

Thesis title	Shelf Life extension of Brown Rice by Ethanol Vapour Technique together with Packaging.
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Degree	Master of Science
Programme	Food Science
Year	1998
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ABSTRACT

According to the study of shelf life extension of brown rice by ethanol vapour technique together with packaging, there were three principle factors in the $4 \times 2 \times 2$ factorial design : times of the ethanol vapourization (0 ,5 ,10 ,15 min), kinds of package pouch (polypropylene,PP and polyethylene,PE) and various storage temperatures (20°C and 38°C). The objectives were the optimum method for the extension shelf life of brown rice. The effects of the three factors on free fatty acid (FFA) ,moisture content ,cooking test (Volume Expansion, VE. ; Water Absorption,WA ; Total Soluble Solid,TSS), organoleptic test with 20 panelists and microbial analysis for 180 days, and comparing an amount of Thiamin(Vitamin B₁) after processed with an amount of Thiamin after storing for 180 days of Jasmine and Khoatahaeng Brown Rices were studied.

The effect of ethanol vapourized times (5 ,10 ,15 min) on brown rices(Jasmine and Khoatahaeng varieties) by ethanol vapour from aqueous ethanol 50% comparing with the untreated ethanol brown rice at the same condition showed that the amount of FFA of the ethanol untreated brown rices were significant higher than the amount of FFA of the ethanol treated brown rice at $P \leq 0.05$. The amount of FFA of the brown rice treated ethanol vapor at 5 ,10 and 15 min were non-significant. While amounts of moisture content, cooking test, amount of Vitamin B₁ of the ethanol treated brown rice and the ethanol untreated brown rice were non-significant. The effect of ethanol vapour could reduced the amounts of microorganism.

Regarding with package pouches , the results of the two varieties showed that the amount of FFA during 30 -90 days storage were non-significant difference but significant

difference after 180 days storages in both PP and PE. The brown rice were packed in PP had lower FFA and more consumer acceptance than in PE while the cooking test, the amounts of microorganism, consumer acceptance and the amounts of Vitamin B₁, of the brown rice of package were non-significant difference, especially storage at 20°C for 180 days. FFA of treated ethanol brown rice of the two varieties kept at 20°C were less increased than the other kept at 38°C. The treated brown rice of the two varieties packed in PP and PE were good at cooking characteristics but they still had vitamin B₁-loss.

Considering the interaction effect of the three factors on brown rice after 180 days storage, the treated brown rices of the two varieties packed in PP and kept 20°C showed the good results. After the experiment, the results show that the ethanol treated brown rice of the Jasmine and Khoatahang varieties (11-12 % moisture content) had been increased in FFA 3.17 and 3.22 times, VE. 1.32 and 1.10 times, WA. 1.15 and 1.19 times respectively. They had also been decreased in TSS 1.07 and 2.59 times for Jasmine and Khoatahang respectively. In term of storage in this condition - packing in PP and kept at 20°C, they showed not only good organoleptic scores but also very low ($<10 \times 10^3$) of microorganism, and are also related to FFA at 0.7 Jasmine and 0.3 Khoatahang.