

LITTLE BEANS, BIG NUTRITION



INTRODUCTION

There is a lot of talk in the media about the need for Americans to improve their diets, yet we know that consumers are not likely to change their eating habits. As evidenced by growing concerns about health-related issues, such as obesity, diabetes, digestive health and cardiovascular disease, it is clear that something must change. It is time for a shift in how we formulate food products, providing consumers with better choices while still delivering products they will incorporate into their everyday diets.

Beans represent a significant opportunity for food manufacturers to boost the nutrient content and create “better-for-you” products. There are clear public health and marketing benefits associated with the promotion of products that include beans. Beans are packed with fiber and protein, as well as being a good source of numerous vitamins and minerals. They have a low glycemic index which may play a role in maintaining normal blood sugar levels. Yet dried beans are among the most underutilized foods in the American diet. The average consumption is less than one cup per week, which is only about one-third of the USDA recommendation [1].

Cooked ground bean products make nutrition innovation a reality. Bean powders, in particular, are cost-effective and versatile and can be used in nearly any application—snack foods, cereals, dips and even cookies. Bean powders offer the same nutritional benefits as whole, prepared beans.



Pinto Bean



Black Bean



Small Red Bean



Navy Bean



Great Northern Bean



Dark Red Kidney Bean



Chickpea



Pink Bean



Mayocoba Bean

BEAN NUTRITION

Dried beans, also called legumes, are among the best sources of plant protein and are low in both saturated and total fat. Like all plant foods, they are cholesterol-free. One-half cup of beans provides approximately 8 grams of protein—about the same amount found in a cup of milk—and between 100 and 130 calories (Table 1).

According to the 2005 Dietary Guidelines, nutrients of concern for many Americans include fiber, magnesium, potassium and calcium, all of which are contained in beans [1]. Beans are among the richest sources of dietary fiber. And, they provide a number of essential nutrients, including the B vitamin folate, and minerals such as iron, zinc, magnesium, copper, potassium and sometimes calcium. Data from the National Health and Nutrition Examination Survey that included almost 10,000 Americans showed that adults who consume beans have higher intakes for some of these key nutrients [2].

(Table 1)

Protein in one serving of cooked beans (1/2 cup) and other selected foods.

Food	Protein (grams)
Black Beans	7.6
Chickpeas	7.2
Kidney Beans	7.7
Lima Beans	7.3
Pinto Beans	7.7
1 Large Egg	6.7
1 Cup Milk	8.2
1/2 Cup Yogurt	6.4
1/4 Cup Chopped Walnuts	4.4

Source: USDA Nutrient Database (<http://www.nal.usda.gov/fnic/foodcomp/search/>)

Beans are the only food to appear twice in the USDA Food Pyramid: the vegetable group and the meat and beans group.



Cooked ground bean products can be used to pack a nutritional punch in snack foods.

BEAN NUTRITION (CONT.)

Beans are important sources of these key nutrients:

Folate

Is needed for formation of red blood cells. This vitamin plays a crucial role in the development of the nervous system of the embryo early in pregnancy. Inadequate intake is linked to serious birth defects. As an example of what beans can offer, a half-cup serving of kidney beans delivers 141mcg of folate [3].

Magnesium

Is important in energy production and in the synthesis of bones. More than 300 metabolic reactions in the body require this mineral. A half-cup serving of navy beans delivers 48mg of magnesium, which is over 10% of the RDI [3, 4].

Potassium

Helps to regulate fluid balance in the body and is important in maintaining healthful blood pressure levels. It is also linked to improved bone health. A one-half cup serving of lima beans, for example, can deliver 478mg of potassium [3].

Iron

Is a component of red blood cells. Iron deficiency is a common problem in developing countries, and often falls short in the diets of low-income Americans. Inadequate iron intake can lead to anemia and poor immune function. A one-half cup serving of cooked red kidney beans provides 2.60 mg of iron [3].

Amounts of selected nutrients in 1/2 cup servings of different types of beans!

Food	Protein (grams)	Folate (micrograms)	Magnesium (milligrams)	Potassium (milligrams)	Iron (milligrams)
RDI ²	50	400	400	3500	18
Black Beans	7.6 (8.1) ³	128 (32.0)	60 (15.0)	305 (8.7)	1.8 (10.0)
Chickpeas	7.2 (9.8)	141 (35.2)	39 (9.8)	239 (6.8)	2.4 (13.3)
Kidney Beans	7.7 (10.5)	115 (28.8)	40 (10.0)	357 (10.2)	2.6 (14.4)
Lima Beans	7.3 (10.8)	78 (19.5)	40 (10.0)	478 (13.6)	2.2 (12.2)
Pinto Beans	7.7 (9.5)	147 (36.8)	43 (10.8)	373 (10.7)	1.8 (10.0)

¹Source: USDA Nutrient Database (<http://www.nal.usda.gov/fnic/foodcomp/search/>)

²Reference Daily Intake

³Numbers in parentheses represent percent RDI (most commonly known as percent Daily Value). Values for beans corrected for protein quality (PDCAAS).

