

Beef/Soy: Consumer Acceptance

KENNETH M. WOLFORD, Manager of Commercial Development, General Mills Protein Operations, Box 1113, Minneapolis, Minnesota 55440

ABSTRACT

Significant changes of social pursuits are not easily wrought. We are steeped in traditions which influence every aspect of our behavior. History shows it is difficult to alter these patterns. Food consumption is at the nucleus of this tradition and it is not without difficulty that we successfully introduce major change to our eating habits. Yet this was accomplished within this current year in a great portion of society, and with more than a modicum of success by the blending of textured soy protein with red meats at the retail store level.

INTRODUCTION

The blending of protein mixtures goes beyond written record. Animal and vegetable protein combinations have been and are currently produced in a variety of human food forms in many nations. Soy is the leading representative of vegetable proteins and soy derivatives are currently being introduced to meat components in the form of isolates, concentrates, flour, and grits. When added to meats, the soy products can contribute flavor, ensure nutrition, and provide economy. With the introduction of texture to vegetable protein, its versatility has been amplified and its functionality increased.

Soy utilization in meat extension achieved its first significant breakthrough in the U.S. in February, 1971, when the U.S. Department of Agriculture approved its use at the maximum level of 30% in the Class A government-subsidized school lunch feeding program. This meant that 25 million school children would be consuming some vegetable protein foods. We would be raising a whole new generation of young people accustomed to eating textured vegetable protein.

While textured soy protein can be combined with many types of chopped or diced meat, poultry, or fish, in the U.S. it is presently utilized predominately in ground beef

mixtures. To fully appreciate this use prominence, we must understand the significance of ground beef in the American daily diet. The annual total beef consumption in the U.S. is judged to be 116 lb/capita. Of this total, consumption of ground beef makes up just over 22%, or ca. 26 lb/person. It appeals to all age groups, people at all levels of income, and those located in all parts of the country. Many consume ground beef-oriented items in one form or another two or three times per week.

History shows that the overwhelming percentage of food production and consumption of food products containing textured vegetable protein was in the area of commercial feeding and distribution. Finished food products were served in governmental subsidized feeding programs, involuntary feeding establishments, and in other areas that did not carry the focused burden of full consumer or end-user orientation. This was a natural avenue for new food distribution.

CONCEPT BREAKTHROUGH

Apart from involuntary commercial feeding or specific ethnic appeal, a food product was marketed to all demographics—a good product made from a blending of protein mixtures and sold through supermarket meat counters.

General Mills, in cooperation with Red Owl retail food stores, pioneered the use and commercialization of textured vegetable protein added to fresh red beef on March 11, 1973, in Minneapolis, Minnesota. This was the first time in the U.S. that this new food product was marketed. It created a new food category, identified as Beef Patty Mix. This reference is actually a misnomer since bulk red beef is utilized in a variety of finished food forms (loaves, casseroles, chili, ethnic dishes, etc.) apart from beef patties or hamburger-style products.

The product, in the form of one of America's favorite foods—hamburger—was packaged, advertised and merchandised in direct parallel with regular ground beef. The original retail product was named "Juicy Burger II," a

TABLE I

Beef Trim Sources

Source	Proximate composition (%) ^a			
	Fat	Protein	Water	Cost/lb ^b
Lean trim				
Bull meat, full carcass	11.7	19.4	67.9	\$1.03
Cow meat, full carcass	11.0	19.0	69.0	1.02
Boneless beef, 90% lean	11.0	20.0	68.0	0.96
Boneless chucks	7.2	19.8	72.5	0.97
Boneless beef trim, 85% lean	20.0	19.0	61.0	0.92
Boneless beef trim, 75% lean	29.0	14.0	57.0	0.79
Frozen imported meats				
Cow meat, 90% visual lean	9.0	20.0	70.0	0.99
Bull meat, 90% lean	9.0	20.0	70.0	1.05
Shank meat	6.6	19.8	72.6	1.03
Fat trim				
Beef navels	47.0	9.0	44.0	0.46
Beef plates	40.0	10.0	50.0	0.46
Beef trimmed flanks	42.6	12.8	43.5	0.42
Boneless beef trim, 50% lean	50.0	9.0	41.0	0.52
Special beef trimmings (in house)	35.4	13.2	51.4	0.59

^aThese values are approximate and may vary between lots, depending upon the source of the raw material.

^bNational Provisioner Daily Market Service, October 31, 1973.

TABLE II

Cost Comparison Example for One Pound of Final Product ^a			
Meat cut	\$/lb	Percent of final product	Cost, \$
Regular ground beef			
90% lean	0.96	60%	0.58
50% lean	0.46	40%	0.18
	Total cost	100%	0.76
Beef/Bontrae blend			
90% lean	0.96	38%	0.36
50% lean	0.46	37%	0.17
Hydrated Bontrae	0.12	25%	0.03
	Total cost	100%	0.56

^aPredicated on beef trim costs 10/31/73—National Provisioner Daily Market Service.

blending of two protein sources—animal and vegetable—and triggered a proliferation of similar products across the nation, identified as Burger Pro, Plus Burger, Pro/Teen +, etc.

