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## The “Clean Label” Movement What Is It? How Does Soy Fit In?

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# THE “CLEAN LABEL” MOVEMENT: DIETARY PROBLEM OR HEALTHY SOLUTION?

By Tamara Schryver, PhD, MS, RD

Over the last five years, “clean label” food products have swept through the conventional food supply. Literally every food and beverage category has been affected from dairy to bakery, baby foods to snack foods, alcoholic beverages to water, and though not human food, even dietary supplements and pet food.<sup>1</sup> According to research from Nielsen and Label Insight, overall sales of clean label food and beverages grew 1.2% in the past year.<sup>2</sup> And while consumer awareness has increased not only in regard to product claims related to clean labels but to what ingredients are actually in the products, the intent of the food movement and the specific impact of clean labels on otherwise nutritious, accessible foods, isn’t always aligned. Thus, the case with soy and soy ingredient derivatives.

The transformation of the American table can be traced back to the 1950s with advancements in agricultural technology bringing an abundant, affordable food supply. For the first time ever, average consumers could focus their food preparation efforts on gastronomic luxuries rather than food for necessity.<sup>3</sup> Traditional soyfoods were consumed largely by immigrants and at the same time, soy protein products were developed for use in U.S. Army rations, to feed refugees, and to enhance the functionality of products sold in grocery stores and schools.<sup>3,4</sup>

At the turn of the century, the food movement’s attention focused more on the delivery of “whole food” or “real food” from alternative food systems that pro-

moted foods that were less processed and refined, and sourced from local, sustainable markets. One leading advocate, Michael Pollan, provided advice on eating in his book, *Food Rules*, which focused several rules on avoiding foods that had ingredients with chemical-sounding names and anything that contained more than five ingredients.<sup>5</sup> Pollan’s specific advice on soy was to avoid foods that contained soy protein isolate, textured vegetable protein from soy, soy isoflavones, and soy lecithin.<sup>5,6</sup>

While the tenets of the modern-day food movement are complex and include not only the food itself but food production, labor practices, distribution, fair trade practices, and environmental concerns, the consumer drive for whole foods has been best captured in its desire for “clean eating.” Clean eating embraces eating “real” foods that are wholesome and unprocessed. It is more than a diet, but a lifestyle that promotes purity through body detoxification and the elimination of entire categories of food such as gluten and soy for nonclinical reasons.<sup>7</sup> Particularly when it comes to soy, these practices are not evidenced-based and run counter to the Dietary Guidelines for Americans.<sup>8</sup> The food industry’s response to consumer demand has been the creation of a variety of “clean label” foods.

## Defining Clean Label

The term “clean label” has no agreed upon definition nor has the Food and Drug Administration (FDA) publicly entered the dialogue to clarify its stance. The term generally refers to food formulations with shorter ingredient lists, without artificial/synthetic chemicals, and with familiar ingredients.<sup>9</sup> The most common claims are “free from artificial colors and flavors,” “no preservatives,” and “only natural ingredients.”<sup>9</sup>

Consumers most often associate the following clean label claims with greater healthfulness: preservative-free, natural, no artificial sweeteners, hormone-free, unprocessed, organic, antibiotic-free, GMO-free, and real.<sup>10</sup> FDA and United States Department of Agriculture (USDA) guidance and policy documents on related terms help develop a framework for how the industry should approach clean label positioning. USDA has defined a “natural” claim, whereas FDA has only provided policy.<sup>11,12</sup> The guidance is similar in that no artificial ingredients may be included in the final product. Additionally, USDA further requires the food item to be minimally processed to qualify as “natural.” USDA also provides criteria for the claims “hormone-free,” “organic,” and “antibiotic-free.”

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FDA has recently provided guidance for labeling foods that are derived from genetically engineered plants. In the U.S., 93% of planted soybeans are bioengineered; however, labeling foods to indicate its status is currently voluntary.<sup>13</sup> Passage of the National Bioengineered Food Disclosure Standard Act in 2016 will soon make disclosure mandatory.<sup>14</sup> The USDA is expected to implement the act in 2018 and may allow a scannable QR code on packaging containing a bioengineered product.

At this point in time, consumers have the option of purchasing “100% organic” or “organic” products if they want to avoid bioengineered ingredients like soy.<sup>15</sup> Organic soyfoods and ingredients, which are currently available for purchase, have experienced enormous growth indicating strong consumer demand.<sup>16</sup> Their leading competitor is the commodity, or conventional, soybean.

### Consumer Acceptance of Soyfoods

For some consumers, “organic” is a proxy for clean label and a soy product with an organic label would meet their personal criteria. Soyfoods perceived to be “whole” like edamame, tofu, soy sauce, tempeh, soy nuts, and soybeans are also likely to meet consumer clean label criteria provided there are no additional artificial colors, artificial flavors, or preservatives added.

