

Title Effect of storage with deoxygenating agent and nitrogen-atmosphere package on quality, especially flavor, of cooked stored rice

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Abstract

Rice is a staple food in many Asian countries, and stored rice must be consumed until the rice is harvested the following year. In Japan, harvested rice is generally preserved by cool storage, since rice stored at room temperature develops a stale flavor that the Japanese dislike.

Therefore, we evaluated volatile compounds of cooked stored rice and investigated storage techniques using a deoxygenating agent and a nitrogen-atmosphere package for preventing the deterioration of quality, especially flavor, due to the oxidization of unsaturated fatty acids in stored rice.

Koshihikari (non-glutinous rice) was used as sample. Storage with a deoxygenating agent (deoxy) was done by inserting the deoxygenating agent Ageless[®] in polyethylene bags packed with brown rice (13% moisture). Storage with nitrogen-atmosphere packaging (nitro) converted the air in bags to nitrogen gas. Volatile compounds of the cooked stored rice were extracted by a simultaneous distillation extraction method and analyzed by gas chromatography-olfactometry (GC-O), GC-mass spectrometry and sensory evaluation.

By sensory evaluation, the deoxy-rice was very similar in quality to non-stored rice (fresh rice), while non-treated stored rice (control rice) and nitro-rice had a stale flavor and undesirable taste. By GC-O, the numbers of volatile compounds in the deoxy- and fresh rice were less than those in the control- and nitro-rice. Oder intensity of 2-acetyl-1-pyrroline, a popcorn-like flavor compound, in Koshihikari decreased during storage. However, its decrease could be inhibited by the deoxy-storing. Therefore, it was clarified that the storage technique using a deoxygenating agent could maintain the quality the quality of rice at room temperature.