

**MOISTURE ABSORPTION RATE OF PADDY AND EFFLUENT QUALITY IN PARBOILING OF PADDY UNDER AERATED AND UN-AERATED WATER RECIRCULATION**

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Parboiling of paddy is a hydrothermal treatment, which involves soaking, steaming and drying prior to milling. Cold water soaking and hot water soaking are commonly practiced by millers and soaking paddy in stagnant cold water for 36-72 h at room temperature is the most common practice. Depending on the grain type and frequency of water change, 1.3 to 8 m<sup>3</sup> of water is consumed by a metric ton of paddy and soaked water is discharged to the environment as effluent without being treated. Therefore, this study was conducted to distinguish the effect of water recirculation and aeration on moisture absorption rate of paddy and effluent strength. A short-grain improved paddy variety (Bg 358) was used. Polyvinyl Chloride (PVC) pipes with 0.1 m internal diameter and 1.3 m in height were used as the soaking tanks. Three soaking treatments; submerged and stagnant (T1), submerged, aerated and recirculated (T2), and submerged, un-aerated and recirculated (T3) were tested. Water recirculation was performed using 12V DC pumps and a bath shower was used for aeration. First 12 h of soaking was applied in all treatments. Thereafter, intermittent water recirculation was carried out for T2 and T3 for next 24 h by operating pumps for 10 min on and 20 min off. Electrical Conductivity (EC), pH and dissolved oxygen (DO) of soaking water were measured at 2 h intervals and moisture content of paddy was measured at 6 h intervals. Final biological oxygen demand (BOD) and chemical oxygen demand (COD) of all three treatments were also measured. According to the results, after 36 h of soaking, the highest moisture content of 29.4% was observed under aerated recirculation while the paddy in un-aerated recirculation and stagnant soaking reached 27.7% and 26.6%, respectively. After 36 h, BOD values of soaking water for T1, T2 and T3 treatments were 1343, 1011 and 720 mg/L, respectively. Aeration increased the pH of soaking water while other treatments reduced pH. It is concluded that aeration has the highest influence on paddy grain soaking rate than recirculation and that may be due to the pH of water. In addition, submerged aeration reduces the effluent strength to about one half.