The challenge is the “soy-free” market, which was estimated to be \$4.5 billion for the 12 month period ending July 1, 2017—the third largest behind “organic” and “no artificial color.”<sup>17</sup> In 2016, 16% of Americans were trying to avoid soy in their diets while only 13% were trying to increase soy consumption.<sup>18</sup> Beef, milk and dairy were the only other sources of protein more commonly limited or avoided than soy.<sup>18</sup>

In the last thirty years, unfounded fears have been expressed by some that soy might feminize men, increase the risk of certain cancers, be unsuitable for kids, be allergenic, or be an inferior source of protein. However, there are strong data to support the safety of soy, its relatively low rate of allergenicity, and its superior protein quality.<sup>19-21</sup>

New emerging concerns are related to processed foods in general, especially in ingredients like soy protein concentrate, isolated soy protein, and texturized vegetable protein. This concern is in part due to the fact that hexane is used to process the soy.<sup>22,23</sup> Consumers are also reacting to their perception of environmental concerns related to the use of genetically modified soy.<sup>23</sup> However, plant-based diets that contain soy protein have a lower carbon footprint than animal-based diets that include meat and dairy.<sup>24</sup>

### Unacceptable Ingredients Lists

With no FDA definition for “clean label,” food institutions choosing to use the term are left to define it themselves. While Whole Foods and Panera are believed to be

among the first to publish lists of ingredients they find unacceptable in foods they sell or make, other retailers, food manufacturers, restaurants, and food service channels like schools, hospitals, colleges and universities have developed their version of a list. Unacceptable ingredient lists are generally lists of ingredients a retailer or manufacturer has deemed contrary to that organization’s clean label philosophy and most always include the exclusion of artificial colors, artificial flavors, artificial preservatives, artificial sweeteners, high fructose corn syrup, hydrogenated fat, BHA/BHT, nitrates/nitrites, and dough conditioners. Inclusion of “natural” colors, flavors and preservatives vary. As noted earlier, these lists are based on subjective perceptions rather than scientific evidence.

A few organizations include some form of soy on their “unacceptable” ingredients list like hydrolyzed soy protein, textured soy protein, soy protein concentrate, and/or isolated soy protein. In contrast, a national Mexican restaurant chain reports to use “real” ingredients on its web site, one of which is soyfritas (made from tofu), while a national noodle company chain does similarly with soybean oil and soy sauce.

### Impact on the Consumer

The upside of the clean label phenomenon is the emerging transparency and dialogue between those who grow, manufacture, and prepare food with those who consume it. On the downside, clean label efforts often ignore the sodium, sugar, or calorie content of food in its obsession with what not to eat. Additionally, many processed foods and food categories have been slighted and outright banned for unscientific reasons. Processed soyfoods sometimes fall in this category and we should be aware of this situation because a nutritious food can easily be excluded from an otherwise healthy diet.

The food movement is continuing to evolve with emphasis shifting from “unacceptable ingredients lists” to larger issues like managing the communication and use of bioengineered crops, organic and sustainable food, fair trade practices, humane treatment of animals, food waste, and the overall environmental impact of agricultural practices. Soyfoods can most certainly be part of the solution. 🍌

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The nutritional profile and functional properties of soy and its constituents (oil, protein, fiber) influence a surprising number of food products in the market today.<sup>1</sup> Soy as an ingredient in foods adds nutrition like protein, healthy polyunsaturated fat, phytonutrients and dietary fiber.



The health benefits of soy have been studied extensively. Various soy products are viewed as health promoting, and may play a role in weight loss, improving glucose tolerance, lowering bad cholesterol,

and possibly reducing risk of breast, prostate and colon cancers.<sup>1</sup>

Soy protein is a sustainable protein when incorporated into various food products. It is a high-quality protein containing all of the essential amino acids.<sup>2</sup> Soy protein added to cereals, protein bars, and bakery goods increase both the quantity and quality of the protein in these products. One reason the food industry uses soy protein is because it has the ability to gel after heating. This attribute allows the food product to retain moisture, flavor, aroma and its shape, and hold other food ingredients within the food product.

### Types of Soy Protein Additives

Textured soy products, which are also called “textured soy protein” (TSP) or “textured vegetable protein” (TVP) are made from soy flour, soy concentrate or soy protein isolate.<sup>1,3</sup> TVPs are added to many types of fibrous foods and ground meat products to increase protein content and enhance flavor. TVPs are most commonly used as meat extenders, available in granules, flakes, or chunk style products. A pound of TVP approximates roughly 3 lbs. of ground beef, from a protein perspective.<sup>4</sup> When re-hydrated, 1 cup of TVP produces around 2 cups of TVP.<sup>4</sup>

Soy flour, which is approximately 50% protein, is commonly used to replace non-fat dry milk or whole milk solids in food processing.<sup>1</sup> Soy flour improves the browning result of baked and cereal products without compromising nutrient or protein content.<sup>2</sup>

Soy protein concentrates and isolates are approximately 65% and 90% protein, respectively, making these products very low in carbohydrates and fat.<sup>1,3</sup> Soy protein isolates are incorporated into a number of popular items, such as power/cereal bars, protein shakes and liquid nutritional meals to increase protein content.

