



INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by JK Welfare & Pharmascope

Foundation Journal Home Page: <https://ijrps.com>

Assessment of nutritional value of overnight soaked cooked rice over unsoaked cooked rice

Neha Sharma M, Gayathri R*, Vishnu Priya V

Department of Biochemistry, Saveetha Dental College, Saveetha Institute of Medical and Technical Science, Saveetha University, Chennai 600 077, Tamil Nadu, India

Article History:

Received on: 13.04.2018
Revised on: 22.06.2018
Accepted on: 25.06.2018

Keywords:

Beneficial,
Energy,
Minerals,
Nutrients,
Proteins,
Rice,
Soak

ABSTRACT

For centuries, it has been a practice to consume overnight soaked rice in many South Indian families. Having known the health benefits of the soaked rice, the habit of consuming as a breakfast continued for generations. Due to globalization and increased affordability, this has been replaced with hot breakfast and consumption of overnight soaked boiled rice was left behind. Soaked rice is rich in B6, B12 vitamins and is a source of beneficial bacteria which helps in digestion and boosts immunity. The given samples of normal cooked rice and overnight soaked cooked rice are tested for carbohydrate, crude protein, fat/oil and fiber content. The rice which was overnight soaked cooked rice was found to have more nutrient content than unsoaked cooked rice. There is an increase in energy, protein, fat, carbohydrate, fiber content and minerals. Eating fermented rice for breakfast was an old custom among the farmers. It has been proved that overnight soaked cooked rice acts as a healthy breakfast and would play an important role in the health of today's young generation.



* Corresponding Author

Name: Gayathri R
Phone: +91-9710680545
Email: gayathri.jaisai@gmail.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v9i3.1230>

Production and Hosted by

IJRPS | <https://ijrps.com>

© 2018 | All rights reserved.

INTRODUCTION

China and many other Asian countries consume rice as their staple food. Rice is the major source of carbohydrate and energy in our diet. (Kumar *et al.*, 2011). Humans have been cultivating rice crops; rice was first cultivated approximately 8000 to 9000 years ago by people living in the Yangtze River valley in Chin (Higham and Lu, 1998, Liu *et al.*, 2007, Fuller *et al.*, 2010). Rice, a major food crop, is grown in a wide range of ecological conditions (Das *et al.*, 2018). Rice is the most preferred food of Asian countries and recently the consumption has increased in U.S also (Qi Sun *et*

al., 2010). Rice production requires various mechanical processing, rice is milled to remove its husk. Milled rice is the most preferred worldwide. (Villegas *et al.*, 2007, Nanri *et al.*, 2010). Rice is the most preferred staple food of South Indians. Due to industrialization apart from milling rice is polished and refined for consumption. (Vlachos, Arvanitoyannis, 2008). Minerals like calcium (Ca), magnesium (Mg) and phosphorus (P) are present along with some traces of iron (Fe), copper (Cu), zinc (Zn) and manganese (Mn) (Blaak *et al.*, 2012). Metabolic disorders are associated with the high consumption of polished rice by Asian Indians and Japanese (Murakami *et al.*, 2006).

Overnight soaked boiled rice is rich in essential minerals, vitamins and bioactive compounds which serves as a complete breakfast. The soaked cooked rice has B6, B12 vitamins. In olden days, farmers and labourers who did a lot of physical work ate soaked cooked rice for breakfast. Among south Indian families, it is a usual practice to cook rice with excess water. After straining the excess water, rice is ready for consumption. The excess boiled rice is usually soaked in water overnight and allowed to ferment. This soaked boiled rice

becomes a delicious breakfast with fresh raw onions and green chilies for the next day. Some people prefer eating this rice by draining out excess water and along with yogurt and salt.

The lactic acid bacteria break down the anti-nutritional factors in rice and increases iron, potassium and calcium content by several thousand percentage points. This rice generates trillions of beneficial bacteria that help in digestion as they have many diseases fighting and immunity increasing agents. These bacteria in the intestines safeguard the internal organs and keep all organs immune and ready. Insoluble fiber and magnesium have been associated with lower risk of type 2 diabetes in prospective cohort studies (Salmeron *et al.*, 1997, Salmeron *et al.*, 1997, Meyer *et al.*, 2000, Song *et al.*, 2006, Van Dam *et al.*, 2006, Weickert *et al.*, 2006, Schulze *et al.*, 2007). This rice helps in better digestion and wards off ageing, bone related ailments and muscular pains. Consuming this rice as break-fast keeps the body light and also energetic. Infections are prevented due to consuming this rice, as it improves the natural immunity. Hence this study aims at analysing and qualitatively comparing the nutritional values in overnight soaked cooked rice and normal cooked rice.

