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ARABIC SUMMARY

SUMMARY

The present study was conducted at Nobaria Experimental Station, Animal Production Research Institute, Ministry of Agriculture during 2003 – 2004.

In this study, three Barki male sheep were used for the digestibility study, three female sheep were fitted with permanent rumen fistula and used in rumen fermentation study and eight crossbred Freisian cows were used in duplicated 4 X 4 Latin square design for the lactation study. The animals were fed four diets differ in their biological treatment :-

- 1- cotton stalks (CS) + berseem (B) silage, untreated,
- 2- as in one + yeast (LDY),
- 3- as in one treated with inoculant (LAB) produced by (Pioneer, 1132) at the rate of 1 g/ ton and
- 4- as in three + LDY.

Molasses was added to all silages. Concentrate feed mixture was fed to animals according to NRC (1994) recommendation. Tested roughages were fed *ad lib*. Live dried bakeris' yeast supplementation (LDY) was fed at level of 5 g/ head/ day in the digestibility and fermentation trials and 10 gm/ cow/ day in lactation trial. Criteria studied were as follows:-

the chemical changes of silages during the ensiling period, silage quality, concentration of pesticide residues in silage, digestibility coefficients, nutritive value (TDN, DCP), nitrogen balance, rumen NH₃-N and total VFA's concentrations and *in vitro* rate of production, rumen volume, rumen digesta, rate of out flow, microbial protein synthesis, *in situ* DM, OM, CP and CF degradability were

investigated to estimate rate of digestion in the rumen of sheep fed the experimental diets, milk yield and composition, concentration of pesticide residues in milk and economic efficiency were investigated as well.

The results of this study could be summarized as follow:-

- 1- The pH value, $\text{NH}_3\text{-N}$ (mg/ 100 gm DM), total VFA's concentrations (m mol/ 100 gm DM), lactic acid concentration (gm/ 100 gm DM) and acetic acid concentration (gm/ 100 gm DM) were 4.37, 0.49, 2.25, 4.33 and 3.52 and 4.03, 0.40, 2.74, 5.00 and 3.34 for untreated (CS + B) silage and treated (CS + B) silage by LAB, respectively. The treated silage showed better quality than untreated silage.
- 2- The lowest values in DM loss as (%) and CP (%) were observed with treated silage higher losses (%) of fibre fraction specially cellulose were recorded with treated silage except for hemicellulose.
- 3- Silage making resulted in decreased of pesticide residues, and inoculant had more effective on that reduction than untreated one.
- 4- There were significant ($P < 0.05$) differences in the digestibility coefficients of DM, OM, CP, CF, NFE, NDF, ADF and cellulose among the experimental diets. While, no significant differences in digestibility coefficients of EE, ADL and Hemicellulose were detected.

- 5- TDN values ranged between 53.84 (%) and 59.97 for diets containing untreated silage and treated silage plus LDY, respectively with significant differences ($P < 0.05$).
- 6- DCP was significantly higher with treated silage plus LDY (7.75%) compared to other diets.
- 7- NB was highest ($P < 0.05$) with treated silage plus LDY (4.42 g/ d) and the lowest was obtained with untreated silage (2.85 g/ d) with significant differences.
- 8- Rumen ammonia-N concentration (mg/100 ml R.L.) were significantly different ($P < 0.05$), whereas it was ranged between 12.99 and 15.73 for diets contained treated silage plus LDY and untreated silage, respectively. However, rates of ammonia production (mg /100 ml R.L./ hr) was significantly higher in diets supplemented with LDY compared with other diets. Diet containing treated silage plus LDY was recorded the highest rate (4.63) while, that containing untreated silage was recorded the lowest rate (3.11).
- 9- Total VFA's concentrations (meq/ 100 ml R.L.) were significantly different, whereas it was ranged between 11.38 and 14.87 for diets contained untreated silage and treated silage plus LDY, respectively. The same trend was observed for VFA's production rate (meq / 100 ml R.L. /hr).
- 10- Rumen volume values ranged between 3.07 and 4.01 (L) for untreated silage and treated silage plus LDY, respectively, with significant differences. Rumen digesta weight (kg) was take the same trend (3.46 and 4.48, respectively). While, rate

of out flow was significantly lower for diet containing treated silage plus LDY (4.97% / hr) in comparison with other diets.

