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[home](#) [page](#) [about us](#) [contact](#) 

us

**Table of
Contents**

IN PRESS

RAE 2014

RAE 2013

RAE 2012

RAE 2011

RAE 2010

RAE 2009

RAE 2008

RAE 2007

RAE 2006

RAE 2005

RAE 2004

RAE 2003

RAE Home

**Editorial
Board**

For Authors

- **Authors Declaration**
- **Instruction to Authors**
- **Guide for Authors**
- **Copyright Statement**
- **Submission**

For Reviewers

- **Guide for Reviewers**
- **Reviewers Login**

Subscription

Res. Agr. Eng.

Aboonajmi M., Akram A., Nishizu T., Kondo N., Setarehdan S.K., Rajabipour A.:

An ultrasound based technique for the

determination of poultry egg quality

Res. Agr. Eng., 56 (2010): 26-32

The present study investigates the possibility of the non-destructive prediction of the main quality indices of commercial eggs by calculating the ultrasound phase velocity within the egg material. The phase velocity of the ultrasound signal in the egg material was determined by analysing the recorded ultrasound signals using the Fast Fourier Transform. Three hundred commercial eggs (Boris Brown, 33 weeks age) from the first day of egg laying were purchased from a farm and divided in two groups. The first group was kept at the room temperature (22–25° C) and the second group was kept in a refrigerator (5°C). Every week, 25 eggs from both the room and the refrigerator were first submitted to the non-destructive ultrasound test at weekly basis at the room temperature. Immediately after testing, the air cell, the thick albumen heights, the Haugh unit and the yolk index of the eggs were also determined destructively for the comparison purposes. The results were analysed to find any possible correlation between the computed ultrasonic phase velocity and the destructive parameters, during a storage period of five weeks. The tests were carried out using an ultrasound beam with a frequency of 150 kHz with a sampling rate of 2.5 Gs/S on the eggs under a controlled temperature situation. Significant differences between the means of the destructive analysis on different days of the eggs storage were found using ANOVA. The results showed that the phase velocity significantly differs between the eggs stored at the room temperature and those stored in the refrigerator. It was found that the phase velocity decreased as the storage time of the eggs increased in three consecutive weeks.

Keywords:

phase velocity; poultry egg; quality; ultrasound; freshness

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