

From fluffy to broken: IIT-I reveals what happens inside rice grains

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Indore: Ever wondered why some rice grains cook into long, fluffy strands while others bend, crack or burst open?

Scientists at IIT Indore say the answer lies in tiny cracks and air pockets hidden inside the grain, which determine how water enters during soaking and cooking.

The findings, published in the *Journal of Food Science*, provide a scientific explanation for common kitchen observations and could help improve rice quality and processing techniques.

"This research is an excellent example of how scientific investigation at IIT Indore is helping explain everyday phenomena while generating knowledge that can benefit

agriculture, food quality assessment and the rice-processing industry," IIT Indore director Prof Suhas S Joshi said.

The study, led by Ankur Miglani, Prof Pavan Kumar Kankar and Aman Khurana along with PhD scholars Niteen Sapkal, Anoop K R and Sourav Kumar, found that opaque white or 'chalky' rice grains contain tiny internal cracks and air pockets. "The study explains how these tiny hidden cracks and internal structures inside rice grains control the way water enters them during soaking and cooking, ultimately determining why some grains become long and fluffy while others bend, crack or burst open," said Miglani, principal investigator of the study.

According to the research-



ers, chalky rice absorbs water about 2.7 times faster during soaking. As a result, prolonged soaking can weaken the grains even before cooking begins. Experiments on Pusa 1121 basmati rice showed that about 67 percent of fully chalky grains burst during cooking, compared with only 13 per cent of healthy grains.

The study also explains why some grains curve while

cooking. Different parts of the grain absorb water and expand at different speeds, creating internal stresses that cause the grain to bend. Small white rings or bumps sometimes seen on cooked long-grain rice were linked to tiny cracks formed during soaking.

Researchers also identified a microscopic crack-width threshold that can predict whether a grain is likely to burst during cooking, a finding that could help rice breeders and the rice-processing industry improve quality and consistency.

The researchers said that the study suggests that a rice grain's behaviour during cooking may be influenced by how it developed inside the plant, long before it reaches the kitchen.