

# Evaluation of the moisture removal effect of pangolagrass round bales with reformed hay barn in the rainy season <sup>(1)</sup>

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## Abstract

The high temperature and humidity in summer are unfavorable for the storage of hay in Taiwan. This study aimed to use the existing hay barn reformed as a low-input storage improvement case by adopting the principles of physical environment control and strengthening the natural ventilation and moisture removal capacity. After completing the renovation of the facility, the unmodified half of the barn was used as the control. The round hay bales were placed in the barn for six weeks to compare the weight and quality of the hay during the rainy season. This transformation included the facade and floor structures, combined with the stacking of bales to become a ventilation funnel to improve the wind-driven ventilation and buoyancy-driven ventilation. Comparing the micro-climate difference between the two barns, the reformed barn increased the wind speed of the ventilation funnel between the bale stacks and increased the wind speed more at night. The reformed barn also decreased the temperature and increased the relative humidity. For the results of measuring the baled weights for 6 consecutive weeks, the bales of the reformed barn lost 0.55 kg per bale in average in the first week, while the weight of the bales of the control barn increased by 0.94 kg per bale, which reached a significant difference. At the sixth week, the hay bales of the reformed barn increased 0.11 kg per bale in average, while those of the control barn increased 1.39 kg per bale, and the difference was significant. In terms of nutrient content, there was no difference in the contents of neutral detergent fiber and crude protein before and after the survey period, while the acid-washed fiber content of the hay bales in the control barn had a significant difference before and after the storage experiment. According to the observation of the bottom of hay bales, mold spots appeared on the bottom of bales in the control barn, but not in the reformed barn. The upper layer of bale had the highest hay smell score in the reformed barn. It was not significantly different from that the upper of the control barn. No difference was observed for the scores of lower layers of bales between reformed and control barns. This study empirically demonstrate that the reformed barn had better moisture removal effect than that of the control barn during the rainy season, and had positive effect on the storage quality of hay.

Key words: Hay barn, Buoyancy-driven ventilation, Hay quality.

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