

# ISoy

## Introducing Soy Products in Illinois School Lunch Programs



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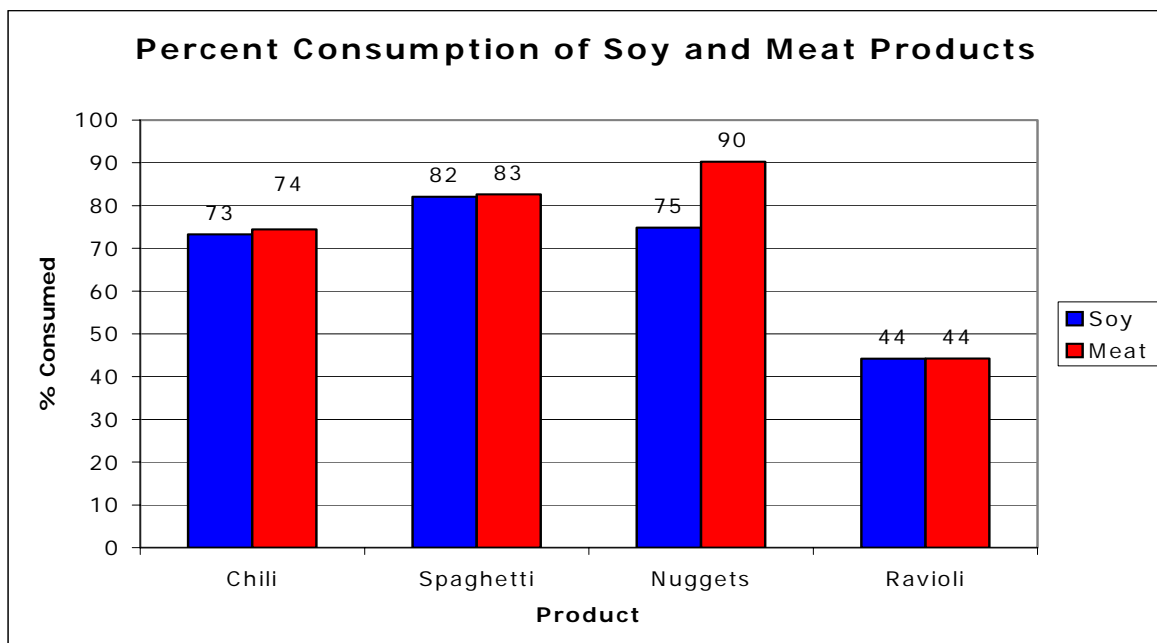
Childhood obesity is a critical national health problem in the United States. There has been a tripling of the incidence in obesity in school children aged 6 to 11 years over the past 2 decades. This increase in childhood obesity has direct impact on both immediate and long-term risks of diabetes and cardiovascular disease. Causes of childhood obesity have multiple roots, including societal and physical changes in the environment. In the school setting, lunch programs and offerings have changed and physical activity has been curtailed. A “healthy school environment”, where children are taught about good nutrition and physical activity and practice these principles, is essential.

The National School Lunch Program sets forth guidelines for menus for school children that will provide lunches and breakfasts that meet recognized standards for nutritional content. The challenge of serving appetizing meals that students will consume is faced daily by the foodservice manager in schools across the country. This is coupled with the need to control costs and still meet quality standards. Despite the best intentions, school lunch audits usually reveal high fat and calories in the average school lunch. The use of commodity foods high in fat, such as 80/20 beef, is universal, because of the cost factor.

The goal of the ISoy program is to show that products made with soy ingredients can help reduce fat, cholesterol and calories, which will help schools meet the recommended dietary recommendations of 30% of calories from fat and less than 10% from saturated fat. In addition, students must find these products as acceptable as those normally served in the lunch program.

**Consumer acceptability** studies are difficult to do in realistic situations. Asking whether a product is liked or disliked in a controlled environment does not always translate into acceptance in a normal eating condition. In our study, plate waste or percent of a product that was consumed during usual lunch programs was used as a proxy for acceptance. If students consumed the same amount or more of the test product than the usual one, then we can conclude that the products were at least equally acceptable.

Figure 1. Average percent consumption of soy-enhanced and meat products in all schools.



As can be seen from Figure 1, the percent consumed of the soy products versus meat version is essentially the same for chili and spaghetti. Both of these entrées are usually prepared from scratch in school kitchens using standardized recipes. This allows foodservice workers flexibility in meeting student preferences. In the testing situation, a basic recipe was used to prepare a frozen product that was reheated in school kitchens, where additional spices or tomato products were added. This had the advantage of allowing the product to be tailored to the school population and service method. Making the frozen meat/soy blend available to the school lunch program would let foodservice preparers use their own recipes.

