



Marketing Vegetable Proteins – The Need for a Technical Understanding of These New Food Ingredients

B.J. MCAULEY, McAuley Edwards Limited,
9 High Street, Bladock, Herts SG7 6AZ, England

The future marketing of soy products is a challenging task. Agricultural research and production have primed the pump. A process and produce development effort has maintained the pressure. Food legislators are urgently trying to find formulae for accommodating this "Novel Food." Never before have legislators worked so closely with an evolving technology at such an early phase in the deliberations. It is essential that the delivery should do justice to the skills that have fed it. Soy producers must accept responsibility as an integral part of the food industry. The manufacturing food industry has become highly sophisticated and cost conscious, creating requirements for a wide range of food functionalities we can provide. Assignment of a new food ingredient can only be made with a thorough insight into application; its cost structure, its process machinery, its quality parameters, its nutritional significance, etc. Without this, either the wrong choice will be made, or equally dangerous, the wrong claims will be made for the correct choice. The consequent disappointment would at best delay the acceptance of what the soy food ingredient industry is trying to do. Only a commitment to understanding the food industry will allow us to define these requirements correctly and establish for our products a rightful position which we can maintain.

INTRODUCTION

Marketing, despite the many attempts to turn it into a pseudo-science is, in reality, a basic discipline in the total chain of development, sales, and consumption. Without its running as a thread throughout, development can be ill directed, costly and with little maturity; sales efforts can be frustrated; and consumption will always be limited to experiment, without repetitive security.

HISTORY

The history of marketing soy protein products is not a happy one. Motivated solely by the requirements of moving a mountain of the unavoidable by-products from edible oil production, the result was quite predictable. Consequences of the apparent easy option of over-claims for immediate sales vs. the sounder marketing investment were with us until quite recently. In retrospect, claims that an oil-free residue from a hydraulic or even a screw press, could simultaneously imitate the behavior of complex proteins such as meat, egg, and milk in a wide range of food products were, to say the least, pretty naive, and also quickly found to be baseless.

Despite the costly lessons learned in the 40s and 50s, our soy processing industry rushed into an even more disastrous venture following the adsorption of extrusion technology. This was undoubtedly an exciting addition to our product scope and indeed a logical exploitation of some of the most valuable soy protein behavioral characteristics, coagulation

and cross linking. Gross overkill, in production capacity application advice and in benefits claimed, has left scars from which, even now, we have not fully recovered. But this time, not only was there damage to our credibility, a repeat of the debacle earlier mentioned, but when one looks at the evolution and formulation of current approaches to food legislation in the area of soy food ingredients, one can see the doubts, fears and misinformation planted right across the spectrum from producer, legislator to consumer.

SOY FOOD INGREDIENT PRODUCTION

Raw material production growth has been breathtaking. Even allowing for the favorable wind created by the demand for a native supply of edible oil, in the United States during the two World War periods a 400% increase in 50 years is still a remarkable achievement. Development of varieties that flourish successfully across the wide range of climatic conditions in Continental America has given not only a sound ratio of yield to assets employed, but harvest stability.

Both of these factors allow subsequent manufacturing and processing to be based on a raw material supply about as stable as possible for a natural commodity.

Processing and manufacturing have certainly maintained this momentum. Acceptance of the quality defects of an overheated residue from oil production led to a rapid development of more costly and sophisticated solvent extraction. One can begin to date the soy food ingredient business from this point. In less than twenty years, our product range developed from an oil plus animal feed base. Quality behaviors in food systems, including textured products, are still the most important. Selective removal of nonprotein components led via the soy concentrates to virtually pure proteins isolated from soybeans. These isolated soy proteins have the abilities to emulsify fats or oils and to bind water; to form gels, fibres and foams etc.

The soy processing industry during this progression has been taken from an essentially farming technology into centrifugation, thermal extrusion, spray drying, enzymatic digestion, and even spinning. Although some experience was drawn upon from the dairy processing industry, this rapid development involved a large commitment to research into food processing and to equipment development. Most important in this development was the impact of human nutrition. Whatever we do must result not in chemical process aids but nutritious food ingredients.

All this is not presented just as an historical summary of what we have done in soy processing. It is the basis for the plea that when we approach the final link in the chain, marketing our products, we do so with the same degree of commitment and acceptance of challenge that our colleagues have demonstrated so clearly.

MARKETING OR APPLICATION

The trauma that was produced in 1973 during the energy and commodity crises has been so analyzed in detail

that any further comment here would be superfluous. One positive result which thankfully has persisted is the critical approach to ingredients developed by the food technologist in the manufacturing food industry. Was NFDM really necessary in a biscuit? Did cake manufacturers always need so much egg, and was it essential that it had to be used in the natural balance of yolk to albumen present in the whole egg? Does the meat packer have to sell expensive red meat; 25 or 30% of the weight of bones produced by traditional butchery, to animal feeds and fertilizer outlets, etc?

