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Changes of physiochemical properties of *LOX-3* null rice lines stored at different storage temperatures and periods

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Abstract

Due to the lack in storage facility, considerable amount of rice is stocked in the open air, which causes increased stale flavor and deteriorates palatability and merchantable quality. Lipoxygenase-3(LOX-3) is involved in the production of volatile constituents in stored rice, and the development of stale flavor is delayed in LOX-3 null rice. LOX activity in the rice grain is localized in bran fraction and the tropical Japonica cultivar 'Dawdam' was reported that the absence of LOX-3 is inherited as a simple recessive trait. Also, it was reported that the peroxidation of unsaturated fatty acids occurs at lower levels in the 'Dawdam' bran fraction during storage than in rice varieties with LOX-3. This study was conducted to develop LOX-3 null rice lines using 'Dawdam' and investigate changes of physicochemical properties of the lines stored at different storage temperatures and periods. So we analyzed texture, toyo glossiness value, germination rate and lipoxygenase activity of 15 LOX-3 null rice lines on the condition of which rough rice had been stored at different temperatures (high temperature condition at 35°C and low temperature condition at 15°C) for 4months. Hardness and stickiness of the lines tendered to be increased when it was stored at high temperature and adhesiveness, springiness, cohesiveness and chewiness was not considerably different according to storage temperatures and periods. The germination rate of HR29062-B-98-2-1-B among LOX-3 null rice lines was higher than another lines, 99.3, 94.0% after 4months stored at low temperature and high temperature, respectively. The lipoxygenase activity was 3,304, 1,601unit/mg protein after 4months stored at low temperature and high temperatures, respectively. So, it is thought that this line will be useful to breed rice varieties with high storability after tested on agricultural traits.

Keywords : Lipoxygenase, Physiochemical property, Storage, rice

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