MATERIALS AND METHODS

Preparation of sample

A measured amount of rice is taken and cooked. This rice is then soaked in water overnight. The same amount of rice is taken and cooked freshly the next day. Thus, the samples are prepared by this method and are ready to be tested for their nutritional values.

Analysis of carbohydrate

Total carbohydrate values in the tables are calculated by difference using the following formula for 100 g of food.

$$\text{carbohydrate} = 100 \text{ g} - (\text{g protein} + \text{g fat} + \text{g alcohol} + \text{g ash} + \text{g water}).$$

Carbohydrate calculated in this manner includes dietary fiber, as well as other components of a food that are not protein, fat, alcohol, ash, or water. (Klensin *et al.*, 1989).

Determination of crude protein

Protein concentration was estimated by Kjeldahl method. Ten grams of the sample was weighed and transferred into a Kjeldahl flask. Strong acid is added to the food to digest it. During digestion with strong acid food releases nitrogen. The released nitrogen is estimated by suitable titration. The concentration of the nitrogen determined by

titration is used to analyse the concentration of protein in the food.

Determination of fat/oil

Ten grams of the ground sample was weighed and transferred into thimbles of a Soxhlet extractor containing 250ml of petroleum ether. The sample was boiled with petroleum ether. Lipids are soluble in organic solvents. Therefore, the lipids in food extract starts dissolving in petroleum ether. The extraction process was continued for 5 to 6 hours. After extraction the solvent was removed and placed in the oven for drying. The weight of the dried and left out sample was recorded. The percentage oil content was calculated as:

$$\% \text{ crude fat} = \frac{\text{weight of dish + contents after drying} - \text{weight of empty evaporating dish} \times 100}{\text{weight of sample taken for analysis}}$$

Determination of fiber content

Two grams of the ground sample was weighed and placed into a conical flask. The sample was extracted by stirring with petroleum ether, to remove fat. After the removal of fat, the sample was boiled with hot sulphuric acid for 40 minutes. It is followed by filtering the extract with fine muslin cloth. The filtrate was washed several times to make sure it is not acidic. Boiling of the extract was repeated with Sodium hydroxide for 40 minutes. The percentage of crude fiber present in the food sample was calculated as,

$$\% \text{ crude fibre} = \frac{\text{weight of insoluble matter} - \text{weight of ash} \times 100}{\text{weight of sample}}$$

RESULTS AND DISCUSSION

When the soaked and unsoaked rice were compared on the basis of their nutritional values, it was found that the energy content of the soaked cooked rice was higher having the value 349 kcal when compared to unsoaked cooked rice having the value 343 kcal. When these samples were tested for protein, the soaked cooked rice was found to have higher level of protein i.e. 8.1 g and the unsoaked cooked rice had 7.2 g of protein. The unsoaked cooked rice was estimated to have 0.4 g of Fat whereas the soaked cooked rice was found to have higher content of Fat i.e. 0.6 g. The carbohydrate content of the unsoaked cooked rice was calculated to be 78.5 g whereas the carbohydrate content of soaked cooked rice was found to be 77.1 g showing that the unsoaked cooked has higher carbohydrate content. The fiber content of the unsoaked cooked rice was estimated as 2.2 g whereas the fiber content of the soaked cooked rice was higher having the value 2.7 g. The study also showed that the soaked cooked rice had higher mineral content of value 0.9 g than unsoaked cooked rice having 0.7 g of minerals.

Table 1: Estimation of nutritional value of soaked and unsoaked rice

Parameters	Cooked Basmati Rice / 100g	Soaked Basmati Rice / 100g
Energy (Kcal)	343	349
Protein (g)	7.2	8.1
Fat (g)	0.4	0.6
Carbohydrate (g)	78.5	77.1
Fiber Content (g)	2.2	2.7
Minerals (g)	0.7	0.9

The rice which was overnight soaked cooked rice was found to have more nutrient content than unsoaked cooked rice. There is an increase in energy, protein, fat, carbohydrate, fiber content and minerals. Nutrients are components in foods that an organism uses to survive and grow (Amina Mehrin Bano *et al.*, 2016). Consuming soaked rice as breakfast keeps the body light and also energetic. It is proved that; a beneficial bacterium gets produced in abundance for the body. Iron deficiency is one of the most common nutritional deficiencies worldwide (Trishala *et al.*, 2017), and so iron consumption is very important. Stomach ailments decrease when this soaked rice is consumed in the morning, as, excessive and harmful heat retained in the body is neutralized. This overnight soaked cooked rice helps in curing all types of ulcers in the body. This heals allergy induced problems and also dermal ailments. Fresh infections are kept at bay due to consuming the overnight soaked cooked rice. As this rice is rich in fiber content it helps in good bowel movement, and refreshes our body and mind.

