

Utilization and Potential Applications of By-products of Rice Processing

K. Rayaguru

ABSTRACT

Rice is the staple food for a large portion of the world's population providing the basis for nutritional sustenance. By-products of rice processing occupy a prominent position, not only in terms of its amount produced worldwide, but also because of its unique chemistry-related features. These by-products together contain more than half of the nutritional value of every year's rice crop. However, ineffective technology has caused the rice by-products i.e. husk, bran and broken to be thrown away or disposed of as a low value fuel or animal feed. In this direction, some attempts have been made to produce high value products. Rice husk has a considerable fuel value for a variety of possible industrial uses. This is also used for manufacturing of particle boards, furfural, fertilizer, bedding material and feed for animals. It is a potent source of silica for the manufacture of silicates. Rice husk ash has got several applications in silicon based industries, apart from extensive uses in the field of construction engineering. In recent years, advances in stabilization techniques have been made which has led to new uses for bran and its derivatives, most notably bran oil for cooking and waxes for cosmetic products. In this contribution, a critical review on the processing and application of rice by-products in industrial, food and feed sector encompassing the technological aspects as well as the economic and environmental issues is presented. The compilation addresses the implementation of these systems, if feasible, will increase the profitability of rice sector and will further stimulate the food, feed and chemical industry.

Rice (*Oryza sativa*) is one of the main cereal crops, as well as staple food for most of the world's population, especially Asian countries. Approximately 600 million tons are harvested worldwide annually out of a production area of about 150 million hectares. India produces approximately 19.5% of the total global rice output. The demand for rice is expected to remain strong over the next few decades because of which the rice industry will remain sustainable for a long time, and the production of rice by-products will remain high. Rice grains undergo several processing steps before they can be consumed by the end user. Rice processing covers the operations from harvest to the production of graded white rice and several by-products. The process involves cleaning, hulling/shelling, whitening, polishing and grading. An ideal milling process will yield 20% husk, 8-12% bran and 68-72% milled white rice depending on the variety and degree of milling. Rice by-products actually have higher amount of nutrients when compared to the polished rice.

These can be used in better and profitable manner for industrial, food and feed purposes. Therefore, the economics of rice milling industries is largely dependent on the commercial utilization of its by-products.