



LIFE STAPLES — THE STORY OF WHEAT

LIFE ITSELF HAS BEEN PROCESSED OUT OF THE STAFF OF LIFE

When the Pharaohs of ancient Egypt died, they were buried with everything they would need to sustain them in the afterlife. In uncovering some of these tombs, scientists found large earthenware jars full of wheat which would still sprout even though it was almost 4,000 years old!



Within each whole-wheat berry or kernel, nature has packed all of the elements necessary to reproduce life. So long as the wheat berry remains intact in its original form, it will keep indefinitely. For thousands of years, however, humans have ground whole-wheat berries into flour for use in breads, pastas, noodles, cakes, breakfast cereals, tortillas, and other widely consumed foods, earning wheat the nickname “the staff of life.”

Wheat, a member of the grass family, provides more nourishment for more people worldwide than any other food. While rice is the most common grain in Asia, wheat is the dietary base in Africa, Europe, North and South America, Australia, and a large part of Asia. In many developed nations, wheat provides 40-60% of the calories in the diet.

The Industrial Revolution forever changed the way we eat wheat. As people began to move away from agricultural communities and into large cities, a serious problem developed: How could the flour be made to last long enough to feed large masses of people? The grain processor solved the problem by taking out some of the things which made the flour spoil — notably, the nutrient-rich outer bran and germ layers of the wheat berry, which contains most of the plant’s vital lipids, sterols, vitamins, and minerals. In fact, modern milling subjects whole-wheat berries to about two dozen processes before they’re transformed into table flour. However, this modern solution created new problems.

WHAT’S REMOVED: VITAMINS, MINERALS, AND LIPIDS AND STEROLS

Processing removes wheat’s bran, germ, and oil. Outer layers such as the bran contain most of the vitamins and minerals, and are sold to ranchers for livestock feed. (In this respect, cattle eat better than we do!) Wheat germ and wheat germ oil, rich sources of natural vitamin E and important lipids and sterols, are sold as foods and supplements.

WHAT’S ADDED: BLEACH AND A FRACTION OF THE PREVIOUSLY-REMOVED VITAMINS

After removing most of the nutrient-rich portions of wheat, the grain processor leaves unbleached flour, which still contains certain nutrients that attract insects. This flour is then treated with bleach, which oxidizes proteins and other nutrients in the flour and extends its shelf life. It is then synthetically “enriched” by adding some of the same types of nutrients which were removed in the milling process, typically at lower levels than were present in the unmilled food. Ironically, “enrichment” usually replaces only three to six of the over 20 items originally removed!

HOW MUCH NUTRIENT VALUE IS LOST DUE TO WHEAT REFINING?

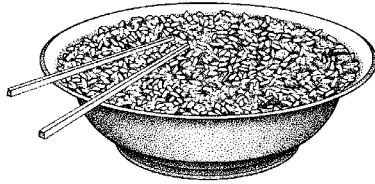
In refining whole wheat to make white flour, much of the wheat’s original nutrient value is lost. Removal of the oils (lipids and sterols) to avoid rancidity is only part of the story. As the chart on the left from the *American Journal of Clinical Nutrition* shows, the majority of the remaining nutrients are lost to processing as well.

Nutrient	% Loss in White Flour
Thiamin	77
Riboflavin	80
Niacin	81
Vitamin B ₆	72
Pantothenic acid	50
Folacin	67
Alpha-tocopherol	86
Betaine	23
Choline	30
Calcium	60
Phosphorus	71
Magnesium	85
Potassium	77
Manganese	86
Iron	76
Zinc	78

*Adapted from Schroeder, H.A. *American Journal of Clinical Nutrition* 24:562, 1971.



LIFE STAPLES — THE STORY OF RICE



A SYMBOL OF LIFE AND FERTILITY FOR CENTURIES

Rice provides most of the food for more than half of the world's human population. About 94% of the world's rice is produced and consumed in Asia, where it is a symbol of life and fertility — hence the origin of the widespread custom of throwing rice at bridal couples! A member of the grass family, rice was cultivated in China as early as 27 centuries B.C., and in Japan it is so important that even the Emperor joins in its ritual harvest. More than 25 species of rice exist, but one species — *Oryza sativa* — furnishes virtually all of the world's rice.

