Milling

Modern rice milling

Rice Science for a Better World

postharvest fact sheets

The milling process in large commercial mills combines a number of operations that produce better quality and higher yield of white rice from paddy or rough rice.

The modern milling process

1. Pre-cleaning

When paddy comes into the mill, it contains foreign materials such as straw, weed seeds, soil, and other inert materials. If these are not removed before hulling, the efficiency of the huller and milling recovery will be reduced. The capacity of the paddy pre-cleaner is normally 1.5 times the milling capacity.

2. Removing the husk (dehusking or dehulling)

Brown rice is produced by removing the husk from rough paddy rice. The husk is removed by friction as the paddy grains pass between two abrasive surfaces that move at different speeds. After dehusking, the husk is removed by suction and transported to a storage dump outside the mill. Husk accounts for 20% of the paddy weight and an efficient husker should remove 90% of the husk in a single pass

Rubber roller husker

3. Paddy separation

The paddy separator separates unhusked paddy rice from brown rice. The amount of paddy present depends on the efficiency of the husker and should not be more than 10%. Paddy separators work by making use of the differences in specific gravity, buoyancy, and size between paddy and brown rice.

Vertical core polisher

4. Whitening or polishing

White rice is produced by removing the bran layer and the germ from the paddy. The bran layer is removed from the kernel through either abrasive or friction polishers. The amount of bran removed is normally between 8 and 10% of the total paddy weight. To reduce the number of broken grains during the whitening process, rice is normally passed through two to four whitening machines connected in series.

5. Separation of white rice

After polishing, white rice is separated into head rice, large and small broken rice, and “brewers” by an oscillating screen sifter. Head rice is normally classified as kernels that are 75-80% or more of a whole kernel. To attain a higher degree of precision for grading and separation a length or indent grader is used.

6. Rice mixing

A good rice mill will produce 50-60% head rice (whole kernels), 5-10% large broken and 10-15% small broken kernels. Depending on country standards, rice grades in the market will contain from 5 to 25% broken kernels. If rice mixing is to be done properly, a volumetric mixer is necessary.

7. Mist polishing

Mixing a fine mist of water with the dust retained on the whitened rice improves the luster of rice (polishes) without significantly reducing milling yield. A friction type-whitening machine, which delivers a fine mist of water during the final whitening process, is used for “final” polishing before sale.

Bagging station

8. Rice weighing

Rice is normally sold in 50-kg sacks which must be accurately weighed and labeled. While most rice mills use a manual mechanical weighing system, very accurate and fast electronic systems are also available.

IRRI

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For more information: visit the Rice Knowledge Bank Web Site (http://www.knowledgebank.irri.org), email postharvest@irri.org; or call +63 2 580 5600

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