

Rice Nutritional Benefits to Human Health - A Scientific Analysis

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BACKGROUND OF THE STUDY

Introduction

Rice is palatable starchy cereal grain and about one-half of the world's population including East and Southeast Asia rely on rice as an essential food. About 95 percent of the world's rice crop is consumed by humans. A lot of cultures indicate early rice cultivation namely China, India and cultivation of Southeast Asia. Moreover, earliest archeological proof stems from Central and Eastern China but originated in 7000 - 5000 BCE. Over 90 percent of the world's rice is grown in Asia, China, India, Indonesia and Bangladesh. Japan, Pakistan and Southeast Asian nations grow small quantities of rice. Rice is cultivated in Europe, North, South America and Australia (Britannica, 2026). Rice is among the oldest cereal grains in the world, main types are white and brown rice. People have been growing rice but it is categorized into two types over 5000 years ago. Over half of the world's population eat rice and much of the global rice comes from Asia (medicalnewstoday,2025).

OBJECTIVES OF THE STUDY

- To find out significance of rice to human health
- To find out white and brown rice which one is more nutritious
- To find out significance of eating rice everyday
- To find out importance and side-effects of eating raw rice
- To find out negative effects of eating too much white and brown rice
- To find out negative effects of overcooking on rice nutrients

SIGNIFICANCE OF RICE TO HUMAN HEALTH

Rice gives fiber and over 15 essential vitamins and minerals including folic acid, B vitamins, potassium, magnesium, selenium, iron and zinc. Rice is gluten-free, highly digestible and least allergenic of all grains which is vital grain for those suffering from celiac disease and gluten intolerance. Rice contains complex carbohydrate and the body digests it gradually as assisting to stay invigorated throughout the day. Those who consume rice experience decreased danger of

blood pressure. Research indicates that consuming carbohydrate such as rice increases levels of feel-good chemical, serotonin which assists to boost mood and suppress appetite. Eating rice assists to lose weight. Recent study revealed that those who eat rice were less likely to become obese and had 34 percent of decreased danger for high blood pressure, 27 percent of decreased danger for increased waist circumference and 21 percent of decreased danger for metabolic syndrome. Human clinical trials published in 2013 revealed that eating white or brown rice increased satiety and feeling of fullness. Rice is fat-free encompassing no trans-fat or saturated fat which can increase LDL cholesterol. Brown and white rice encompass resistant starch fostering fullness and healthy body weight (usarice,n.d). White and brown rice encompass carbohydrate and protein with no sugar but have akin calorie, carbohydrate, protein and fat. Rice mainly consists of carbohydrate and many of the carbohydrate in rice is starch. Starch comprises of long chains of glucose known as amylose and amylopectin.

Brown and white rice hold resistant starch. Resistant starch increases butyrate in the gut. Butyrate boosts gut health by decreasing inflammation, improving gut barrier function and decreasing the danger of colon cancer (medicalnewstoday,2025).

Nutritional contents of 100 grams of white short grain cooked rice

Nutrients	Amount
Calories	359
Carbohydrate	80.3g
Protein	7.04g
Fat	1.03g

HEALTH BENEFITS OF BROWN RICE

The kernels of brown rice contain bran layer. The bran layer makes brown rice nutritious than white rice. It takes long time to cook brown rice because of its brown layer. Brown rice assists those suffering from diabetes to regulate their blood sugar. Brown rice encompasses many fiber than processed rice. Fiber decreases cholesterol, the danger of heart disease and stroke. Fiber makes a person to feel satisfy and assists to maintain healthy weight. Brown rice holds vitamins and minerals that assist blood to transport oxygen and perform other important functions. Brown rice encompasses three different types of phenolics namely, antioxidants. Antioxidants can decrease the danger of cancer by maintaining free radicals from destroying cells. Phenolics are found in the bran layer of the rice and in the germ. When the bran is eradicated to make it white rice, a lot of the phenolics are lost. Brown rice encompasses insoluble fiber which fosters regular bowl movements. Brown rice also hinders hemorrhoids and improve bowel control because it is gluten-free. Brown rice is good for people suffering from celiac disease (WebMD,2024). Brown rice decreases the danger of type 2 diabetes. Brown rice encompasses antioxidants which protects against oxidative stress and decreases the danger of chronic diseases. Selenium in brown rice is vital

for thyroid function and immune health. Eating brown rice helps nursing mothers to improve disturbed mood, stages of depression and fatigue. Calcium and magnesium in brown rice assist to maintain bone health. Brown rice may assist to protect against medical conditions like arthritis and osteoporosis. Manganese in brown rice is vital for bone development, wound healing, muscle contraction metabolism, nerve function and blood sugar regulation. Brown rice gives powerful plant compounds. Antioxidants in brown rice assist to hinder cell injury caused by unstable molecules known as free radicals. Brown rice decreases inflammation in the body.

