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**The Thesis Submitted to the Degree of M.Sc.  
(In the Field of Animal Nutrition)**

# **Effect of different levels of multienzymes and yeast (*Saccharomyces cerevisiae*) on the nutritive value of sorghum forage silage**

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## Abstract

This study was carried out to evaluate changes in chemical composition and nutritional value of sorghum silage in response to multi-enzyme and yeast supplements. For this aim, sorghum forages in milk stage of seeds (at June 2012) were harvested and chopped with cutting length about 2 to 4 cm. The chopped forages then were mixed with the multi-enzyme at three levels (0, 3 or 6 grams per 1 Kg of dry matter (DM)) and the yeast, *Saccharomyces cerevisiae*, at three levels (0, 2.5 or 5 grams per 1 kg of DM) and ensiled in 5 Kg plastic baskets. The silages were opened after 2 months and their chemical compositions including dry matter (DM), organic matter (OM), ether extract (EE), ash, water soluble carbohydrates, cell wall and cell wall without hemicelluloses fractions were measured according to the standard procedure. Dry matter digestibility, metabolizable energy content and dry matter degradability were also determined by gas production (*in vitro*) and nylon bags (*in situ*) methods. Results showed that the addition of enzyme at 6 g/ kg of DM and yeast at 2.5 g/ Kg of DM caused a significant reduction in pH value (from 4.21 to 3.91). Furthermore, significant falls in cell wall (from 67.84 % to 62.37 %), cell wall without hemicelluloses (45.61 % to 40.42 %) contents as well as dry matter digestibility (from 38.08 % to 36.46 %) were observed by adding the enzyme at 6 g/ Kg DM with the yeast product at 5 g/ Kg of DM, while DM content was elevated from 95.96 % to 96.87 %. The *in situ* degradability outputs indicated an increased DM degradability (from 33.26 % to 37.52 %). In addition, the findings obtained from *in vitro* gas production method revealed that supplemental enzyme at levels of 3 and 6 g/ Kg of DM and yeast at 2.5 g/ Kg DM were associated with increased gas productions from 33.26 % to 35.60 %, 37.30 % and 33.82 %, respectively, whereas the yeast at level of 5 g decreased gas production as compared to control. In conclusion, considering the changes in cell wall contents, hemicelluloses contents and degradability values in the present study, it can be suggested that the enzyme at level of 6 g/Kg DM along with 2.5 g of the yeast product per Kg of DM can be used to make good sorghum hay silage.

**Key words:** Enzyme, *Saccharomyces cerevisiae*, dry matter degradability, digestibility, silage, forage sorghum.