

Effect of processing of date palm leaves with urea and enzyme on nutrient digestibility, feeding behavior and some blood and rumen parameters of Arabian sheep

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Abstract

This experiment aimed to investigate the effect of processing date palm leaves with urea and enzyme on digestibility, rumination and some blood and rumen parameters of Arabian sheep. In this research, 16 Arabian sheep with an average age of 8 months and weight 28 ± 1.5 kg were used. The ratio of concentrate/forage in the treatments was 50:50. Treatments were including 1) diet contains wheat straw (control), 2) diet contains crude date palm leaves, 3) diet contains crude date palm leaves+ 3 g/kg Natuzyme enzyme and 4) diet contains date palm leaves processed with 4 % urea. In this experiment it is considered 21 days for adaptation and 14 days for sampling. At the end of the experiment, nutrient digestibility, feeding behavior and blood and rumen parameters were determined and the obtained data were analyzed in a completely randomized design. Results showed feed intake, digestibility of dry matter and organic matter and blood cholesterol level were not influenced by experimental diets. However, digestibility of NDF and ADF, blood glucose and urea and ruminal ammonia concentration significantly increased in sheep fed with date palm leaves processed with urea. A diet containing date palm leaves with urea had the greatest rumination and chewing and the highest ruminal pH was observed in the diet containing unprocessed date palm leaves. It can be concluded that the processing date palm leaves with urea and or enzyme without any negative impact on livestock, improve its nutritive value, also increase digestibility. Therefore, it may be used instead of wheat straw in the Arabian sheep diet.

Key words: Urea, Enzyme, Date palm leaves, Blood and rumen parameters, Arabian sheep

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References

- AOAC. (2005). Official Methods of Analysis. 15th ed. Association of Official Analytical Chemists. Arlington, U.S.A. P: 1094.
- Arhab, R.; Macheboeuf, D.; Doreau, M. and Bousseboua, H. (2006). Nutritive value of date palm leaves and *Aristida pungens* estimated by chemical, *in vitro* and *in situ* methods. Tropical and Subtropical Agrosystems, 6: 167-175.
- Badamana, M.S. and Sutton. J.D. (1992). Hay intake, milk production and rumen fermentation in British Saanen goats given concentrates varying widely in protein concentration. Animal Production Science, 54: 395-403.
- Bahman, A.M.; Topps, J.H. and Rooke, J.A. (1997). Use of date palm leaves in high concentrate diets for lactating Friesian and Holstein cows. Journal of Arid Environment, 35(19): 141-146.
- Broderick, G.A. and Kang, J.H. (1980). Automated simultaneous determination of ammonia and total amino acids in ruminal fluid and *in vitro* media. Journal of Dairy Science, 54: 1176-1183.
- Chaji, M. and mohammadabadi, T. (2010). The effect of low temperature steam, sodium hydroxide and exogenous enzyme on *in vitro* degradation of rice straw by rumen bacteria of sheep. Indian Journal of Small Ruminants, 16(2): 190-194.
- Cherdthong, A.; Wanapat, M. and Wachirapakorn, C. (2011). Influence of urea calcium mixture supplementation on ruminal fermentation characteristics of beef cattle fed on concentrates containing high levels of cassava chips and rice straw. Animal Feed Science and Technology, 163 (1): 43-51.
- Genin, D.; Kadri, A.; Khorchani, T.; Sakkal, K.; Belgacem, F. and Hamadi, M. (2004). Valorisation of date-palm by-products (DPBP) for livestock feeding in Southern Tunisia. Zaragoza Ciheam, 59: 221-226.
- Hassan Sallam, S.M.A.; da Silva Bueno, I.C.; de Godoy, P.B.; Eduardo, F.N; Schmidt Vittib, D.M.S. and Abdalla, A.L. (2010). Ruminal fermentation and tannins bioactivity of some browses using a semi-automated gas production technique. Tropical and Subtropical Agroecosystems, 12 (1): 1-10.
- Makkar, H.P.S.; Becker, K.; Abel, H.J. and Szegletti, C. (1995). Degradation of condensed tannins by rumen microbes exposed to quebracho tannins (qt) in rumen simulation technique (rusitec) and effects of qt on fermentative processes in the rusitec. Journal of the Science of Food and Agriculture, 69: 495-500.
- McDonald, P.; Henderson, A.R. and Heron, S.J.E. (1991). The Biochemistry of Silage. 2nd Ed. Marlow, UK: Chalcombe Publications. P: 341.
- Morgavi, D.P.; Beauchemin, K.A.; Nsereko, V.L.; Rode, L.M.; Iwaasa, A.D.; Yang, W.Z. et al. (2000). Synergy between ruminal fibrolytic enzymes and enzymes from *Trichoderma longibrachiatum*. Journal of Dairy Science, 83(6): 1310-1321.
- NRC. (2007). National Research Council: Nutrient requirements of small ruminants, sheep, goats, cervids and New York camelids. National Academy of Science, Washington, DC. P: 384.
- Paengkoum, P.; Liang, J.B.; Jelan Z.A. and Basery. M. (2006). Utilization of steam-treated oil palm fronds in growing goats: 1. supplementation with dietary urea. Asian-Aust. Journal of Animal Science, 19(9): 1305-1313.
- Sheperd, A.C. and Kung, L.J. (2005). Effects of an enzyme additive on composition of corn silage ensiled at various stages of maturity. Journal of Dairy Science, 79(10): 1767-1773.
- Van Soest, P.J. (1994). Nutritional ecology of the ruminant. 2th ed. Cornell University Press, Ithaca, NY. P: 476.
- Van Soest, P.J.; Robertson, J.B. and Lewis, B.A. (1991). Methods for dietary fiber, neutral detergent fiber and non-starch polysaccharides in relation to animal nutrition. Journal of Dairy Science, 74(10): 3583-3597.
- Vasta, V.; Mele, M.; Serra, A.; Scerra, M.; Luciano, G.; Lanza, M. and Priolo, A. (2009). Metabolic fate of fatty acids involved in ruminal biohydrogenation in sheep fed concentrate or herbage with or without tannins. Journal of Animal Science, 87(8): 2674-2684.