Effects of Radio Frequency Heating and Storage Time on Physical and Chemical Properties of Rough Rice cv. Khao Dawk Mali 105

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https://doi.org/10.12982/CMUJNS.2018.0008

ABSTRACT

As shown in prior research (Wangspa et al., 2015), radio frequency (RF) heat treatment at 65°C for 120 seconds is the appropriate combination to completely kill all stages of rice weevil (Sitophilus oryzae L.) in rough rice cv. Khao Dawk Mali 105. As a follow-on, this study evaluated the effects of this optimal RF combination on various properties of the rice relative to untreated control during storage for up to six months. Rough rice samples were treated with RF 65°C for 120 seconds, and packed in gunny-sacks and stored for up to six months at 25-32°C, alongside the control. Every month, a portion of the untreated and RF-treated rice was removed, milled and tested for physical (moisture content, color, and pasting) and chemical properties (amylose, protein, and 2-acetyl-pyrroline content) important to rice quality. Before storage, all properties of the untreated and RF-treated rice were similar, except for small, but significant changes, in amylose and 2-acetyl-1-pyrroline (2-AP). The storage-induced changes in the moisture content, head rice, amylose content, and protein content of the rice did not very between the untreated and RF-treated rice over the entire period. Although there were small but significant differences in color (after many months of storage), pasting properties (during the middle months), and 2-AP (in some months) between the untreated and RF-treated rice during storage, the differences were all small enough to not significantly affect the quality or consumer acceptance of the rice compared to the untreated rice. Thus, RF-treatment (at 65°C for 120 seconds) can effectively control weevils in Thai Hom Mali rough rice, without adversely affecting important physical and chemical properties of the rice during storage compared to untreated rice.

Keywords: Rice quality, Pasting properties, Amylose content, Rice protein, 2-acetyl-1-pyrroline