Rice Science FOR DECISION-MAKERS

VOL. 2 NO. 3 • NOV. 2011 • ISSN 2094-8409

Pushing for brown rice consumption among low- and middle-income families

Boosting research, production, and promotion of brown rice to fit the purchasing power and appetites of ordinary families is instrumental in addressing our nutrition concerns and narrowing the gap between domestic rice supply and demand.

Back in the olden times, Filipinos had been eating manually pounded brown rice as part of their daily diet. It was only with the introduction of rice mills from the West that our ancestors began to mill and polish their grains to the staple food known today as white rice.

KEY POINTS

- Brown rice is regarded as a valuable tool in confronting malnutrition and other health concerns in the country.
- Despite scientific studies pointing to the superiority of brown rice in terms of nutritional aspects, not many Filipinos have knowledge of this food.
- The overall demand for and acceptability of brown rice is low because of its high cost, reported presence of anti-nutrition components, short shelf-life, unappealing texture, and longer cooking time required.

What is Brown Rice?

Brown rice is a whole grain cereal produced by removing only the hull or husk using mortar-and-pestle or rubber roller (dehuller) milling machine. It is known as *pinawa* in Pilipino but labeled either as brown, unmilled, or unpolished rice. The bran layer (darak) that is not removed gives the grain its brown color and retains its high levels of soluble fiber, antioxidants, and other vitamins and minerals. When the bran is removed, it becomes well-milled or white rice.

Nutritional and Health Aspects

Brown rice is considered to be a lost health food. The past decade has seen a boost in brown rice research revealing more of its nutritional characteristics and reviving interest in promoting it as main staple.

According to Juliano, the nutrient profile of brown rice is superior to milled rice in terms of protein, fat, B vitamins, dietary fiber, vitamin E, minerals, and antioxidants (see Table).

Nutrient composition of brown rice and milled rice.

Nutrient	Amount per 100 g at 14% Moisture	
	Brown Rice	Milled Rice
Energy Content (kJ)	1520-1610	1460-1560
Energy Content (kcal)	363-385	349-373
Crude Protein (g)	7.1-8.3	5.8-7.1
Crude Fat (g)	1.6-2.8	0.3-0.6
Crude Ash (g)	1.0-1.5	0.3-0.8
Total Dietary Fiber (g)	2.9-4.5	0.7-2.7
Crude Fiber (g)	0.6-1.0	0.2-0.5
Available Carbohydrates (g)	73-87	77-89
Sugars (g)	0.8-1.4	0.1-0.5
Phytic Acid (g)	0.4-0.9	0.1-0.2
Phosphorus (g)	0.17-0.43	0.08-0.15
Phytic Acid P (g)	0.13-0.27	0.02-0.07
Iron (mg)	0.2-5.2	0.2-2.8
Zinc (mg)	0.6-2.8	0.6-2.3
Thiamin (mg)	0.3-0.6	0.02-0.17
Riboflavin (mg)	0.04-0.14	0.02-0.06
Niacin (mg)	3.5-6.2	1.3-2.4
Folate (μg)	16-20	6-9
Vitamin E, α-tocopherol (mg)	0.6-2.5	<0.10-0.30

adopted from Juliano, 2010

Because of its bran, brown rice carries more nutrients than white rice. When whole rice grain is mill-polished, it loses much of its original nutrient content. Moreover, brown rice has y-oryzanol, an element that helps reduce plasma cholesterol but increase high-density lipoprotein (HDL) cholesterol level, and acts as an antioxidant.

Several studies assert that brown rice is beneficial to health. Health experts claim that a diet with whole grains, like brown rice, can reduce the blood pressure of non-hypertensive people with high cholesterol and risks of cardiovascular diseases such as heart disease, hypercholesterolemia, and stroke.

Brown rice, too, has plenty of phenol, which is said to be effective in fighting cancer (Hudson and colleagues, 2000) and in reducing the risk of diabetes (Harvard School of Public Health, 2010).

However, most studies on brown rice benefits were done *in vitro* (outside the body). More clinical studies are therefore needed to strengthen the health claims associated with eating brown rice.

