

Fermentation quality characteristics of rice plant (*Oryza sativa* L., Chineria-Mama) as whole crop silage

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Introduction Research of production and utilization of whole crop rice silage has been carried out as a major challenge for increasing production of self-sufficient feeds in Japan. Various methods have been tested to improve the fermented quality of whole crop rice silage. Chineria-Mama as a paddy rice line was selected and bred recently. It is indicated that this rice plant has high-yielding ability (high dry matter productivity) and lodging resistance. Utilization of Chineria-Mama rice plant is expected to have a large potential as a feedstuff for ruminant domestic animal. In order to use effectively the rice plant as whole crop silage, it is necessary to study its fermentation quality characteristics. It is important to prepare good silage, because high quality silage can reduce energy loss. The objectives of this study were to investigate the fermentation quality characteristics of Chineria-Mama whole crop rice silage and to examine the effect of addition of fermented juice of epiphytic lactic acid (FJLB) and fermented juice of silage extract (FJSE) on the fermentation quality.



Fig. 1. Chineria-Mama rice plant (left) and general cultivar rice plant (right).

Materials and Methods Rice plant (*Oryza sativa* L. line, Chineria-Mama) was cultivated by using conventional methods. The rice plants were cut with a cutter blower into 1-3 cm pieces and 0.7 kg amounts were crammed into plastic pouches without (control) or with 1% of FJLB or FJSE in the fresh matter. All silages were maintained indoors and opened after 1, 3 and 5 months. FJLB and FJSE were prepared according to the following method. 200 g of the cut fresh Chineria-Mama silage and Chineria-Mama rice plant were macerated with 1 L of water and 2% granulated sugar was added. The mixture was incubated anaerobically at room temperature for 2 days, and then filtered through quadruple layers of cheesecloth. The filtrate was collected in a plastic bucket and blended with 2% granulated sugar.

Results The pH value for silage of control and FJLB treatment was under 4 throughout all periods. The pH of FJSE treatment silage was higher than that of control and FJLB treatment silage. There was no remarkable difference in lactic acid content between the control and the FJLB treatment at 1, 3 and 5 months after silage preparation. In the FJSE treatment silage, however, lactic acid content was lowest throughout all periods, specifically after 3 and 5 months. Propionic acid was observed only in FLSE treatment silage. Butyric acid content of the control silage tended to be high compared with that of the silage treated FJLB and FJSE. There was no large difference in volatile basic nitrogen content among three treatment silages.

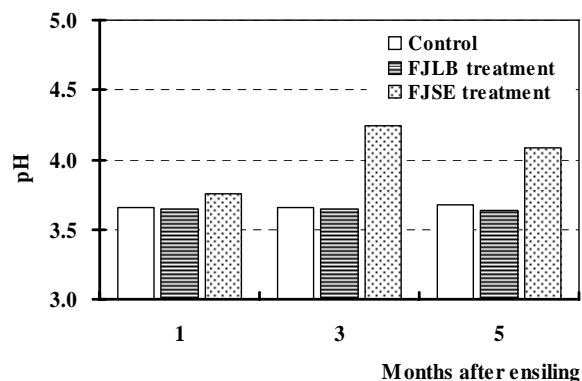


Fig. 2. Fermentation quality (pH) of Chineria-Mama rice whole crop rice silage without or with FJLB or FLSE. FJLB, fermented juice of epiphytic lactic acid; FJSE, fermented juice of silage extract.

Conclusions The present results suggest that the fermentation quality of Chineria-Mama whole crop rice silage is good, and the addition of FJLB and FJSE prepared in this experimental does not improve on the fermentation quality of silage.