

# DETERMINATION OF IMPORTANT PHYSICAL PROPERTIES AND WATER ABSORPTION CAPACITY OF SHORT TYPE IMPROVED PADDY VARIETIES OF SRI LANKA

G.C. Thilakarathna, S.B. Navarathne, I. Wickramasinghe  
*Department of Food Science and Technology, Faculty of Applied Sciences,  
University of Sri Jayewardenapura, Gangodawila, Nugegoda, Sri Lanka.*

**Abstract**— Three popular paddy varieties in Sri Lanka, BG358, BG360 and BW367, were experimented in order to determine the important physical properties and water absorption capacities. Axial dimensions (length, width, and thickness), 1000 grain mass, geometrical mean diameter, surface area, volume, sphericity and aspect ratio were determined as the physical properties of paddy varieties. According to the research outcome, most of physical properties were significantly different ( $p < 0.05$ ) among the varieties while some similarities ( $p > 0.05$ ) were also observed. To investigate the water absorption capacity of different paddy varieties in terms of moisture gain, the paddy varieties were immersed in hot water at 70 °C for 5 hours. Samples were drawn from respective paddy variety for every 30 minutes in order to measure the moisture absorption. According to the results, during the initial stage of soaking, all paddy varieties illustrated rapid moisture increment. Afterward the rate of moisture increment was gradually declined and attaining to the saturation point, where the moisture variations were insignificant ( $P > 0.05$ ) for paddy varieties. Until reaching to the saturation point, moisture absorption pattern of paddy varieties were significantly different ( $p < 0.05$ ). Results indicated that highest and lowest moisture increment was recorded by BG360 and BW367. The soaking time and varietal differences were also significantly influenced ( $P < 0.05$ ) on water absorption capacities.

**Index Terms**— Improved paddy varieties, Moisture absorption capacity, Moisture content, Soaking time, Physical parameters, Saturation point

## I. INTRODUCTION

Paddy (*Oryza sativa L.*) is the major cereal crop in Sri Lanka and is cultivated in many countries of the world. More than half of the global population consumes this cereal as a staple food, because it is an important source of energy and other nutrients [16]. Paddy essentially goes through different hydrothermal treatments while further processing [20]. Soaking of paddy/rice is a common practice, that employs for various processes

such as parboiling, puffing and flaking rice [1],[17]. For the cooking purposes, rice is soaked in water for softening the grain, which facilitates water uptake by starch during cooking [8]. As well as soaking is an essential step in wet milling because it reduces the mechanical stress and enhancing the extraction of significant constituents such as starch and essential micronutrient [8],[1],[18],[5].

The temperature of the soaking medium is greatly affected on the rate of water absorption [10]. If higher the temperature of the soaking medium, the higher the rate of moisture absorption. [17]. In order to minimize grain's splitting and solid leaching which occurs during soaking, the temperature of the soaking medium should be controlled below the starch gelatinization temperature of paddy [9]. The water absorption rate of the grains is also impacted on the type of paddy variety, consisting differences in physical and chemical characteristics [7]. The purpose of this experiment was to measure the important physical properties and investigating the moisture absorption pattern of three most commonly cultivated improved paddy varieties in Sri Lanka with a view to get an idea about the water absorption capacity at 70 °C.

## II. MATERIALS AND METHODS

### Samples Preparation

Ten kilo grams of commercially available, three prominent improved paddy varieties (BG358, BG360 and BW367)<sup>1</sup> were purchased from paddy suppliers and impurities of these paddy such as dirt, husk, immature or broken seeds, stones and other particles were removed and shade dried. Dried paddy was packed in polypropylene bags and stored in-house conditions (28-

<sup>1</sup> BG- Bathalegoda ; BW- Bombuwala - The letters depicted two Paddy research centers in Sri Lanka