11- Microbial protein synthesis showed values ranged between 47.24 and 92.89 (g/ d) for diets contained untreated silage and treated silage plus LDY, respectively.

12- From the *in situ* degradability study it can be observed that:-

- a) Rumen effective degradability (ED) of dry matter for single roughage sources was highest significantly for diets contained treated silage plus LDY and untreated silage plus LDY (43.54% and 39.58 %, respectively). Also, rumen ED for concentrate feed mixture used was take the same trend.
- b) Rumen ED of organic matter for single roughage sources was significantly higher ($p < 0.05$) when adding LDY in diets. However, rumen ED for concentrate feed mixture used was recorded the lowest value for untreated silage containing diet (49.43%) with significant differences ($P < 0.05$) than other diets.
- c) Rumen ED of crude protein was not significantly different for single roughage sources and concentrate feed mixture used.
- d) Rumen ED of crude fiber for single roughage sources was highest with treated silage plus LDY containing diet followed by diet contained untreated silage plus LDY (31.79% and 27.55%, respectively). Whereas, rumen ED of crude fiber for diets contained untreated silage and

treated silage was significantly lower (20.32% and 21.68%, respectively). Also rumen ED for concentrate feed mixture used was take the same trend.

13- Production of milk and composition :-

- a) For milk yield and FCM (4%) production, the diet containing treated silage plus LDY had highest ($P < 0.05$) daily milk yield (15.21 kg/ d) compared with other diets, while diet containing untreated silage was recorded the lowest milk yield (12.23 kg/ d). When the values were calculated as FCM (4%) it was take the same trend for actual milk yield.
- b) Adding LDY lead to higher fat (%) and protein (%), while lactose (%) increased with diets treated by LAB with significant differences. Diet contained treated silage plus LDY was recorded highest value of total solid (%) and solid not fat (%) (13.12% and 9.61%, respectively) with significant differences.
- c) Milk components yield (g/d) were improved with significant difference among diets. The highest value were recorded with diets containing treated silage plus LDY, while the lowest value were recorded with diet contained untreated silage. There were significant ($P < 0.05$) differences in calculated milk energy (kcl) among the experimental groups. However, cows fed treated silage plus LDY tended to produce more milk yield.
- d) All pesticide residues in milk were less than limits of quantification.

e) Efficiency of milk production :-

Average DMI was highest ($P < 0.05$) with diet containing treated silage plus LDY (15.40 kg / d), while diet containing untreated silage was recorded the lowest DMI (14.05 kg / d). Diet containing treated silage plus LDY was clear to be more efficient (1.092, 0.655 and 0.084) when milk efficiency was expressed as DMI or TDN or DCP per one kg FCM (4%) produced. While diet contained untreated silage was the lower one (1.279, 0.688 and 0.090).

14-From the economical point of view, diet contained treated silage plus LDY showed the lower cost of one ton diet. However, diets contained LDY showed the lowest cost for producing one kg of microbial protein (MP) in the rumen of sheep. Although the high cost of daily DMI (L.E) showed by lactating cows fed diet contained treated silage plus LDY, it was the cheapest one for producing one kg milk.

So, it could be concluded that:

- (1)- Biologically treatment of cotton stalks plus the first cut berseem in addition of LDY had been proven to be good feed for ruminants beside the concentrate feed mixture during late summer season in Egypt, so, it allowing other crop to be cultivated during this period and decrease the feed gap problem in ruminant.
- (2)- To avoid occurrence of some nutritional disorders (e.g. bloat or diarrhea) when feeding animals on the first cut of berseem as a sole roughage.

- (3)- Using cotton stalks as silage component may be leads to decrease boll warms (*Pectinophoro gossypiella*) also, it can resulted in less using of pesticide and protect the environment from this harmful.
- (4)- LAB inoculant leads to improvement of silage quality and reducing spoilage and losses of nutrients percent during silage preparation.
- (5)- Silage making leads to reduce the concentration of all pesticide residues. However, inoculant had more effective on that reduction. Whereas, all of them were in the limits of quantification.
- (6)- Adding LDY at level of 10 g/h/d lead to an improvement in milk production and its composition and can maximizing economic efficiency.
- (7)- Increase the income of farmers who cultivating cotton crop.