CONCLUSION

Eating fermented rice for breakfast was an old custom among the farmers and labours. It has been proved that the overnight soaked cooked rice acts as a healthy breakfast and would play an important role in the health of today's young generation.

REFERENCES

- Amina Mehrin Bano, Vishnupriya V, Gayathri R. Nutritional awareness among adolescents. *Research J Pharm and Tech*, 2016, 9(7), 898-902.
- Blaak EE, Antoine JM, Benton D, Björck I, Bozzetto L *et al.* ., Impact of postprandial glycaemia on health and prevention of disease. *Obes Rev*, 2012, 13, 923-984.
- Das G, Rao GJN, Varier M, Prakash A, Prasad D. Improved Tapaswini having four BB resistance genes pyramided with six genes/QTLs, resistance/tolerance to biotic and abiotic stresses in rice. *Sci Rep*, 2018, 8(1), 2413 -2417.

Fuller D, Sato Y-I, Castillo C, Qin L, Alison R, Weisskopf A *et al.* ., Consilience of genetics and archaeobotany in the entangled history of rice. *Archaeological and Anthropological Sciences*, 2010, 2,115-131.

Higham C, Lu TLD. The origins and dispersal of rice cultivation. *Antiquity*, 1998, 72, 867-7.

Kumar S, Mohanraj E, Sudha V, Wedick NM, Malik V, Hu FB, Spiegelman D, Mohan V. Perceptions about varieties of brown rice: a qualitative study from Southern India. *J Am Diet Assoc*, 2011, 111, 1517-1522.

Liu L, Lee G-A, Leping J, Juzhong Z. Evidence for the early beginning (9000 cal) of rice domestication in China: a response. *The Holocene*, 2007, 17, 1059-1068.

Meyer KA, Kushi LH, Jacobs DR, Slavin J, Sellers TA, Folsom AR. Carbohydrates, dietary fiber, and incident type 2 diabetes in older women. *Am J Clin Nutr*, 2000, 71, 921-930.

Murakami K, Sasaki S, Takahashi Y, Okubo H, Hosoi Y, Horiguchi H, Oguma E, Kayama F. Dietary glycemic index and load in relation to metabolic risk factors in Japanese female farmers with traditional dietary habits. *Am J Clin Nutr*, 2006, 83(5), 1161-1169.

Nanri A, Mizoue T, Noda M, Takahashi Y, Kato M, Inoue M, Tsugane S. Rice intake and type 2 diabetes in Japanese men and women: the Japan Public Health Center-based Prospective Study. *Am J Clin Nutr*, 2010, 92, 1468-1477.

Qi Sun, Donna Spiegelman, 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(11), 961-969.

Salmeron J, Ascherio A, Rimm EB, Colditz GA, Spiegelman D, Jenkins DJ, Stampfer MJ, Wing AL, Willett WC. Dietary fiber, glycemic load, and risk of NIDDM in men. *Diabetes Care*, 1997, 20, 545-50.

Salmeron J, Manson JE, Stampfer MJ, Colditz GA, Wing AL, Willett WC. Dietary fiber, glycemic load, and risk of non-insulin-dependent diabetes mellitus in women. *J Ame Med Asso* 97, 277, 472-477.

Schulze MB, Schulz M, Heidemann C, Schienkiewitz A, Hoffmann K, Boeing H. Fiber and magnesium intake and incidence of type 2 diabetes: a prospective study and meta-analysis. *Arch Intern Med*, 2007, 167, 956-965.

Song Y, He K, Levitan EB, Manson JE, Liu S. Effects of oral magnesium supplementation on

glycaemic control in type 2 diabetes: a meta-analysis of randomized double-blind controlled trials. *Diabet Med*, 2006, 23, 1050-1056.

Trishala A, Geetha, Vishnu Priya V. Serum calcium and iron in pregnancy. *Intl J Curr Res*, 2017, 9 (05), 49866-49868.

Van Dam RM, Hu FB, Rosenberg L, Krishnan S, Palmer JR. Dietary calcium and magnesium, major food sources, and risk of type 2 diabetes in US black women. *Diabetes Care*, 2006, 29, 2238-2243.

Villegas R, Liu S, Gao YT, Yang G, Li H, Zheng W, Shu XO. Prospective study of dietary carbohydrates, glycemic index, glycemic load, and incidence of type 2 diabetes mellitus in middle-aged Chinese women. *Arch Intern Med*, 2007, 167, 2310-2316.

Vlachos A, Arvanitoyannis IS. A review of rice authenticity/adulteration methods and results. *Crit Rev Food Sci Nutr*, 2008, 48, 553-598.

Weickert MO, Mohlig M, Schofl C, Arafat AM, Otto B, Viehoff H *et al.*, Cereal fiber improves whole-body insulin sensitivity in overweight and obese women. *Diabetes Care*, 2006, 29, 775-780.