RICE PROCESSING DESTROYS MANY NUTRIENTS

Most people prefer white rice over brown. The only difference between the two is processing: Rice with the hulls removed but the bran left on is brown rice, whereas rice which is further processed (i.e. polished, “enriched”) is white rice. The nutritional value of rice is concentrated in the outer layers of the granule, which are rich in B-vitamins, vitamin E, minerals, fiber, and lipids and sterols such as gamma-oryzanol. Processing removes these layers, which are often sold as livestock feed. So while processing degrades the nutritional value of the human diet, at least it enriches the animal diet.

In rice-eating nations, 60-80% of calories come from rice. This means that 20-40% of calories from the other foods consumed must supply all the missing vitamins, minerals, and other important nutrients. In many countries, the nutrient content of rice largely determines the quality of health of the people who must subsist upon it. And white rice is not a nutrient-diverse food: 92% of a polished rice granule is solely carbohydrates, and only 2% of the additional material has any nutritional value.

The milling of rice has dramatic health consequences, the most important of which is the loss of thiamin (vitamin B₁) responsible for beriberi among peoples whose diets consist almost entirely of white rice. Milling also decreases the content of riboflavin, niacin, protein, iron, and calcium in white rice. Brown rice, in contrast, retains its nutritional value.

Due to the industrialization of the Far East, Asian rice is now probably more processed than ever before in history. To put back some of the nutrients removed during processing, vitamins and minerals are sprayed on white rice, which ironically is then described as “enriched.” Vitamins and minerals are not the only nutrients stripped from rice during processing, but these are the only nutrients returned during “enrichment.” A significant amount of protein, fiber, and lipids and sterols are forever lost during the conversion of brown rice to white.

LOSSES OF NUTRIENTS WHEN BROWN RICE IS PROCESSED TO WHITE RICE*

Nutrient	% Loss in White Rice
Protein	11
Fat (includes lipids/sterols)	79
Fiber	67
Calcium	25
Phosphorus	57
Iron	50
Potassium	57
Thiamin	79
Riboflavin	40
Niacin	66
Alpha-tocopherol (vitamin E)	84

*Composition of Foods, Agricultural Handbook No. 8, Agricultural Research Service, United States Department of Agriculture, 1963.



LIFE STAPLES — THE STORY OF SOY



THE LEGUME THAT CONQUERED THE WORLD

Soybeans belong to the pea family (Leguminosae) and are among the first crops cultivated by humans. Since the 11th century B.C., they have been grown in China, where they were the most important crop. They made their way to Japan in the 7th century, to Europe in the 17th century, and to the United States in 1804. Today, soybeans are everywhere. They are the world's leading legume crop, with more than 100 million metric tons produced annually.

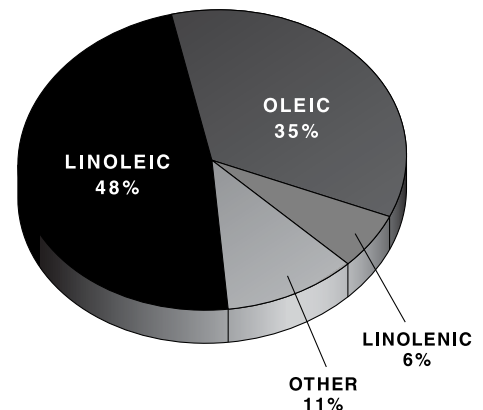
SOY FOODS ARE GROWING IN POPULARITY

Soybeans have a bright future in the global kitchen. They are currently processed for consumption as oil in margarines, shortenings, and salad dressings, and as protein in tofu, miso, tempeh, soy milk, meat extenders, and meat replacements (for example, bacon-like bits, simulated sausages, etc.). As the nutritional and health benefits of soybeans become better known, soybeans are sure to become dietary superstars. But for now, think of them as undiscovered actors whose time will soon come in the theater of global nutrition.

SOYBEANS PACK A LOT OF NUTRITIONAL VALUE

Soybeans are 13-25% oil, 30-50% protein, and 14-24% carbohydrate. They are an excellent source of essential fatty acids (those which are not produced by the body and therefore must be consumed in the diet). Good sources of complementary protein when consumed with cereal grains, soybean products are comparable to milk, a high-quality protein, in essential amino acids. "When well-processed soy products serve as the major or sole source of protein intake, their protein value approaches or equals that of foods of animal origin, and they are fully capable of meeting the long-term essential amino acid and protein needs of children and adults," say V.R. Young and N.S. Scrimshaw of the Massachusetts Institute of Technology's Clinical Research Center and Department of Nutrition and Food Science.

