

## NON-DESTRUCTIVE QUALITY EVALUATION OF DRAGON FRUIT USING ULTRASOUND METHOD

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### ABSTRACT

In Indonesia, the quality of dragon fruit is still commonly determined manually by using visual appearances. This method is objected to inconsistency measurement caused by human errors that will result un-uniformity quality qualification and also it is unable to measure internal quality of the fruits. Destructive method is commonly used to determine internal quality of dragon fruit, but it is un-applicable for controlling the quality of fresh dragon fruit. So, non destructive method is required for evaluation the quality of dragon fruit.

The objectives of the research were to determine the physicochemical and ultrasound wave transmission characteristics of super red dragon fruit in three maturities and to study the relationship between ultrasound wave transmission characteristics and physicochemical characteristics of super red dragon fruit. Super-red dragon fruits were harvested at 30, 32, and 34 days after flower blooms (AFB). The results showed that the ultrasound velocity of super red dragon fruit ranged from 614,10 to 680,58 meter per second and the attenuation coefficient was 57,71 to 62,22 Neper per meter. The attenuation coefficient was significantly different in three maturities. There were significant correlations between ultrasound parameters, (i.e. velocity and attenuation coefficient) and physicochemical (i.e. firmness, sugar content, total soluble solid, and total acid) of super red dragon fruit.

Keywords: Attenuation, Dragon fruit, Ultrasound, Velocity

### INTRODUCTION

Dragon fruit is newly introduced to the consumers in Indonesia, however some provinces in Indonesia have developed the cultivation of this product. It is a promising product in domestic market. The cultivation of dragon fruit gives many benefits, not only for the cultivators but also for reducing import rate and if possible penetrating export market. In 2006, the total production of local estates in Malang, Yogyakarta, Semarang, Pasuruan, Jombang, and Klaten reached 1,341 tons/year. Fruit production is increasing every year due to increasing demand.

Post harvest handling in domestic market includes sorting, grading, packaging, and transporting. Sorting and grading are done manually through fruit visual appearance which causes un-uniformity results. Internal quality of fruit such as sweetness must be determined using destructive method known as sampling. Since it's destructively characteristic that is not appropriate for handling fresh fruit, a non-destructive is importantly needed to be applied.

One of successful non-destructive methods in determining fruit quality is ultrasound wave (Budiastra, *et al*, 1999). Ultrasound has shown satisfying results in determining quality of mango (Mizrach *et al*, 1997), avocado (Gallili *et al*, 1993), cherry-tomato (Trisnobudi, 1998), mangosteen (Juansyah, 2005), and durian (Haryanto, 2002). Ultrasound method has not yet been experimented for dragon fruit quality evaluation.

The objective of the study was to develop non-destructive quality evaluation of super red dragon fruit using ultrasound wave method, specific objectives were: a) determining ultrasound wave