DRIED BEANS AND DIETARY FIBER

Increased dietary fiber consumption is associated with multiple health benefits [5]. Fruits and vegetables rich in soluble fiber (which includes beans) are associated with lower risk of heart disease by lowering total and LDL blood cholesterol levels [6]. Dietary fiber is also important for digestive health—essential for laxation and intestinal regularity. Constipation is experienced by at least 20% of people over 65 years of age [1].

Fiber is an important part of a healthy diet, yet most Americans do not consume the recommended amount of fiber [1]. The 2005 Dietary Guidelines for Americans recommends 14 grams of fiber for every 1,000 calories consumed, or approximately 28 grams per day for women and 36 grams for men [1]. Most Americans consume only around half of the recommended amount of fiber, which is found only in plant foods like beans [1]. Cooked dried beans in particular are one of the most fiber-rich foods available (Table 2).

Dietary fiber includes a group of compounds found in plant foods, which are mostly resistant to digestion by enzymes in the small intestine. However, some fibers are partially digested in the colon. There are three broad categories of dietary fiber that are part of a well-balanced diet, all of which are found in dried beans.

Soluble fiber...

as its name implies, is water-soluble. Broken down and fermented in the colon by bacteria, soluble fiber absorbs water in the small intestine to become a gelatinous, viscous substance which can maintain normal blood cholesterol (certain viscous soluble fibers) and blood sugar levels. It is found in beans, oats, barley, and certain fruits and vegetables.

Insoluble fiber...

in contrast to soluble fiber, does not dissolve and passes intact through the intestines. Insoluble fiber speeds the passage of foods through the digestive system, thereby adding bulk to the stool and facilitating regularity. It is found in the skins of fruits and vegetables, as well as in beans, whole-wheat products, corn bran, seeds and nuts.

Resistant starch...

is different in structure from fiber, but like soluble fiber, it resists digestion and passes intact through the small intestines and can be fermented by bacteria in the colon. Some resistant starch is made during the processing of foods, but it is also found naturally in beans.

(Table 2)

Dietary fiber content of one serving cooked beans (1/2 cup) and other selected foods.

Food	Dietary Fiber (grams)
Black Beans	7.5
Chickpeas	6.2
Kidney Beans	6.5
Lima Beans	6.6
Pinto Beans	7.7
1 Cup Blackberries	7.6
1 Ounce Bran Cereal	5.3
1 Cup Cooked Oat Bran	5.7
1/2 Cup Cooked Sweet Potatoes	4.1

Source: USDA Nutrient Database (<http://www.nal.usda.gov/fnic/foodcomp/search/>)

HEALTH BENEFITS OF BEANS

Dried beans and weight control

The number of overweight and obese people has increased dramatically in the United States in the past 20 years. In 2004, nearly one in five U.S. children and adolescents were overweight and about one in three adults were considered obese [7]. Due to their protein and fiber content, dried beans may play a role in maintaining an ideal weight [8].

People who eat more protein may tend to eat less overall.

In one study conducted by researchers from the University of Washington School of Medicine, when subjects were placed on a high protein diet and allowed to eat as much as they wanted, they consumed 400 calories fewer per day than when they consumed a diet that was lower in protein [9]. In response to this research, an editorial in the *American Journal of Clinical Nutrition* by an internationally renowned obesity expert suggested it was time to consider recommending an increase in protein content of the American diet [10]. Optimally, healthful foods like beans are important contributors to dietary protein and minimize the potential impact of saturated fat which accompanies animal protein. Beans are rich in fiber and low in fat, as well as an important vegetable source of protein.

Research suggests that fiber impacts satiety by decreasing hunger, prolonging satiation, and/or increasing satiety signals [11]. For example, a Canadian study found that young men who were fed a high-fiber, pre-load snack 75 minutes before lunch felt more full at lunchtime and reduced their intake of food by an average of 172 calories [12].



Beans come in many varieties.



Adding bean powders to your soups, sauces and dressings can help boost nutritional content.

