceptance: "We have to use it, because meat is so expensive." Might it not also indicate that the product is too often abused and strained beyond the limits of its extension power? This is caused by poor technical service, poor judgment by the processor, or a combination of the two. The inevitable result is that the consumer focuses with dismay on the deterioration of the traditional product he has grown to expect, and blames it on the soy extender. This I maintain need not be if we begin more forcefully to promote intelligent formulation designed to protect the traditional character of meat and other products.

One sees similar examples with isolates where their functional properties are simply abused, resulting in the charge that traditional products are adulterated. In both cases the advantages of these products are cited by some regulatory agency as reasons for restriction. In short, we are critizised because our products are too good. So the onus is on the industry to promote intelligent extension, through improved technical service enabling the processor to save costs without overextending.

To sum up, this industry surely can design vegetable proteins to fit today's market needs, for we have the resources to do so. It can be done faster and more effectively if we get helpful support from the regulatory agencies, recognizing that what we produce are not harmful additives, but healthful and helpful ingredients of benefit to the consumer.

Also needed is closer cooperation with the food processing industry, the academic community, and national research institutes. Finally, a new resolve on our part to protect the integrity of use of soy proteins, and to promote their harmony and compatibility with other ingredients.