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## Nutritional comparison between brown rice and white rice

**Ranajit Kumar Khalua, Souvik Tewari and Rita Mondal**

### Abstract

All rice consists almost entirely of carbs, with small amounts of protein and practically no fat. Brown rice is a whole grain. That means it contains all parts of the grain including the fibrous bran, the nutritious germ and the carb-rich endosperm. White rice, on the other hand, has had the bran and germ removed, which are the most nutritious parts of the grain. So Brown rice seems to be a more healthful choice than white rice. However, there may be certain situations where white rice is a better choice in case of pregnancy. Both types of rice can fit in a healthful diet. While brown rice contains more fiber (that is helpful for diabetes) than white rice, it has less fiber than many other whole grains. This may make it a good option for people who want to add more whole grains to their diet, but do not currently consume much fiber. Fiber intake should be increased gradually and with adequate fluid intake. This can help prevent symptoms such as diarrhea, constipation, gas, and bloating.

**Keywords:** rice processing, brown rice, white rice, low fibre diet, high fibre diet and health benefits.

### 1. Introduction

Rice is a versatile grain consumed by people around the world. It serves as a staple food for many people, specially those living in Asia. Rice comes in several colors, shapes and sizes, but the most popular are white and brown rice. White rice is the most commonly consumed type, but brown rice is widely recognized as a healthier option. Brown rice is a whole grain, that means it contains all parts of the grain including the fibrous bran, the nutritious germ and the carb-rich endosperm. White rice, on the other hand, has had the bran and germ removed, which are the most nutritious parts of the grain. This leaves white rice with very few essential nutrients.

White rice (WR) lacks phytochemicals such as polyphenols, oryzanol, phytosterols, tocotrienols, tocopherols, and carotenoids, as well as vitamins and minerals that confer protection against heart disease and cancer. Indian diets are high in carbohydrates, and cereals continue to be the staple food, contributing to two-thirds of the total carbohydrates consumed. Traditionally, cereals were processed for consumption by labor-intensive hand-pounding. Today, Asian Indian diets have undergone a rapid nutrition transition, resulting in an increased consumption of refined carbohydrates, unhealthy fats, and foods of animal origin, which are associated with an increased risk of obesity and type 2 diabetes.

Brown rice is a one of the most important helpful staple which can be added to the daily diet for keeping a healthy digestive system. Brown rice is an unrefined and unpolished whole grain which is produced by removing the surrounding hull layer of the rice kernel. Its grain contains its nutrient-dense bran and germ layer. It is chewier as compared to white rice and has a nutty flavor. Brown rice is a highly nutritious food. It gives low calories (216 calories per cup), high in fiber, gluten free. During processing of brown rice only the outermost layer (the hull) is removed from the rice kernel and is the least damaging to its nutritional value. The complete milling and polishing that converts brown rice into white rice destroys 67% of the vitamin B3, 80% of the vitamin B1, 90% of the vitamin B6, half of the manganese, half of the phosphorus, 60% of the iron, and all of the dietary fiber and essential fatty acids.

#### • Nutritional value of brown rice and white rice

Brown rice may contain more protein, fiber, and carbohydrates than white rice, but it also contains more fat.

According to the United States Department of Agriculture National Nutrient Database, 1 cup of cooked, enriched, long-grain white rice provides:

- 205 kilocalories (kcal)

- 4.25 grams (g) of protein
- 0.44 g of fat
- 44.51 g of carbohydrates
- 0.6 g of fiber

Alternatively, the U.S. Department of Agriculture National Nutrient Database lists that 1 cup of cooked, long-grain brown rice provides:

- 248 kcal
- 5.53 g of protein
- 1.96 g of fat
- 51.67 g of carbohydrates
- 3.2 g of fiber

**Table 1:** Values of vitamins and minerals in 1 cup of cooked, long-grain white or brown rice

Vitamin/mineral	Percent daily value provided by white rice	Percent daily value provided by brown rice
Iron	11	6
Thiamine	17	24
Niacin	12	26
Vitamin B6	7	12
Folate	38	5
Phosphorus	7	21
Magnesium	5	20
Zinc	5	10
Selenium	17	17
Copper	5	11
Manganese	37	98

• **Nutritional differences**

White rice is brown rice that has had the bran and germ removed. As a result, white rice lacks some antioxidants, B vitamins, minerals, fats, fiber, and a small amount of protein. Many varieties of white rice are enriched to replace the nutrients lost during processing. Rice is gentle on the digestive system and generally well-tolerated. Both white and brown rice are naturally gluten free. Cooling rice after it is cooked results in higher levels of a fiber called resistant starch. This even applies if the cooked, cooled rice is later reheated. This form of fiber may help promote gut health. Both white and brown rice develop more resistant starch when cooled after cooking, but brown rice contains more fiber overall.