On the other hand, nuggets and ravioli were processed products that could not be modified in the school kitchen. Chicken nuggets are stock products on essentially all school menus, as well as in fast food restaurants. Thus, students have strong preconceived notions of flavor, size and shape of nuggets. Chicken nuggets were preferred to soy-based nuggets in all schools. However, the percent consumed is over 75% for both types, indicating that soy-based nuggets could be served and still achieve acceptance. The unusual round shape and large size of the frozen ravioli product made it distinctively different from the usual canned product served in many school lunch programs. Percent consumption of both soy-enhanced and meat versions of the ravioli was much less (44% consumed) than of any other entrée tested, indicating that the product used was probably not suitable for school lunch programs. Reformulation and testing with children could result in a more satisfactory product for both nuggets and ravioli.

From a *nutritional standpoint* (Tables 1 and 2), spaghetti made with soy/meat (50/50 blend of rehydrated textured soy and 80%lean/20% fat beef) had 22% less calories, 43% less fat and half as much saturated fat and cholesterol when compared with beef product (80% lean/20% fat). Percent calories from fat was reduced from 54% to 40%. If rehydrated soy alone, rather than the blend was used instead, further reductions in percent calories from fat could be achieved.

Chili made with 100% soy had 32% fewer calories, 20% of the total fat, and essentially no saturated fat or cholesterol when compared with chili made with 80/20 beef. Percent calories from fat was reduced from 54% to 14%. Foodservice cooks could use the rehydrated product in their own recipes and achieve similar results.

Ravioli made with soy/meat blend (50/50 blend of rehydrated textured soy and 80%lean/20% fat beef) was similar in calories, fat, and cholesterol to the all beef version. Further modifications in the product for the school lunch market would be needed to increase the percent consumption or acceptance.

Chicken nuggets used in each school were from different sources. Based on comparisons with USDA values for fast food chicken nuggets, soy nuggets had more protein, slightly less total fat, half the saturated fat, and no cholesterol. The product can be viewed as a vegetarian entrée, as well as being lower in fat and cholesterol.

Table 1. Comparison of calories and fats in meat (80/20 beef) and meat/soy blend (50/50 rehydrated textured soy and 80/20 beef) spaghetti and ravioli.

	Spaghetti (3/4 cup serving)		Ravioli (5 raviolis without sauce)	
	Meat	50/50 Meat/Soy	Meat	50/50 Meat/ Soy
Calories	360	282	165	166
Protein (grams)	19	20	10	9
Carbohydrate (g)	22	22	28	28
Total fat (g)	21	12	2	2
Fat as % calories	54	40	9	10
Saturated fat (g)	7.4	3.9	0.7	0.8
Cholesterol (mg)	64	33	26	22

Table 2. Comparison of calories and fats in meat (80/20 beef or all chicken nuggets) and 100% soy replacement (rehydrated textured soy) chili and nuggets.

	Chili (1/2 cup serving)		Nuggets (6 chicken nuggets or 5 soy)	
	Meat	100% soy	Chicken	100% Soy
Calories	262	179	297	275
Protein (grams)	15	18	16	18
Carbohydrate (g)	14	20	16	18
Total fat (g)	15	3	19	16
Fat as % calories	54	14	58	55
Saturated fat (g)	5.1	0.2	4	2.5
Cholesterol (mg)	45	0	55	0

**Cost comparisons** for the various products can be made on a hypothetical basis. The cost of 80/20 beef according to the USDA commodity price list (2004) is \$48.45 for 40 lbs. or \$1.21 per lb. Dry textured soy granules range from \$1.27 to \$1.57 per lb., and when rehydrated the cost would be approximately \$0.40 per lb. Thus, a 50/50 blend of rehydrated textured soy and 80/20 beef would cost approximately \$0.80 per lb, or two-thirds the price of a pound of commodity ground beef. Coupled with the improved nutritional profile of products made with the blend and the equivalent acceptability, textured soy products provide a benefit to school lunch programs.

### Sources to purchase soy products

SYSCO Corporation [www.sysco.com](http://www.sysco.com)

Rhinehart

UniPro Foodservice, Inc. [www.uniprofoodservice.com](http://www.uniprofoodservice.com)

ProGroup Distribution Centers

Asmussen Waxler Group [www.awgfood.com](http://www.awgfood.com) 847-816-0100

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