IMPORTANT UNSATURATED FATTY ACIDS IN SOYBEAN OIL



Adapted from: Smith, A.K. and Circle, S.J. Soybeans: Chemistry and Technology. Avi Publishing Company, Inc., Westport, Connecticut, 1972.



THE NEED FOR SUPPLEMENTATION

“Good food is the best medicine,” goes the saying. Yet it can be difficult to consume foods that provide the *nutrient density* and *nutrient diversity* we need each day for optimal health. Either we make poor food choices, or we try to pick healthful foods, but nutrient losses during food harvest, processing, transportation, and preparation degrade its value and undermine our best efforts. Resulting nutritional “gaps” can impact health, both short-term and long-term.

Health and disease are not black-and-white states. Barring mishap, the usual situation is not that one day you’re perfectly healthy, and the next day you die. Over the course of several decades, our bodies can go from a state of vibrant health, to tiredness, to marginal nutritional deficiency, to disease and subsequent death.

MANY FACTORS DETERMINE YOUR NUTRIENT NEEDS

No two people are alike in their nutritional needs. Members of the same family, eating the same meals, will derive different benefits from the foods served. Our personal tastes dominate much of what we consume. While one person refuses to eat green vegetables, another will prefer foods heavy in fat, and yet another may consume only a very small amount of protein. Our individual metabolism also determines the benefits we derive from food. Age, sex, physical condition, and activity levels directly affect the body’s need for nutrients and its ability to use them. Many scientists believe that these differences may play a large part in explaining why some people complain of feeling tired and sluggish while others remain vital and active.

Certain aspects of your lifestyle can increase nutrient demands. For instance, physically active people may need more antioxidants than sedentary individuals. So, too, might people who are exposed to pollution on a daily basis, who consume foods laden with fat or chemical additives, or who are under mental stress. Alcohol, medication, food additives, and water contaminants can also increase the need for certain nutrients. Smokers may benefit from more vitamin C, and coffee drinkers may want to take more B-vitamins. Dieters, on the other hand, may need more vitamin E, as avoiding fat means missing out on some of the richest sources of this vitamin. And if they eat products made with “fake fats” such as olestra, they may need to supplement with vitamins A, D, E, K, and carotenoids, as artificial fats may hinder the body’s utilization of these lipid-soluble nutrients.

TWO GOALS OF NUTRITIONAL SUPPLEMENTATION

Supplementation can go a long way toward filling nutritional gaps created by suboptimal diets and impacting your quality of life. Nutritional supplementation has two goals:

1. Providing nutrients in amounts sufficient to *prevent or correct deficiency symptoms*.

2. Providing nutrients in amounts necessary for supporting *optimal health*.

In other words, supplementation can give your body what it needs to survive *and* thrive!

THE RDA TO SURVIVE: PREVENTING NUTRIENT DEFICIENCIES

The **Recommended Dietary Allowance (RDA)** is the amount of a vitamin or mineral necessary to prevent the appearance of deficiency symptoms in healthy people. Nutrient deficiencies may cause cells to slow their various critical activities until they either receive proper nutrition or die. As cells decline or die, various tissues and organs slowly begin to degenerate.

When we consume fewer nutrients than our bodies need, supplements can help fill immediate gaps, such as the greater demand for nutrients during physical activity. Or, taken over time, supplements can correct deficiencies. But just as the symptoms of long-term deficiency do not appear overnight, nor can they be corrected immediately. It can take weeks or even months before the full benefits of supplementation are achieved.

Dietary gaps have definite health consequences. Some consequences are unalterable — for example, birth defects resulting from insufficient intake of folic acid during pregnancy. Others create conditions which may or may not be corrected, which can significantly impact the quality of life. Even deficiencies of substances which have no established RDAs, such as omega-3 fatty acids and bioactive phytonutrients (plant nutrients that have activity in the body), may tip the body’s balance away from health and toward disease.

For most people, just consuming the RDA is a challenge. As we have seen, suboptimal intakes are not rare; they’re very common. And certain populations are particularly at risk for nutritional deficiencies — women (especially those who are pregnant or breastfeeding), the elderly, children (especially those from low-income families), high school and college students, smokers, dieters, etc.