Soy protein can also be found in a variety of food products, including dairy products, frozen meals and desserts, cereal/cake/snack products, and meat entrees, to name a few.

For more information about a wide variety of soyfood products, see the *Soyfoods Guide*, available online at *The Soy Connection* website: [www.soyconnection.com](http://www.soyconnection.com). 🍌

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# NUTRIENT QUALITY ENHANCED IN PRODUCTS WHEN SOY COMPONENTS ADDED TO FOODS

By Mark Messina, PhD, MS

Concentrated sources of soy protein, commonly referred to as soy protein products (SPPs), are widely used by the food industry for their functional properties, such as enhancing moisture content and increasing shelf life.<sup>1-4</sup> These concentrated sources of protein, which include isolated soy protein (ISP), soy protein concentrate (SPC) and soy flour (also textured soy protein or textured vegetable protein), are also used to increase the protein content of a wide variety of products such as energy bars and breakfast cereals. These protein sources form the basis for creating a variety of meat analogues, such as soy burgers, which have become increasingly popular as more people opt to consume plant-based meals. By definition, ISP, SPC and soy flour are approximately 90%, 65% and 50% protein, respectively (See Table 1).

Despite surveys indicating consumer interest in increasing protein intake, in recent years, there has been some resistance against consuming foods that contain SPPs. This resistance has occurred at the individual level as well as the institutional setting. There is no question that the SPPs are viewed very differently than traditional Asian soyfoods, such as tofu and miso. In some cases, institutions have balked at using products to which soy protein has been added on the grounds that these soy protein-enhanced products are inconsistent with the public's desire to consume "clean label" foods. Since the SPPs began being added to meat products in the 1960s/1970s as a cost-saving measure (the cost of beef increased dramatically in the early 1970s), it is not surprising that products to which soy protein were added were initially viewed as inferior. However, that perception of these products is without scientific merit.

To some extent, differentiating the traditional soyfoods from the SPPs makes nutritional sense. Virtually all nutritionists and dietitians recommend emphasizing the consumption of whole foods and minimizing the intake of highly refined products. However, more often than not, refinement refers to the effect of processing on the carbohydrate content of a food. As a result of processing, there are clear differences in nutrient and non-nutrient content between the traditional soyfoods and the SPPs. For example, many of the SPPs are devoid of fat and fiber, and some are very low in isoflavones. SPPs are, as the name suggests, primarily sources of protein.



Today, soy protein can be found in many products of questionable nutritional value. However, the value of the products to which soy protein has been added needs to be separated from the value of the SPPs. Concerns about the use of SPPs in institutional settings are not new. Forty years ago, it was claimed that adding soy protein to meat lowered the protein quality of the soy-enhanced product.<sup>5</sup> However, that impression was based on rodent assays which are now known to undervalue legume proteins such as soy. Current assays show that the quality of soy protein is similar to or higher than the quality of meat protein.<sup>6,7</sup> Thus, not only is protein quality not compromised when SPPs are added to meat, from a functional perspective, the organoleptic properties are likely enhanced as a result.

While it is difficult to say precisely what constitutes a "clean label," the interest in eating this way is increasingly tied to concerns about the environmental impact of the foods we eat. Therefore, it is ironic that at a time when the impact of dietary choices on the environment are beginning to influence consumer purchases, soy protein-enhanced meat products are actually perceived as being less environmentally friendly. It is well established that soybeans are an especially efficient means of producing protein<sup>8</sup> and life-cycle assessments show that the SPPs are also an environmentally efficient means of delivering protein even though they require additional processing in comparison to the whole soybean.<sup>1</sup>

Soy protein is one of the eight foods responsible for 90% of all food allergic reactions in the United States.<sup>9</sup>

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**Table 1. Soy Protein Composition**

Soy Protein Form	Protein Composition
Soy Flour	40–55%
Soy Concentrate	65–90%
Soy Isolate	90–95%
Textured Soy Protein	<50%

Source: Soyfoods Association of North America. *Soy fact sheets* [Internet]. Available from: <http://www.soyfoods.org/soy-products/soy-fact-sheets>.

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As such, product labels require that the presence of soy protein be indicated. The widespread use of SPPs does require that soy allergic individuals be especially observed. However, the eight foods that require being labeled are not equally allergenic. In fact, surveys suggest that only about 1/2,500 adults have a doctor-diagnosed soy allergy.<sup>10</sup> Therefore, relatively few people will be inconvenienced by the use of SPPs.

It is hard to identify all of the objections to the use of SPPs but lack of long term safety data should not be one. Several long-term trials that have intervened with far more soy protein than would likely be consumed via soy protein-enhanced products have not revealed any significant adverse effects.<sup>11,12</sup> Notably, soy infant formula produces normal growth and development according to the American Academy of Pediatrics.<sup>13</sup> Infants using soy infant formula consume far more soy protein on a body weight basis than could realistically be consumed via the consumption of foods containing soy protein.

In conclusion, SPPs are widely used by the food industry for their functional attributes. When used primarily to increase protein content, protein quality is definitely not compromised nor are any environmental advantages sacrificed. 🍌

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