NUTRITIONAL CONTENTS OF BROWN RICE

- Vitamins B1
- Vitamin B3
- Vitamin B6
- Vitamin B9
- Vitamin K
- Vitamin E
- Magnesium
- Phosphorus
- Selenium
- Manganese
- Potassium
- Iron
- Antioxidants flavoids
- Essential fatty acids
- Folate
- Manganese

Nutritional values of half cup of brown rice

- Calories: 109
- Fat: 1 gram
- Carbohydrate: 23 grams
- Fiber: 2 grams
- Sugar: 0 gram

NEGATIVE EFFECTS OF EATING BROWN RICE DAILY

- Brown rice encompasses high fiber which can lead to bloating gas ; stomach cramps. The outer layer of the grain, bran and germ can aggravate the digestive tract. This may create abdominal discomfort.

- Studies indicate that brown rice holds a lot of arsenic element than white rice. Being exposed to arsenic element for quiet a long time can create chronic illness like heart disease, an increase danger of cancer and diabetes.

- Brown rice holds phytic acid which is an antinutrient. The phytic acid decreases the absorption of some minerals in the body which causes mineral deficiencies.

NUTRITIONAL CONTENTS OF WHITE RICE

- Carbohydrates
- Manganese
- Iron
- Fiber
- Energy
- Calcium
- Potassium
- Phosphorus
- very little fat
- Calories

Reasons why white rice is specially valued

- It is easy to prepare
- It is easy to digest
- It gives energy
- It can be combined with vegetables, meat, fish or sauces.

HEALTH BENEFITS OF WHITE RICE

White rice digest easily because it decreases in fiber. It does not encompass more fiber, magnesium, potassium, B vitamins such as B1, B3, B6, B9 and iron as compare to brown rice. Due this, white rice may be good for those suffering from irritable bowel syndrome or inflammatory bowel disease. White rice encompasses more than 53 grams of carbohydrate in a single serving. Small amount

of carbohydrate comes from fiber, many of it is starch and small amount is sugar. It does not hold fat when it is cooked without adding oil. It contains more than 4 grams of protein. It is good source of manganese giving more than 30 percent of the daily value. It also contains iron giving 15 percent of the daily value. One cup (186g) of cooked short-grain white rice holds 242 calories. 88 percent of it comes from carbohydrates, 1 percent from fat and 7.2 percent comes from protein. White rice gives 14.9 mg of magnesium assisting an individual to reach 420 mg recommended daily. Magnesium is structural element of bones helping hundreds of enzymes reactions involved in synthesizing DNA, protein and is demanded for proper nerve conduction and muscle contraction. One cup of cooked white rice holds 19 milligrams of magnesium. Rice encompasses higher levels of resistant starch when it is cooked and cooled. Studies proposed that resistant starch can develop fatty acids that assist colon to become healthy. These fatty acids reduce the danger of colorectal cancer. White rice gives quick energy because the content of carbohydrate is high. It is recommended for people suffering from digestive problems or those recovering from illness. It gives essential nutrients like iron and B vitamins helping metabolic functions.

Difference between brown and white rice

Brown rice

- It contains three elements of the grain namely, bran, endosperm and germ. It holds more fiber than white rice. It encompasses few carbohydrates than white rice at 49.6 g per cup.
- It has chewier texture.

White rice

- The bran and germ have been removed. The endosperm which remained is starch and nutritious.
- It has soften texture.

GLYCEMIC INDEX OF BROWN AND WHITE RICE

GLYCEMIC index is scoring system that grades foods from 0 to 100 depending on how they increase blood sugar. Decreased GI score of a food, reduces and slows the blood sugar climbs after a person has eaten. Glycemic index is vital for those suffering from diabetes. White rice contains high glycemic index of 73 . Brown rice holds medium glycemic index of 68.

SIGNIFICANCE OF EATING RICE EVERYDAY

Importance of eating rice include non-inflammation in the gut. Vitamin B helps nervous system function to be effective. Many vitamin B subtypes operate to procreate neurotransmitters which control biological processes. Rice is good source of vitamin B and consuming it regularly promotes nervous system health. It helps to control digestive system and hinder constipation. The fiber in rice reduces constipation and controls digestive system. Rice is natural diuretic which assists to eradicate excess water from the body. Eradicating excess water from the body implies urinating often assisting the body to get rid of uric acid and lose weight. Rice contains sodium, fat but encompasses low amount of cholesterol that assists to hinder obesity. Rice encompasses vitamins like vitamin D, Riboflavin, thiamine, fiber, calcium, iron and other minerals. Eating rice everyday makes bones and teeth strong. The grain holds natural anti-inflammatory properties reducing the deposit of atherosclerotic plaque. This decreases the danger of severe heart condition such as heart attack or strokes. Rice is rich in fiber which can decrease the danger of cancer. Rice contains fiber which helps digestion and maintains blood pressure. Rice assists to reduce glucose absorption in the body. Rice assists to keep blood sugar levels under control.