Brown rice has drawbacks, of course. Juliano in 2010 identified four anti-nutrition factors that lurk in brown rice, namely: trypsin inhibitor, hemagglutin (lectin), oryzacystatin, and allergic proteins. Phytic acid has anti-cancer and antioxidant properties but it significantly lowers iron absorption, making BR not suitable for Filipinos with iron-deficiency anemia.

Fortunately, laboratory tests show that these anti-nutrition elements in BR are denatured during the cooking process. Phytic acid can be reduced or neutralized using several methods such as soaking and fermentation.

Production and Utilization

Rice production in the country is increasing (Francisco, 2011), yet the threat of growing rice utilization persists mainly because of rising population and per capita consumption.

Given the country's struggle for rice self-sufficiency, the government resorts to strategies that can increase the volume of *palay* produced per unit area and maximize edible milled rice from the produce.

Brown rice has 10% higher milling recovery than white rice. This would result in about 1.2 million metric tons additional edible rice supply (Andales, 2011). Francisco (2011) projects that if all Filipinos would eat brown rice for breakfast, lunch, and dinner just once a month (36 meals a year), our rice importation would shrink by an average of 50,000 metric tons per year, valued at US$20.32 million (or P812.81 million) savings yearly.

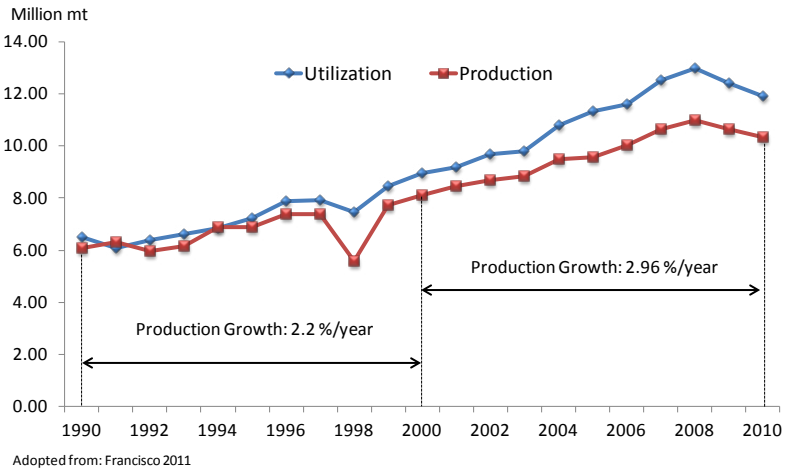
Increasing brown rice production and consumption will also lessen milling expenses as brown rice requires shorter processing time. Polishers and whiteners used in white rice production will not be necessary anymore.

> If all Filipinos would eat brown rice for breakfast, lunch, and dinner just once a month (36 meals a year), our rice importation would shrink by an average of 50,000 metric tons per year, valued at US$20.32 million (or P812.81 million) savings yearly.

Challenges Confronting the Brown Rice Market

Brown rice has low market demand on account of its high cost, short shelf-life, unappealing texture, longer cooking time requirement, and presence of anti-nutrition components. Also, not many are fully aware of the benefits that can be derived from eating brown rice. With low demand, producers are discouraged to supply in large quantities resulting in inaccessibility.

Brown rice is costly due to lack of appropriate processing equipment and high cost of packaging material that can ease shelf-life problems. Inappropriate processing equipment prolongs brown rice production.



Adopted from: Francisco 2011

Trends in Rice Production and Utilization, 1990-2010

CALL FOR ACTION

- Research on brown rice should be intensified to address knowledge gaps on presence of anti-nutrition factors, short shelf-life, and appropriate processing equipment and packaging material. Brown rice production and consumption must be adopted as one strategy for attaining rice self-sufficiency.
- The Departments of Agriculture, Health, Education, Science and Technology, Trade and Industry, Interior and Local Government, Social Welfare and Development, and private religious organizations can work together to conduct massive awareness campaigns that advocate brown rice consumption. This can help create sustained demand for brown rice.
- The National Food Authority (NFA) could include brown rice in its current mandate. This calls for specialized milling and warehousing capacity for brown rice that can be used for NFA's rice distribution programs such as food- for-work and other feeding programs.
- Invest on the development of appropriate processing equipment and improvement of postharvest facilities to encourage large-scale brown rice production. This can improve the efficiency of processing and packaging, prolong shelf-life, reduce the selling price of brown rice making it more available and accessible to the target population—the low- and middle-income families.