• **Folate**

Women who are pregnant, could become pregnant, or are breast-feeding need increased levels of folate. Getting enough folate can help decrease a baby's risk for certain birth abnormalities, especially neural tube defects. Aside from the folate that is naturally present in foods, it is recommended that women who could become pregnant also get 400 micrograms (mcg) of folic acid per day. Since white rice is fortified with folic acid, it could be a better choice for people with increased folate needs or those at risk of not meeting their folate needs.

• **Low-fiber diet**

A low-fiber diet is recommended for certain conditions involving the gut, such as diverticulitis, and diarrhea, and after surgeries that involve the stomach or intestines. White rice contains less fiber than brown rice so may be a better choice when a low-fiber diet is needed. However, brown rice

is also relatively low in fiber, so both can work.

• **High-fiber diet**

In contrast, even though brown rice is only slightly higher in fiber than white rice, it may be a better choice when a person needs to eat a high-fiber diet. Fiber can help promote healthier cholesterol levels, regularity, and weight management. It can also ease constipation.

• **Better nutrition**

Since brown rice has not been stripped of its bran and germ, it is significantly higher in many vitamins, minerals, and other nutrients. This makes it the ideal rice choice for those looking to improve their overall nutrition.

**Summary**

Brown rice seems to be a more healthful choice than white rice. However, there may be certain situations where white rice is a better choice in case of pregnancy. Both types of rice can fit in a healthful diet. While brown rice contains more fiber (that is helpful for diabetes) than white rice, it has less fiber than many other whole grains. This may make it a good option for people who want to add more whole grains to their diet, but do not currently consume much fiber. Fiber intake should be increased gradually and with adequate fluid intake. This can help prevent symptoms such as diarrhea, constipation, gas, and bloating.

**Reference**

1. Chen H, Siebenmorgen TJ, Griffin K. Quality characteristics of long-grain rice milled in two commercial systems. *Cereal Chem. J.* 1998; 75:560-565.
2. Fairhurst T, Dobermann A. Rice in the global food supply. *Better Crops Int.* 2002; 16:3-6.
3. Kale SJ, Jha SK, Jha GK, Sinha JP, Lal SB. Soaking induced changes in chemical composition, glycemic index and starch characteristics of basmati rice. *Rice Sci.* 2015; 22:227-236.
4. Khalua RK, Tewari S, Mondal R. Effect of Brown rice on Oxidative diseases (Diabetes, Atherosclerosis and Cancer). *Universal Review*, July 2019 Issue (Volume 10 Number 07). [In press; Acceptance No: 15261].
5. Liu L, Guo J, Zhang R, Wei Z, Deng Y, Guo J, Zhang M. Effect of degree of milling on phenolic profiles and cellular antioxidant activity of whole brown rice. *Food Chem.* 2015; 185:318-325.
6. Panneerselvam P, Binodh AK, Kumar U, Sugitha T, Anandan A. Microbial association in brown rice and their influence on human health. In: Manickavasagan A., Santhakumar C, Venkatachalapathy N, editors. *Brown Rice*. Springer International Publishing; Cham, Switzerland. 2017, 159-181.
7. Sun Q, Spiegelman D, van Dam RM, Holmes MD, Malik VS, Willett WC, Hu FB. White rice, brown rice, and risk of type 2 diabetes in US men and women. *Arch. Intern. Med.* 2010; 170:961-969.
8. Vetha Varshini P, Azhagu Sundharam K, Vijay Praveen P. Brown rice Hidden nutrients. *J Biosci. Tech.* 2013; 4:503-507.
9. Zareiforoush H, Minaei S, Alizadeh MR, Banakar A. Qualitative classification of milled rice grains using computer vision and meta heuristic techniques. *J Food Sci. Technol.* 2016; 53:118-131.