

## A Closer Look at Complete Proteins *(For a summary, see the red highlighted areas below)*

By Michelle Dudley, for Spiritual Food CSA, March 2009

It is widely understood that protein is an important nutrient required for the building, maintenance and repair of body tissue. According to nutritiondata.com, the actual protein quality of a food source is dependent on having all essential amino acids in the proper proportions. If one or more amino acid is not present in sufficient amounts, the protein in your diet is considered incomplete.

Nutritiondata.com states that an amino acid score of 100 or higher indicates a high-quality protein. If the amino acid score is less than 100, this website provides a link to find complementary sources that would build a more complete protein. Comparing split peas and lentils, we can see that the amino acid score does not necessarily relate to the number of grams of protein per cup. Lentils have 2 grams more protein per cup than split peas. However, the protein of lentils is deficient in one amino acid and considered an incomplete protein, whereas split peas contain a complete set of amino acids. *(See the Ballentine information below to see how quantity and quality both play a role.)*

Food	amino acid score	grams of protein/cup
Lentils	86	18
*Split Peas*	102	16
Pinto Beans	83	41
*Black Beans*	104	42
*Chicken*	136	41
Almonds	55	30
*Garbanzo Beans*	106	39
Kale	92	2
Figs	78	0
Brown Rice	75	15
*Quinoa*(grain w/ highest protein)	106	24

Of this list, those with an asterisk\* signify a source of especially high quality proteins. nutritiondata.com

Prior to the mid-1900's it was a common belief in Western culture that the only way to obtain complete proteins was by eating meat, eggs or milk. It was believed that non meat eaters weren't getting enough protein. In contrast, *Diet for a Small Planet*, a book by Frances Moore Lappé in 1971 fortuitously promoted vegetarianism and the belief that non meat-eaters *were* able to get sufficient protein. Her research supported the idea that the 9 essential amino acids we need to obtain may also come from a variety of fruits, vegetables, nuts, seeds, legumes and grains as the chart above also demonstrates. She presented theories on how to make complete proteins by pairing the essential amino acids present in various extents in a wide-range of plant sources. Lappé convinced millions that eating plant foods in "complementary" combinations, and within the same meal, would meet nutritional requirements and be equivalent to proteins found in meat.

While the protein content of a numerous variety of foods was clear, according to many, the "protein combining" was a myth, particularly the alleged need to consume the complementary proteins in a single meal or within hours in order for the digestive process to assimilate them as "complete". Further research confirmed this myth by showing that the liver stores amino acids for some time, meaning that combining foods is not necessary to obtain complete sets of essential amino acids. The belief resurfaced -that as long as your diet contains a variety of grains, legumes and vegetables you will be getting enough protein. In a later edition of *Diet for a Small Planet*, Lappe herself renounced her emphasis on combining proteins from plant sources in a single meal. Her later theories are consistent with findings that replicating the composition of animal proteins is not essential to human nutrition. In 1981 Lappe explained,

"When I first wrote *Diet for a Small Planet* in 1971, the idea that people could live well without meat seemed much more controversial than it does today. I felt I had to prove to nutritionists and doctors that because we could combine proteins to create foods equal in protein usability to meat, people could thrive on a non-meat or low-meat diet. Today, few dispute that people can thrive on this kind of diet. In fact, more and more health professionals are actually advocating less meat precisely for health reasons. In 1971 I stressed complementary protein sources because I assumed that the only way to get enough protein (without consuming too many calories) was to create a protein as usable by the body as animal protein. In combating the myth that meat is the only way to get high-quality protein, I reinforced another myth."

However, while it may have been proven a myth, there are still valid reasons for combining proteins in the same meal. Rudolf Ballentine, M.D. respected leader and author in the field of alternative medicine also provides an invaluable source of information regarding this topic. In both of his books, *Diet and Nutrition* (1978) and *Transition to Vegetarianism* (1987) he upholds Lappe's first theories in that it is useful to know how to combine proteins effectively. He believes there are optimal ratios to form amino acid links. In *Diet and Nutrition* chapter 6 Ballentine explains that while legumes are deficient primarily in the amino acid, methionine, grains contain this in sufficient amounts. Likewise, grains lack the lysine that is abundant in legumes. Combined in proper proportions, these two items are much more useful for the body. **Although he agrees that the liver and kidneys can deal with fragmented proteins, too much of this storing process can become a burden for these organs over time. He explains how incomplete proteins can become waste that may overwhelm and irritate the organs, resulting in accumulated toxins.**

