

Development and Evaluation of Broccoli By-product Silage as a Substititional Ingredient of TMR for Dairy Cows

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Introduction

One of the accessible ways to achieve a sustainable livestock industry is to increase the utilization of agricultural by-products in feed industry. In Pyeong-chang, Gang-won province, Korea, over 4,000ton of broccoli are grown annually, but their by-products (stems and leaves) of about 6,000ton per year are discarded.

Aim

A study was designed to establish the optimal silage formula using broccoli by-product with various combination of feed additives and to test their availability as a TMR ingredient for dairy cows.

Methods

Broccoli by-products (BB) have been mixed with several agricultural by-product additives with or without lactic acids bacteria (LAB) inoculation in a series of silage preparation trials. 27 Holstein cows in lactation were used to test feed value of broccoli by-product silage (BBS) as a TMR ingredient for 8 weeks. During the first 4 weeks, a commercial TMR was fed to the cows as a control feed. Then, the test TMR which was substituted by BBS to 20% (wt/wt) was fed to the same cows during the next half period of 4 weeks. Milk samplings were conducted once a week to analyze the change of milk yield, nutritional components and functional substances between control and test periods.

Results

The optimal broccoli by-product silage (BBS) was obtained when BB combined with beet pulp & wheat bran (10% each, 20% of the total silage weight) with inoculation of *L. plantarum* according to feed value, fermentation quality and cow's palatability test. In cow's performance, it was determined that there was no significant difference in the milk yield and milk components including milk fat, protein, lactose, SnF, MUN compared to the control period. During the test period, antioxidant activity in milk tended to increase.

Conclusion

BBS had a high feed values with food fermentation quality and was concluded that when replacing 20% of commercial dairy TMR with BBS, it did not adversely affect to the dairy production. Therefore, BBS could be used as an eco-friendly alternative ingredient resources for the TMR in dairy industry.