Importance of fat in white rice

- It makes the rice light
- It makes the rice easy to digest

NUTRITIONAL VALUES OF RAW RICE

Nutrients	per 100g (approx.)
Carbohydrate	80 g
Protein	7 g
Fat	0.6 g
Fiber	1.3 g
Iron	1.5 mg
Magnesium	23 mg

IMPORTANCE OF EATING RAW RICE

Raw rice contains high carbohydrate which gives quick energy. Some of the types of raw rice encompass iron, zinc and magnesium. Some people say chewing raw rice relief stress because of the crunchy texture. According to some traditions and fasting rituals raw rice is utilized.

SIDE EFFECTS OF EATING RAW RICE

- Raw rice encompasses resistant starch making it hard to digest, causes bloating gas and constipation.
- Raw rice may contain spores of *Bacillus cereus* that lead to food poisoning, cause vomiting and diarrhea.
- Eating raw rice could be a sign of pica, connected to iron deficiency or mental health problems.
- Raw rice can destroy tooth enamel.
- Raw rice holds phytic acid linked with minerals such as iron and zinc intruding with nutrients absorption.

Reason to wash and cook white rice in clean water: Naturally white rice holds arsenic which can be reduced by washing and cooking in clean water. Arsenic in white rice may cause nausea, vomiting and diarrhea. Therefore washing and cooking it in clean water reduces arsenic by 57 percent.

DIGESTIVE PROCESS OF RICE

Masticating breaks rice into smaller particles and salivary amylase change rice starch to simple sugar (maltose). Masticating rice well decreases the digestive problem on the stomach (0 -2 minutes). The stomach swirls rice with gastric acid and pepsin. Digestion of plain rice in the stomach takes 30 - 45 minutes. This occurs because of low fat and decreased fiber. Digestion of brown rice in the stomach takes 60 - 90 minutes due to high fiber. **Small intestine (1 -2 hours)** pancreatic amylase breakdown starch into glucose. Through the intestinal wall, the glucose is absorbed into the bloodstream procreating characteristic energy sugar after rice meal. **Large intestine (1 - 2 hours)** resistant starch reaches the colon and gut bacteria ferment it procreating short-chain fatty acid that foster gut lining. This is microbiome support for brown and cooled white rice. Full digestion of plain rice takes 1.5 - 2 hours and brown rice takes 3 - 4 hours.

NEGATIVE EFFECTS OF EATING TOO MUCH WHITE RICE

Studies proposes that people who consumed too much white rice may experience higher danger of developing type 2 diabetes than those who eat brown rice. It may cause by white rice's higher glycemic index (GI) which measures how fast the body converts carbs into sugars absorbed into the bloodstream. High GI foods cause fat glucose spikes and low GI foods generate gradual increase in blood sugar. Glutinous and short-grain white rice contain higher GI and may have effect on the glucose levels. According to 2022 review the danger of developing diabetes increases at 6 percent for each extra 150 g of white rice eating daily. Some people accept that white rice can increase the danger of metabolic syndrome which is referring to five risk factors that may increase the danger of health conditions such as heart disease, diabetes and stroke. The five risk factors are high blood pressure, high blood sugar levels, excess fat around the waist,

high triglyceride levels and low level of HDL (good cholesterol). 2018 study discovered that high consumption of white rice caused 3 kilograms increase in body mass. White rice encompasses arsenic which is poisonous element. Eating too much white rice can increase insulin levels.

NEGATIVE EFFECTS OF EATING WHITE RICE THREE TIMES A DAY

- White rice encompasses high glycemic index which increases blood sugar levels rapidly. Consuming white rice three times a day can increase the danger of type 2 diabetes, insulin resistance and fatigue.
- The percent of carbohydrates in rice is high but decreases in fiber and consuming too much white rice can cause excess calories input, fat accumulation around the waist and makes it hard to maintain healthy weight.
- A diet holding too much white rice increases triglyceride levels causing high cholesterol, heart disease and blood pressure.
- During rice processing, it loses most of the nutrients, depending on rice for three times a day causes lack of vitamins, minerals and poor digestion health.
- White rice lacks fiber which is vital for digestion. Eating too much rice causes constipation, weak gut health and decreased metabolism

HOW OVERCOOKING NEGATIVELY AFFECTS RICE NUTRIENTS

- Rice contains B vitamins such as thiamin, niacin and folate and too much heat makes these nutrients to breakdown and reduce.
- Boiling rice in excess water and drain it causes minerals like potassium, magnesium and calcium to extract from the grain into the water. These nutrients will lost if the cooker throws the water away.
- Overcooking can make protein structures in rice difficult to breakdown.

- About 50 - 70 percent of water-soluble minerals are lost if rice is cooked in excess water.
- Over boiling rice increases glycemic index (GI) by breaking down the grain structure which lead to hyperglycemia

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