These were the questions to be answered, and this was the opportunity for our growing ingredient industry in the early 70s. We had the economic solution, we had product availability, but in many cases we failed in our marketing. Of course, we had sales. Textured flour sales in the US in ground meat application were phenomenal. However, when meat prices eased, even though there was still a favorable differential between vegetable and meat protein prices, sales of textured flour fell away very badly. Complete milk replacers and egg extenders abounded in '73-74, but how many are still brand leaders in the food manufacturing industry today?

Marketing soy protein ingredients can only mean assuming full partnership in food product manufacture. This in turn imposes responsibilities on us which we cannot shirk.

Legislation is a subject covered at this conference in depth in other papers. Hopefully, we are already getting through the fact that we reflect the main concerns of legislators on food safety and informative labeling. This also, incidentally, is a part of marketing. In this paper I would like to concentrate on our responsibility to the food manufacturer.

Before we approach an area of possible application for our ingredients, we have much research to do. The economic picture, both immediate and in the longer term, is of paramount importance. The Scandinavian fish product manufacturer is faced with declining availability but increasing price. The UK pork producer has the problem of noncompetitiveness forced on him by the politics of a difference between fiscal rates of exchange and an EEC trading currency. The price support policy for NFDM in the US is gradually forcing this ingredient out of the food processors' inventory.

These are examples of marketing opportunities calling for our attention, and only our involvement with the industry will help us define them. This detailed involvement will also tell us the type of solution likely to be economically possible. The Scandinavian fish product manufacturer will not find the addition of a soy protein *per se*, to extend his volume, the answer. He can meet part of his material shortfall by using fish, frozen at the peak fishing season. In addition there is a large available volume of fish flesh produced mechanically from fish too small for manual filleting. However, these materials have quality deficiencies: water-binding, gel formation, and color. This necessitates a keen understanding of how the quality of Scandinavian fish products is judged. Because of the accepted part they play in the diet, the nutritional integrity of the product must be maintained. Only now can we begin to assign one of our ingredients to the area. A protein ingredient could be theoretically selected. However, an in depth knowledge of other ingredients, process and equipment, is still necessary to deliver the promised behavior. A gelling protein, for example, will only gel in a food if it is allowed to hydrate with a minimum and indeed after a maximum amount of formula water. If the process is such that there is insufficient time or if other ingredients com-

pete favorably for that water, then a valid, expected solution will be perverted. Minor adjustments could have given the promised performance.

The UK ham processor can also be helped to remain competitive. His easy options are either to reduce his cooking temperature or to increase his pumped water, both of which will decrease his quality and reduce the nutritional value of the product. A protein addition, of the correct technical behavior and nutritional quality, will not only reduce his cooking losses and therefore increase his yield, but will improve quality by allowing better cooking, sliceability, etc. Here again desk side selling could be disastrous. A detailed knowledge of ham processing is essential before attempting the addition of an ingredient such as a protein. The properties which define a protein for this application are those which make it difficult to apply.

Ease of "solution," ease of diffusion in a complete meat muscle etc., could be achieved with lower molecular weight proteins. However, these enhance foaming, fostered by ham pickle make up and injection techniques. Again a gelling protein is required for improved texture and adhesion in the bone cavity. Factors such as buffering and other pH effects must be budgeted for in the overall complementary formulation of economics, quality, nutrition, process, and equipment.

The same disciplined approach is essential in the NFDM replacement in bakery products in the US. In Europe when we began to study this application area, it was found that in many cases it was the nonprotein fraction which was the reactive *raison d'être* for NFDM. It would have been of limited value to us in a marketing sense to apply a protein ingredient, however efficient, when what was needed was basically a Maillard reaction.

Many disappointments can be had when using highly functional soy proteins in bakery systems. All of them are understandable and nothing to be ashamed of, but they must be taken into account. A simple replacement of milk protein with a water-binding soy protein will increase batter viscosity to a point where air will not be incorporated efficiently and soy protein will come out of the argument with the reputation of decreasing cake volume. Similarly a gelling protein, an obvious egg albumen extender or replacer, will fail in a cake if it gels at too low a temperature before the flour starches gelatinize.

This paper was not meant to be the technical road map for applying our exciting, economic and nutritious soy protein ingredients. Rather, it is an appeal to all who believe that food technology is all about the basic understanding of how food ingredients interact.

In marketing soy protein ingredients, we have many things to be proud of and to believe in. Our raw material is produced by an industry whose growth is unparalleled in commodity agronomics. Using this, the soy processing industry has committed itself in technology, process development, and product innovation on a successful scale unequalled in the food industry. Our attention to our nutritional responsibility as shown by the results of human nutritional studies, from infants to adults, must be interpreted by our legislators with equal respect.

In essence can we not add the final touch? We must be part of, an important part of, any branch of the food industry into which we want to market our ingredients. We can only be accepted, in these terms, if we commit to understand all the vital requirements correctly. Our reward will be the reward of all who work in providing us with the ingredients we market. We will see these new food ingredients established with a recognized, rightful position which will be easily maintained and developed.