Adding fiber to the diet has been shown to decrease energy intake and increase the production and release of satiety hormones. In subjects who consumed a meal containing white beans, secretion of the satiety hormone cholecystokinin (CCK) was twice as high as it was in subjects who consumed a low-fiber meal [13]. In fact, a large research study shows a correlation between bean consumption and maintenance of lower body weight as part of a healthy dietary pattern including beans. According to researchers from the Baltimore Longitudinal Study of Aging (BLSA), subjects consuming a fiber-rich dietary pattern that was high in whole grains and legumes had the lowest body mass index (a measurement of weight to height), smallest waist circumference and the smallest average yearly increase in body mass index [14].

HEALTH BENEFITS OF BEANS (CONT.)



Cooked ground bean products are available in a variety of forms to suit many applications.

Dried beans and digestive health

Among people over age 65, more than 20% suffer from constipation, a condition that is often easily relieved by boosting fiber intake [15]. High-fiber foods, such as beans, are known to be beneficial in maintaining a healthy digestive tract.

Fiber-rich foods may be more beneficial than fiber supplements since other compounds in these foods also play a role in improving health [2, 5, 16].

Dried beans and heart health

Low levels of LDL-cholesterol are associated with a decreased risk for heart disease. A recent analysis of 10 clinical studies showed that bean consumption decreases both total cholesterol and LDL-cholesterol levels [17]. Lowered cholesterol

and LDL-cholesterol levels are recognized as a means to prevent heart disease. Furthermore, research from the Department of Nutrition at the Harvard School of Public Health found that the consumption of just one serving of beans per day is associated with a 38% lower risk of myocardial infarction [18]. The soluble fiber in beans may be part of the explanation for their coronary benefits through their impact on cholesterol levels. Beans are also a good source of folate, which has been reported to be associated with improved heart health [19, 20].



Cooked ground bean products can be formulated into pasta and noodle applications to improve nutritional content.

INCORPORATING MORE BEANS INTO AMERICAN DIETS

Beans have a rich history in cuisines throughout the world and are important components of diets of some of the healthiest populations in the world. And, today there are exciting and innovative ways to help Americans boost their intake of these healthful foods. For food manufacturers, incorporating beans into products may offer opportunities for benefit claims. In addition to the specific benefits related to protein, fiber and other nutrients, adding beans to foods also offers the opportunity to help manufacturers include the appealing “serving of vegetables” claim to packaging.

Bean powders—made from ground cooked beans—provide one of the easiest ways to incorporate beans into familiar and new foods. These all-natural products have all the nutrition benefits of whole beans, including fiber and protein.

VegeFull™, a line of cooked ground bean products produced by the Archer Daniels Midland Company, provides a variety of bean powders that contain more than twice as much fiber and protein as whole-wheat flour.

VegeFull cooked bean products come fully cooked and ready to incorporate into a wide variety of applications, including snack foods, breads, pastas, tortillas and dips—products that are already part of American consumers’ daily diets. Several bean varieties and forms are available to help manufacturers achieve varying flavors, textures and colors. These bean products have a mild flavor that will not compete with other flavors in the products, making reformulation quick and efficient.

Our cooked and dehydrated whole-bean powders offer more protein and fiber than typical whole-grain flours!

Food	Protein %	Fiber %
Edible Bean Powder Avg.	23.8%	23.5%
Whole-wheat Flour	12.5%	10.5%
Enriched Cornmeal	8.5%	7.4%
Corn Masa	8.1%	7.3%
Potato Flake	8.3%	6.9%
Rice Flour	5.9%	2.4%

Source: USDA Nutrient Database (<http://www.nal.usda.gov/fnic/foodcomp/search/>)



Bean powders are available in many varieties and colors.

CONCLUSION

Protein-rich and high in fiber, beans have a number of important health benefits. They are a good source of a number of essential nutrients and are reported to be associated with lower risk for obesity, diabetes and heart disease. But they are highly underused in American diets. The use of cooked ground bean products, such as VegeFull, offers manufacturers an easy way to boost nutritional benefits of products that are already familiar and appealing to Americans.

VegeFull can be incorporated into snack foods, breads, pasta, tortillas, dips and baked goods easily and efficiently. It is precooked and, because it comes in many varieties, it is easy to control the appearance and flavor of products.

It is time to take a closer look at how we can better serve the needs of consumers by providing them with options that fit their lifestyle, yet still help them achieve a better way of life. VegeFull Cooked Ground Beans can help you make the shift by creating better-for-you products that fit seamlessly into the everyday products your customers already enjoy.

For more information, visit www.adm.com/vegefull or call 800-637-5843.



Archer Daniels Midland Company

4666 Fairies Parkway

Decatur, IL 62526

United States of America

Phone: 800-637-5843 / 217-424-5200

www.adm.com

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