Effect of microwave assisted soaking on hydration and gelatinization properties of paddy during parboiling

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Parboiled rice is preferred over raw rice because of its high nutritional content and better cooking property. But, the process of parboiling is time consuming and also requires precise control to ensure the desired grain quality. The current study is based on microwave soaking of paddy for subsequent parboiling. This study investigated the effect of microwave treatment along with varying grain weight and grain to water ratio. The moisture uptake, starch gelatinization, leaching losses, and swelling index were evaluated for the experimental conditions. The microwave power was varied from 400 W to 900 W and soaking time was maintained between 5 to 25 min. A face-centred central composite design was applied and a total of 30 experimental runs were generated. During soaking, with increasing grain weight, the energy utilization efficiency was found to be higher. Higher grain water ratio was more effective for moisture uptake, only at longer soaking duration. Leaching loss was increased with increase in soaking time up to microwave power of 630 W, beyond which the rate of leaching goes down. Swelling was more prominent once the moisture content exceeds 24% mc (wet basis), wherein the major increase was noticed in the width of the grain. A partial gelatinization was noticed when the grain was soaked for longer duration under higher microwave power. The findings of the study would help in reducing the soaking duration and preventing the undesirable changes in the process of parboiling.

Key words: microwave, moisture uptake, leaching loss, swelling index