The concept was immediately successful and received outstanding consumer acceptance. There was a *rush* by retailers to duplicate the initial positive marketing penetration; in many programs, the result was that the blended product outsold regular ground beef by varying ratios.

What prompted this success? This general acceptance? This market readiness? Was it the record high food costs—meat prices, specifically? Product convenience and flexibility? Attractive packaging and merchandising? Perhaps all these things plus a product of versatility and superior performance, a sound marketing program, and dramatic conceptual economics. Juicy Burger II had all the visual impact and functions of regular ground beef. It possessed near equal flavor and nutritional characteristics and was priced 20% lower than standard retail costs.

Creation of this type of product can take many forms. There is an infinite number of possible meat/soy mixtures; processing can be varied and flexibilities exist for the manipulation of all components. Additionally, acceptable latitudes in pricing permits marketing variations.

Considerable thought, engineering, and food science were applied in the creation of Juicy Burger II. While many flexibilities exist, a description of the initial product creation and success story can serve universally as a product development guide.

PROCESSING AND PRODUCTION

Meat components were chosen from recognized beef trim sources that are normally utilized in the production of

TABLE III
Typical Nutritional Data

Component	Regular ground beef	Beef/soy blend (75/25)
Protein	17.0%	17.0%
Fat	25.0	23.0
Carbohydrate	—	3.0
Ash	0.5	3.0
Moisture	57.5	54.0
Calories/100 g	293.0	287.0
B ₁	0.08 mg/100 g	0.11 mg/100 g
B ₂	0.16 mg/100 g	0.14 mg/100 g
Niacin	4.33 mg/100 g	3.44 mg/100 g
Iron	2.17 mg/100 g	2.17 mg/100 g
Calcium	15.1 mg/100 g	20.9 mg/100 g
B ₆	0.4 mg/100 g	0.55 mg/100 g
Phosphorus	173.0 mg/100 g	173.0 mg/100 g
B ₂₁	1.9 mcg/100 g	1.5 mcg/100 g
PER ^a	2.76	2.68

^aPER = protein efficiency ratio.

pure ground beef. Generally, these sources include varying percentages of lean trim and fat trim. In the case of the beef/soy blend, components were chosen for visual appeal, taste, function, and economy (Table I). General Mills created a dry textured soy protein specifically structured to blend with fresh red beef.

This soy protein, produced by a unique patented processing technique, is an exceptionally clean tasting product with an absence of aftertaste. There is no burnt cereal flavor which is often associated with soy products. As a result of this blandness, it readily receives and retains the natural meat flavors and juices that we desire from fresh red beef. Beyond this, consideration of color and particle size has been practiced to achieve a rapid and uniform hydration, and a homogeneous blending with ground beef. These facts contribute to the production of a bright, fresh-looking, meat-oriented food product.

Recommendations for mixing and blending include hydrating the textured vegetable protein at the ratio of 2 parts water to 1 part product, by wt, and adding this blend to the total product mix at the rate of 25%. This mixture produces a natural appearing and tasting product. Table II illustrates the economics of this ingredient blend compared with a typical all beef mixture.

The methodology of production utilizes standard meat processing equipment. The processing takes place at a central preparation plant and initial mixing steps include the following: (A.) Place a portion of lean and fat beef trim in silent cutter and coarse chop. (B.) Add hydrated textured vegetable protein, remainder of beef trim, and coarse chop until blended. (C.) Convey to mechanical stuffer and fill flexible film keeper case with coarse chopped blend. (D.) Product is then boxed and sent to retail units under refrigeration. For outlying stores, product is sent frozen in the same keeper cases. (E.) The stores then grind the coarse chopped material, as needed, through a 1/8 in. plate and package and price for retail sale. Generally, one-pound units and larger "family" packs are prepared in this manner. All components should be kept cold. Original system was set for 32°.

In March 1973 when the first product reached the retail meat case, it was priced at .75/lb, for regular ground beef.

TABLE IV
Cooking Yield Comparison^a

Item	Regular ground beef	Beef/Bontrae blend
Grams before cooking	452	452
Grams after cooking	312	353
Cooking loss	140	99
Shrink	31%	22%

^aOne pound fried into patties.

This and subsequent products have generally ranged between .10-.20/lb lower in cost than all-beef. Public reception has been excellent and the new product is viewed as an item that offers a sincere price/value relationship.

Other mixing methods can and have been employed that differentiate from the method used for the initial market breakthrough. Mixer/grinders can be substituted in place of the silent cutter chopper. Blending is also done by individual retail units. Other beef/soy ratios can be combined instead of 75% beef and 25% soy and flexibilities exist in the soy hydration procedure. Textured vegetable protein is a thirsty product and will certainly absorb more moisture than the 2:1 ratio described earlier.