Works Cited:

S. C. Andales. 2011. "Development of Brown Rice Milling System (BRMS)". Philippine Rice Research Institute–Los Baños.

H. M. Corpuz. 2011. "Ways to improve acceptability of brown rice to consumers," paper presented at the Policy Workshop on Mainstreaming Brown Rice to Low- and Middle-Income Families Sept. 29, 2011, Clark, Angeles City, Pampanga.

B.O. Juliano. 2010. "Grain quality of Philippine rice". Philippine Rice Research Institute. p. 59.

E.A. Hudson, P.A. Dinh, T. Kokubun, M.S.J. Simmonds, & A. Gescher. 2000. "Characterization of potentially chemopreventive phenols in extracts of brown rice that inhibit the growth of human breast and colon cancer cells". *Cancer Epidemiology, Biomarkers & Prevention* 9: 1163-1170.

S.R. Francisco. 2011. "Implications of brown rice to self-sufficiency," paper presented at the Policy Workshop on Mainstreaming Brown Rice to Low-and Middle-Income Families, Sept. 29, 2011, Clark, Angeles City, Pampanga.

M.V. Romero. 2011. "Nutritional and health aspects of brown rice," paper presented at the Policy Workshop on Mainstreaming Brown Rice to Low- and Middle-Income Families, Sept. 29, 2011, Clark, Angeles City, Pampanga.

D. Qi Sun, D. Spiegelman, R.M. van Dam, M.D. Holmes, V.S. Malik, W.C. Willett, & F.B. Hu. "White rice, brown rice, and risk of type 2 diabetes in US men and women". *Archives of Internal Medicine*, online June 14, 2010.

ABOUT THE MATERIAL

Rice Science for Decision-Makers is published by the Department of Agriculture-Philippine Rice Research Institute (PhilRice). It synthesizes findings in rice science to help craft decisions relating to rice production and technology adoption and adaptation. It also provides recommendations that may offer policy triggers to relevant rice stakeholders in search of opportunities to share their knowledge on rice-related policies.

The articles featured here are grounded on solid basic and applied research in agronomy, biology, chemistry, and engineering; but it also underscores major contribution from the social sciences.

This issue aims to help increase awareness on the nutritional and health aspects, as well as economic gains, to be derived in the production and greater consumption of brown rice. It argues that appreciation, availability, and accessibility of brown rice as staple food especially among low- and middle-income families would lead to economic rewards in the rice sector, the most significant of which is reducing the country's rice importation by as much as 50,000 metric tons. Hence, decreasing the selling price of brown rice through wise investment in postharvest facilities is necessary to spur greater market demand. Pushing for brown rice production and consumption could actually be a route toward rice self-sufficiency.

For comments and requests for additional copies, please write to:

Development Communication Division
Philippine Rice Research Institute
Maligaya, Science City of Muñoz, Nueva Ecija

Contact: amj_eligio@email.philrice.gov.ph
(44) 456-0258,-0277,-0285 loc. 511, 512

Editorial Team: Eufemio T. Rasco Jr.
Aileen C. Castañeda
Flordeliza H. Bordey
Constante T. Briones
Shereen P. Razon

Managing Editor: Anne Marie Jennifer E. Eligio

Layout Artist: Carlo G. Dacumos

Rice Science for Decision-Makers is published as a quarterly policy advocacy material by the Philippine Rice Research Institute, Science City of Muñoz, Nueva Ecija, Philippines. ISSN 2094-8409

Department of Agriculture
Philippine Rice Research Institute
Central Experiment Station
Maligaya, Science City of Muñoz, 3119 Nueva Ecija

CERTIFICATION INTERNATIONAL
ISO 9001:2008 CIP/4360IQ/09/10/668
ISO 14001:2004 CIP/4360IE/09/10/668
OHSAS 18001:2007 CIP/4360HS/09/10/668