

IMPROVED PARBOILING TECHNOLOGY

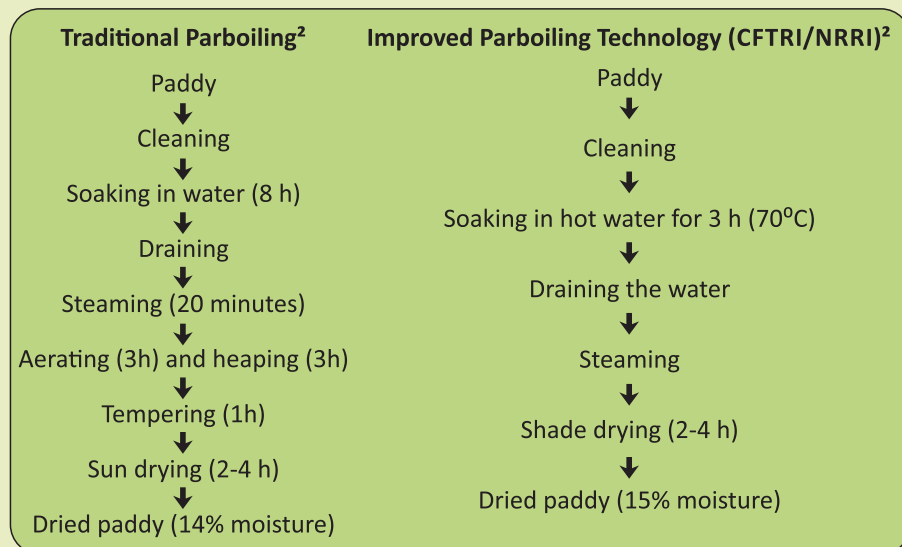
Parboiling is partial boiling of the paddy done before milling to increase its nutritional value, texture of cooked rice, and reduce the breakage in milling.

Parboiling involves three steps: Soaking, steaming and drying.

Parboiling results in gelatinization of the starch during the boiling and re-association of amylose molecules during cooling which forms a tightly packed structure. Finally, the kernels obtained are harder and appear glassy after the parboiling process. Another important use of parboiling is that the micro nutrients present in the bran (usually removed in the whitening process in the rice mill) are transferred to the endosperm. Thus in a nutshell **"Parboiled rice is more nutritious than white rice"**.

The process also improves head rice recovery during milling by cementing little cracks that develop in the endosperm during postharvest processing.

Parboiled rice takes less time to cook and is firmer and less sticky when cooked.



Advantages of parboiling²

1. The process imparts a hard texture and a smooth surface finish to the grain as a result of which the breakage in the milled rice is minimized. While 90 % of the parboiled grains may remain unbroken; the breakage in raw rice could be as high as 50 %. The reduction in broken rice results in an increase of 3-5 per cent in the total yield of rice.
2. Insects find it more difficult to bite and eat their way through the hard and smooth surface of parboiled rice.
3. The loss of solids in the gruel during cooking is also less in parboiled than in raw rice.
4. Milled parboiled rice contains more of B-vitamins than milled raw rice.
5. Loss of B-vitamins is less in parboiled rice, during washing and cooking, compared to that in raw rice.
6. The cooking quality is different from that of raw rice. Parboiled rice is non-sticky and non-glutinous.
7. The parboiled paddy on milling produces a bran higher in oil content (about 25-30 % oil) compared to raw rice bran (about 10-20 % oil).
8. Parboiled rice bran is relatively stabilized compared to raw rice.

Disadvantages²

1. It develops a relatively darker colour compared to raw rice.
2. The traditional parboiled process produces an undesirable smell.

3. Parboiled rice takes more time to cook to the same degree of softness than raw rice.
4. Because of long soaking in traditional process, mycotoxins may develop in parboiled rice and cause health hazards.
5. Heat treatment during parboiling destroys some natural antioxidants and hence parboiled rice develops more rancidity than raw rice during storage.
6. Shelled parboiled rice requires more power for polishing.
7. Parboiled paddy may choke the polisher because of the higher oil content of the bran.
8. Parboiling process requires an additional investment of capital.

Cost-Economics

Cost of CRRRI mini parboiling unit is ` 7000 per unit and the cost of using the mini parboiling unit is less than ` 30/ per quintal which is less than traditional practice by ` 10/-. Payback period of this unit is less than a year or equivalent to processing 10 tonnes of Paddy².

1. URL http://agritech.tnau.ac.in/postharvest/pht_cereal_rice_processing.html
2. Mishra, P, and Das, F.C. 2004. CRRRI Mini Modern Paddy Parboiling Unit , Technical Bulletin.

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