

Editorial

Rice-based Food Security and Balanced Diet

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Editorial

Food is a fundamental human right for existence. Our existence biologically hinges on food. It is not sufficient that we only have food, but it matters whether what we consume and how we consume it is good and balanced. Good eating habits encompass the process of selecting and consuming food that contains essential nutrients for our bodies. Some of these nutrients are carbohydrates, proteins, fats, vitamins, minerals, and water. A proper proportion of these constituents makes food "balanced." Balanced foods assist in bodybuilding, give energy, and increase resistance to infections. Balanced nutrition is necessary for the growth of children, working capacity of adults, and overall well-being of the elderly. Food availability, nutritional value, and safety are also necessary to construct a healthy and powerful nation. The past decade has witnessed the food system in Bangladesh experiencing massive transformation, including heightened food grain production to feed hungry and poor families and a lot of awareness programs and activities for safe and nutritious food. Accordingly, we have been able to attain rice-based food security. Nevertheless, providing nutrient-rich food is now a new challenge for us. There is no hunger issue in Bangladesh at present, but the issue is now one of hidden hunger or malnutrition. Zero hunger and reducing malnutrition are two main targets of UN Sustainable Development Goals (SDGs) by 2030. Bangladesh Rice Research Institute (BRRI) has taken every necessary step towards making Bangladesh free from hunger and malnutrition with particular emphasis on achievement of SDG 2. Causes, Rice is our staple food. Even if there is no supply of other nutritious food, two or three rice meals are still available to nearly all people. Due to financial constraints or a lack of consciousness, the overall public of our country is often unable to purchase or utilize a wide range of healthy foods, such as fish, meat, milk, eggs, bananas, grapes, and apples, among others. Under these circumstances, meeting the

nutritional needs of the growing population has become a major challenge for the government.

To combat this issue and ensure the right to safe and healthy food for public protection and maintenance of health, the Bangladesh Rice Research Institute (BRRI) is occupied with enriching, or improving supplying the content of essential nutrients like zinc, iron, protein, and minerals in rice according to the requirement of the human body. The latest biofortification techniques and GM technology are being applied to develop nutrient-rich rice varieties.

The mass people of our country obtain 70 to 75% of their daily total carbohydrate and 60 to 65% of their daily total protein from rice. Hence, it is imperative to devise ways to fulfill the remaining 25% to 30% carbohydrate and 35% to 40% protein gap from non-rice food items. Specifically, for every 100 grams of rice, one can obtain approximately 129 kilocalories of energy, 78.09 grams of carbohydrates, 7.12 grams of protein, 0.28 grams of fat, 1.30 grams of fiber, 0.07 mg of thiamine, 0.015 mg of riboflavin, 1.09 mg of zinc, 28 mg of calcium, 0.80 mg of iron, 25 mg of magnesium, and a host of other vital nutrients (USAID Nutrition Database). According to per capita consumption of rice in Bangladesh, our daily nutrition from rice does not adequately meet our nutrition requirements. Nearly two out of three children under five years old in Bangladesh are victims of some form of malnutrition, among them 14% are severely malnourished. This is either because of a deficiency in the diet or a deficiency in the knowledge of nutrition. For this reason, BRRI has developed a number of nutritious rice types like zinc, iron, protein, antioxidant, and pro-vitamin-A enriched Golden Rice, and low GI diabetic rice. BRRI's first success in zinc-enriched research was in 2013 when its scientists developed the world's first zinc-enriched rice variety, BRRI dhan62. BRRI later came

up with six more zinc-enriched varieties: BRRI dhan64, BRRI dhan72, BRRI dhan74, BRRI dhan84, BRRI dhan100, and BRRI dhan102. The daily dietary allowance of zinc for an adult male is 15 milligrams and for an adult female, 12 milligrams. BRRI-produced rice contains 19-27 milligrams of zinc. This implies that zinc-enriched rice varieties developed by BRRI are capable of fulfilling the human body's needs for zinc.

Likewise, Adults require 1 gram protein per kilogram body weight, and children require 2 to 3 grams. It has been established through research that if the protein content in rice is raised to 1%, it can fulfill 6.5% of the requirements of the human body. The protein content of our local rice varieties was only 8 to 9%; but our newly identified varieties have a protein content of 9 to 10%. For example, BRRI dhan62 has 9% protein, BRRI dhan81 has 10.3%, BRRI dhan86 has 10.1%, BRRI dhan90 has 10.3%, BRRI dhan96 has 10.8%, BRRI dhan98 has 9.5%, and BRRI dhan107 has 10.5%. Though fish, meat, and pulses are good sources of protein, their availability is no match for that of rice. Protein in BRRI-developed protein-rich varieties can fulfill 60% of our protein requirement. We aim in the future to come up with varieties that contain 12 to 13% protein so that at least 80% of our daily protein requirement will be fulfilled by rice.

Iron is another essential nutrient for a healthy diet. Our newly developed rice variety, BRRI dhan84, contains 10 ppm iron; whereas other BRRI-developed varieties contained 3 to 5 ppm iron only. In BRRI's "Healthier Rice" research program, scientists are now working to develop new dual-benefit varieties containing 45 ppm zinc and 15 ppm iron, with the hope of supplying at least 80% of the human body's total zinc requirement and 50% of its iron requirement from rice.

Now a days, Diabetes is a severe global health problem. Bangladesh stands as the tenth nation globally with a high population of diabetic patients. BRRI has therefore developed low-GI rice varieties such as BR16, BRRI dhan46, BRRI dhan69, and BRRI dhan105 for diabetes management. Yet, readily available conventional rice types in the market possess a high GI, due to which there is a steep rise in diabetic patients' blood glucose levels following their consumption.

A survey conducted in Dhaka in 2003, organized by the National Institute of Mental Health of Bangladesh and the World Health Organization, established that more than 18% of children and adolescents are depressed. Researchers and physicians believe that on average, one out of five individuals are likely to encounter depression once in their lifetime. Researchers at BRRI have developed BRRI dhan31, enriched with the antidepressant compound GABA (Gamma Amino Butyric Acid), to fight depression.

Apart from that, we know that vitamin A deficiency remains a significant public health problem in Bangladesh. Over 20% of pre-school and school-age children and 25% of pregnant and lactating women in rural populations suffer from this problem. Golden Rice, a rice variety enriched with vitamin A that is pending release, has been touted as a solution to this problem. It is expected that, once approved and made available, Golden Rice will be able to meet 30-50% of the vitamin A need.

As mentioned earlier, in case rice is to be consumed as a staple food, we require a minimum of 70 to 75% of our carbohydrates or calories from rice. Otherwise, there will be an increase in diseases such as diabetes and obesity. Correspondingly, the per capita consumption of rice cannot fall below 134 kg per capita. However, now it is observed that rice is being omitted from the diet by numerous individuals to lose weight. They are getting addicted to fast foods instead of rice, which is also higher in calories compared to rice. Some even tell us that consuming rice every day leads to lifestyle diseases. That is incorrect; rather, the trans fats that we consume daily from snacks or street foods are primarily accountable for lifestyle diseases.

In short, for the sake of food and nutritional security, we need to know what we consume. Good food habits and properly balanced food are crucial in building a healthy, strong, and productive nation. Besides personal and social initiatives, government and non-government organizations and the country's media also need to strive towards creating public awareness on this issue. The adage "A sound mind in a sound body" is more than a proverb; it needs to be proved in practical life.