However, at General Mills we recommend a fresh red beef program that includes 75% beef/25% hydrated textured vegetable protein and also suggest that the moisture hydration be restricted to 2 parts water to 1 part product by wt.

BUSINESS PHILOSOPHY

A major reason for these recommendations is a basic business philosophy of preserving the identity of ground beef. This prescribed blending maintains the appearance and flavor expected of regular ground beef. Specifically, the recommendations are made to: (A.) Preserve the textural integrity of the beef/soy mixture. When more than a 2:1 moisture ratio is utilized, you run the risk of producing a finished product that possesses a mushy, soft or mealy texture. This is not meat-like and could prove to be disappointing in various dishes and recipes. (B.) To preserve nutritional benefits. Textured vegetable protein product is ca. 52% protein in its dry form. When hydrated 2:1, we have then produced a "ready to use" product that contains ca. 17% protein, just about the same as ground beef. If additional water is used, say 3:1 hydration, then the protein content has been reduced to ca. 13%, or 25% less than ground beef. For these reasons we advise the 2:1 hydration method to assure the consumer the nutritional excellence expected from a meat-oriented food product. (C.) To reduce cooking shrink or "fry away." If more than two parts water to one part soy is used, we risk losing too large a portion in the cooking process. If we maintain a 2:1 mix ratio, very little cooking loss is experienced—and with an eye toward consumer benefits, more food and food value are retained for family meal service.

We must be concerned with product excellence and there is a sincere fear of less than desirable beef/soy mixtures proliferating the marketplace—products that contribute an unfamiliar texture, a bad flavor, or poor nutrition. This can happen, and could damage this new emerging food category.

CONSUMER BENEFITS

When beef and textured vegetable protein are blended properly, the consumer is offered a versatile, good tasting, nutritious food product—a product in which several consumer benefits can be derived. Table III lists nutritional qualifications of the beef/soy blend and an all-beef product. The comparisons are very similar and attest to the nutritional excellence of the meat and vegetable protein combination.

Of considerable importance is the product's performance and the resultant economics. Table IV details the cooking yield of ground beef and beef/soy blends when formed into patties. There is obviously less fry away in the beef and textured vegetable protein mixture, with more natural juices retained in the blend. In Table V this "cook savings" is translated into consumer economics and can ultimately result in a differential of .42/lb on a cooked basis—a significant savings to the end-user.

TABLE V

Consumer Economics			
Item	Regular ground beef	Beef/Bontrae blend	Percent savings
Price/lb. raw	\$0.95	\$0.75	21%
Raw wt	16.0 oz.	16.0 oz.	
Cooked wt	11.0 oz.	12.5 oz.	
Price/lb. cooked	\$1.38	\$0.96	30%

Beef patty mixes, meat/soy blends, beef and textured vegetable protein—whatever they may be called—have emerged as a recognizable new food category. Textured vegetable protein has acted as a catalyst and the ground work has now been laid for further soy food product development.

INDEPENDENT BUYING DECISION

Of particular significance is the fact that for the first time, the vegetable protein concept has been successfully presented to the consuming public in a major familiar-food category. It has been presented without deceptions, clearly identifying the product make-up and its uses, and participating in a marketing/sales arena that puts it at the mercy of an independent buying decision. At our time in history and development, in March 1973, this approach must certainly be referred to as "courageous marketing."

A major international food manufacturer and a retail grocery corporation had risked their reputations. Fortunately, the job was done right; the concept and product were well received. Now eight months later, the new food has penetrated 50% of the nation's food retailers and is being consumed by millions of Americans. It has served to open up the soy protein processing industry and, as a result, many soy manufacturers are proceeding with plans to expand production facilities.

In less than six months' time, the market has changed from a position where processors were frantically trying to get orders to fill up their plants to a point where they cannot process material fast enough. Peripheral and allied industries have also profited, since suppliers of flexible film keeper cases, film wrap makers, seasoning manufacturers, equipment suppliers, and independent meat processing facilities have all secured increased business as a result of the market breakthrough.

ALTERED TRADITION

The success of the supermarket red meat program can have applications in many types of commercial meat processing. Beyond this, it has laid the groundwork for the introduction of a whole new generation of manufactured protein foods. Specialties are already beginning to appear on the American supermarket shelves. Packages of the basic extender for "do-it-yourself" home use are receiving early sales success. Textured vegetable protein promises to be a valuable and versatile food resource, a product possessing adaptability to the indigenous dishes of many nations.

It is difficult to assess the degree of impact of this recent market penetration. The processing and sale of a new food product is easily recognizable, but of far more significance is the public acceptance of the textured soy concept as another high quality source of protein.

This approval paves the way for the potential merchandising of the many attributes of soy—its nutritional excellence, economy and controllable composition.

We are sometimes too close to our subject matter in our day-to-day living to observe the magnitude of change. The passing of time and the peoples of the world will tell us at some future date to what extent we have altered tradition.