

DEVELOPMENT AND EVALUATION OF A FIELD TEST KIT FOR DETERMINATION OF SILAGE FERMENTATION QUALITY

E.A.V.D. Abeyrathne¹, G.G.C. Premalal² and W.A.D. Nayananjalie¹

¹Department of Animal and Food Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka

²Pasture and Fodder Division, Veterinary Research Institute, Gannoruwa, Peradeniya, Sri Lanka

Silage has an important role in dairy farming systems in Sri Lanka mainly as a forage management tool. High quality silage increases milk production and milk solids in lactating dairy cows. Generally, fermentation quality of silage is determined by standard laboratory protocols though farmers use its organoleptic properties which may not always give true conclusions. Therefore, this experiment was conducted to develop a field test kit to determine fermentation quality parameters of silage at field conditions. Procedures to determine each quality parameter was developed with a series of experiments and validated with the standard laboratory procedures. Using several pH indicators a method to estimate silage pH was included in the test kit. further, it consisted of ammonia reagent, which facilitated the estimation of ammonium-nitrogen content in silage. In measuring lactic acid level of silage, a reagent (lactic reagent) was placed and total acidity was determined using a simple titration counting the committed number of drops of acidity reagent. By compiling each of them, the field test kit was developed. The continuous and rank data obtained for silage quality parameters from both laboratory procedures and field test kit were statistically analyzed using Pearson and Spearman Rank Correlation respectively in Minitab software. Results revealed that pH, total acidity, lactic acid and the ammonium-nitrogen level measured by the test kit were significantly correlated ($p < 0.05$, $r = 0.99$, 0.62 , 0.88 and 0.98 respectively) with the standard laboratory procedures. Therefore, the test kit can be used in the field to determine the silage fermentation quality using pH, ammonium-nitrogen and lactic acid level. However, adjustment is needed to determine the total acidity content in silage in field level.

Keywords: Acidity, Ammonium-Nitrogen, Lactic acid, Silage quality