Compounding the problem, the current RDAs may be too low for many nutrients. For instance, scientists once thought people needed only 60 mg of vitamin C to prevent any signs of deficiency, but new data provides strong evidence to support raising the RDA to 200 mg. In 1996, RDAs were approved for six nutrients: vitamin K, selenium, manganese, chromium, molybdenum, and chloride. Research had shown benefits for these nutrients long before the government designated their RDAs.



THE ODI TO THRIVE: BEYOND DEFICIENCY AND TOWARD OPTIMAL HEALTH

While deficiency symptoms can be corrected by supplying the scarce nutrients, many scientists believe that optimal health results when certain nutrients are consumed in amounts exceeding the RDA. According to Nobel laureate Linus Pauling: *“The RDA for a vitamin is not the allowance that leads to the best health for most people. It is, instead, only the estimated amount that for most people would prevent death or serious illness from overt vitamin deficiency. Values of the daily intake of the various vitamins that lead to the best health for most people may well be several times as great, for the various vitamins, as the values of the RDA.”*

The concept of the RDA may be outdated. A new concept, one that GNLD scientists pioneered in the 1970s, has been gaining wide acceptance in the scientific community: The idea is to consume nutrients at levels which a consensus of scientific studies have shown promote optimal health and vitality. That level of intake is referred to as the **Optimal Daily Intake (ODI)**. For many nutrients, the ODI is much greater than the RDA.










For millions of people, greater-than-RDA nutrient intake may significantly enhance the quality of life. Several studies indicate that not only does calcium at greater-than-RDA levels prevent osteoporosis (thinning of the bones); it also helps *rebuild* bone, especially in conjunction with estrogen-replacement therapy and weight-bearing exercise. Similarly, strong scientific support shows that greater-than-RDA amounts of vitamin E, the major lipid-soluble antioxidant in all cellular membranes, and carotenoids, healthful phytonutrients for which no RDA has yet been established, enhance immune function and help prevent cardiovascular disease. Likewise, at levels twice the RDA, folic acid, a B-vitamin, has been shown to help clear the blood of homocysteine, a natural metabolic byproduct that damages arteries when it accumulates. In addition, essential omega-3 fatty acids, which have no RDA, have been shown to be necessary for optimal function of brains and eyes in infants. And research indicates that vitamins C and E and selenium, probably through their function as antioxidants, may promote optimal health when consumed in amounts greater than the RDA. The exceptions are vitamins A and D, which should not be consumed in greater-than-RDA amounts, as these vitamins can be toxic at high levels.

GREATER-THAN-RDA NUTRIENT INTAKES MAY PROMOTE OPTIMAL HEALTH

As scientists continue to suggest optimal nutrient intakes, the gap between ideal and actual intakes will widen. In many cases the ODI will be several times the current RDA, and the only possible means of attaining those levels will be supplements.

Vitamin E is a classic example: Numerous studies show that the RDA of 30 I.U. is too low to defend the body from oxidants and other free radicals or to provide the maximum health benefit.

Many scientists now believe the Optimal Daily Intake for vitamin E is likely in the range of 100-600 I.U. per day for healthy people. It is nearly impossible to get this amount of vitamin E just from the foods you eat! Even from the richest vitamin E sources, just to get the RDA (30 I.U.) you'd have to eat:

FOOD	AMOUNT NEEDED	CALORIES
Spinach 	2.5 pounds	297 calories
Safflower oil 	3.5 tablespoons	433 calories
Mayonnaise 	11 tablespoons	600 calories
Wheat germ 	6 ounces	670 calories
Peanut butter 	12 ounces	2,036 calories
Butter 	2 pounds	6,546 calories
Whole-wheat bread 	124 slices	6,870 calories
Beef liver (broiled) 	7 pounds	6,966 calories
Eggs 	8 dozen	7,238 calories

Besides being nutrient-dense, a healthy diet is also nutrient-diverse. In vitamin E, you want more than just alpha-tocopherol; you want the eight different bioactive tocopherols and tocotrienols found in vitamin E-rich food. Rather than just beta-carotene, you would want the diverse benefits of the other 50 to 60 carotenoid “family members” existing in the food supply. The same is true with flavonoids, cruciferous compounds, and other healthful nutrients: When it comes to the diet, variety is better for you than the same old things you’re used to.

Virtually everyone can benefit from supplementation, which can help provide the nutrient density and diversity shown to support optimal health. If you’re going to take supplements to take charge of your health, GNLD’s are *simply the best!* Based in Nature and backed by Science since 1958, GNLD supplements are a world-renowned “gold standard” for nutritional excellence.