Thesis Title	Effect of Drying Methods and Storage Conditions on the Quality of Rice *(Oryza sativa* L.)
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Abstract

Experiments on the effects of drying methods, storage times and high temperature treatments on rice quality were conducted. Experiment 1: Sun drying causes low quality of high moisture content (MC) in paddy harvested in the rainy season. 'Suphan Buri 1' paddy was re-wetted to the MC of 26% and 28% (wet basic) and dried by sun drying (38-40°C) for 6 or 8 h or by hot air at 60°C for 7 or 8 h, respectively, to achieve 12–13% MC. The brightness and colour, indicated by the CIE colour system, of paddy, brown and milled rice were not obviously effected by drying methods and the MC. The 26% MC paddy + sun drying or hot air drying presented significantly higher head yield of brown and milled rice compare to the 28% MC. All treated samples showed a very low percentage (less than 1%) of chalky, cracked and defect grains of brown and milled rice. The significantly lowest amylose content was observed in the MC of 26% + hot air drying paddy. The cooking quality, elongation ratio, water absorption, hardness and stickiness were not significantly influenced by drying or the MC. As a result, hot air drying at 60°C can be an alternative method to sun drying for the 26% MC paddy.

Experiment 2: The constant quality of cooked rice is very important for trading and can be observed in aged rice beyond about 4 – 6 months. Quality changes of newly

harvested ‘Suphan Buri 1’ paddy were investigated. The paddy (2 kg) or milled rice (1 kg) were kept in sealed PE (Polyethylene) bags and stored at ambient temperature (30+2°C) for 6 months. Results showed that the qualities of rice gradually changed during the storage time. The tiny changes of the physical properties including colour and head yield of paddy, brown and milled rice stored as paddy were observed after 4 months of storage. Additionally, water absorption, hardness and stickiness of cooked rice from stored paddy did not change during 4 – 6 months. However, the amylose content (28.87%) of milled rice from stored paddy significantly increased to 31.20 % after 2 months, afterward it was 31.35 – 32.42%. In the case of stored milled rice, the physical properties were not clearly found during 4 – 6 months but the constant quality of cooked rice was found after 2 months. The amylose content gradually increased to 32.30% after storage for 6 months. Our results suggest that the quality changes were affected by the form of rice during storage. The stability of the quality of milled rice from the stored paddy could be obtained after 6 months whereas the stored milled rice took only 4 months.

Experiment 3: Aged rice, stored beyond 4 – 6 months, is generally preferred in Thailand because the cooked rice presents harder texture and is less sticky. The newly harvested ‘KDML 105’ and ‘Suphan Buri 1’ paddy with 10.3 and 8.8% MC were kept in sealed aluminum foil bags and incubated at 45°C for 1 month. The quality changes for both cultivars were similar. The yellowness of paddy, brown and milled rice, indicated by L*, a* and b* values, slightly increased compared to the initial values. The elongation ratio and water absorption were improved. The amylose content was slightly increased. Hardness of the cooked rice was increased but the stickiness was

reduced. In conclusion, heat treatment at 45°C for 1 month can be an alternative rice aging technique.

Keywords: Drying/ Storage/ High Temperature/ Rice Quality/ ‘Suphan Buri 1/ ‘KDML 105’