In, *Diet and Nutrition* chapter 9, Ballentine suggests that in selecting a balanced and healthful diet, it is most helpful to take hints from time-tested traditional methods. In looking at traditional diets, however, our best models to follow are of such diets at their height and not during difficult economic circumstances. More specifically, to focus on best nutrition, he notes that one should consider rural diets, as urban populations rely more on the convenience and trends of processed foods often deficient in nutritional value. On the other hand, the "peasant diet" always includes predominately healthful foods. When such traditional diets are examined closely, we may increasingly discover that the rules of proper food selection may be universal.

For example, look at the basic ingredients of traditional diets below:

The East Indian Diet – Main meals are comprised of bread and/or rice (grain), a small amount of daal (beans or peas), one dish of cooked vegetables and a serving of yogurt or a bit of meat, fish or fowl. Frequently there is a small amount of a raw food like radish, greens, fruit, or sprouted beans.

Chinese/Japanese Diet – Rice and vegetables are commonly served with small amounts of soybean products and/or meat or fish. Rice may be replaced in some areas with millet or wheat.

French Diet – Vegetable and soup or salad, generous quantity of bread, meat or cheese in small amounts. Fermented wine or beer seems to replace the yogurt or soybeans of the other diets. Lentils may also be present.

American Indian Diet – Cornbread or corn tortillas make up the largest quantity, then cooked legumes, leafy greens & fruits. In rural Guatemala, sugarcane liquor meets the requirement for a fermented item in the diet.

Middle-Eastern Diet – Often includes meat, pita or flat bread, garbanzo beans, vegetables, yogurt.

As you can see, the same basic ingredients are usually present in some form in the traditions of each of these cultures. According to Ballentine, in each of these diets we can identify five traditional food groups.

1. **Whole grains** constitute the bulk of most of these diets.
2. The ever-present **legume** is generally taken in half the quantity of the grain. This **2:1 grain/legume combination is the core of the meal and provides the essential amino acids.**

3. Nutritious fresh vegetables depend upon availability, but are often consumed in significant quantities. Generally vegetable portions are larger than the legume, but smaller than the grain.
4. A fourth group includes a small amount of dairy, meat, eggs, fish, fowl and certain fermented preparations. All the foods in this group provide the essential B12 vitamin.
5. A small daily quantity of raw foods, fruits or vegetables make up the final group.

Ballentine notes that across the world's cultures the development of such a traditional diet is prevalent, and rarely have we seen a group of people who eat legumes independently. In contrast, the modern American diet strays from these traditional diets and especially from food in its whole, natural form. As the American diet includes a multitude of flavorings, fats, salts, sugar, empty and artificial additives, this modern urban palate is no longer satisfied by the flavor of natural seasonings or fresh, natural products. As a result of the modern American diet, the ratio of nutrients to calories tends to be much lower.

Returning to the protein conversation, Ballentine says that poor quality protein sources (incomplete proteins) especially for someone with a sedentary lifestyle who may also consume alcohol, caffeine, fats and sugars, can be an unhappy choice long term. Likewise, the excessive consumption of meat can cause negative health effects as well. Although frequently used combinations of plant foods containing amino acids in ethnic traditions have arrived at good balances, the modern American diet has not. For example, the peanut butter sandwich teams up wheat and peanuts, two foods that lack the same amino acids.

Although Ballentine encourages us to develop the knowledge for optimal protein combination, **consumers should be confident in their food selection if it mirrors that of cultures who have sustained healthy populations for many generations.** This is a technique that can be much less frustrating than constantly adding up your amino acid links in the same meal. The way our bodies adapt and store the amino acids that we consume in varied ways, seems to depend on a person's lifestyle, metabolism and general health.

In summary, we imagine that you too may find comfort in this final statement from Ballentine. "What should be gained from this discussion is not a mechanical application of amino acid ratios but a respect for traditional diets and a heightened interest in other dietary patterns that are frequently correlated with good health."  
*(Transition to Vegetarianism pg 98)*