EFFECT OF SUPPLEMENTATION LEVEL OF ACACIA LEAVES ON SHEEP PERFORMANCE

By

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B.Sc. Agric. Sc. (Animal Production), Ain Shams University, 1998

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ABSTRACT

Boshra Roshdy Younan. Effect of Supplementation Level of Acacia Leaves on Sheep Performance. Ph.D. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2017.

This study was conducted to evaluate the effect of feeding graded levels of dried Acacia saligna leaves (ALH) on the performance response and some blood parameters of pregnant Barki ewes during late pregnancy and lactating season. Ten ewes aged 3-5 years old at the last third of pregnancy in each group (38.0±1.2 kg body weight) were fed with 0, 20, 40 and 60% of ALH as Berseem hay replacement in a completely randomize design for 250 days. The results showed non-significant differences in daily DM intake and digestibility coefficients for DM, EE, NFE and cellulose. Diets of 40% and 60% ALH showed higher ($P<0.05$) OM, CF, NDF digestibility comparing to 20% ALH and control diets. The highest ($P<0.05$) NB was recorded for ewes fed 60% followed by 40% ALH. The incorporation of ALH at levels 20, 40 and 60% resulted in non-significant differences in live body weight at all periods of the late pregnancy. Pregnant ewes fed 60% ALH diet recorded the highest ($P<0.05$) body weight gain (Kg), daily gain (g/day) and milk yield. Birth weights of lambs were not significantly affected. Blood urea concentrations were decreased ($P<0.05$) with the graded percentage of ALH inclusion instead of Berseem hay. The results of this study revealed that inclusion of dried Acacia saligna leaves up to 60% instead of dietary berseem hay could be best for improving nutrient utilization and ewe's performance during late pregnancy stage.

The Second part of the study was conducted to study the effect of feeding diets containing 40 and 60% Acacia saligna leaves hay (ALH) instead of Berseem hay on growth performance, digestibility, nitrogen utilization, rumen function and economic evaluation and carcass characteristics. Twenty four Barki lambs with an initial body weight of

22.0±0.64 kg and aged 6±0.5 months were used, and divided randomly into three groups, eight lambs each. The experiment lasted 20 weeks. Inclusion of ALH in lambs diets significantly ($p<0.05$) improved the ($P<0.05$) OM, CP and CF digestibility coefficients and did not significantly ($P>0.05$) affect the digestibility of DM, EE and NFE, increased ($P<0.01$) N retention, overall mean of rumen NH_3-N concentrations, insignificantly ($p>0.05$) increased the rumen VFA's concentration, significantly ($P<0.05$) decreased Ophryoscolex, Polystron and Holotrich (Dasytrich and Isotrich) species count, did not affect on MP production at 3, 6 and 9 hrs after feeding, improved ($P<0.05$) daily and final body weight gain, feed conversion, dressing percentage, but it did not affect weights of best ribs (9^{th}, 10^{th} and 11^{th}) and its components of meat, subcutaneous fat, and fat between muscles, total fat, and bone, increased DM and CP content of lambs meat. The present results could be concluded that dried Acacia saligna leaves could be successfully and safely to replace 40 and 60% of dietary roughage in the diets of pregnant Barki ewes and growing lambs and did counter act their feedlot performance. This may be due to Acacia saligna hay condensed tannins (CT) can maximizing the utilization of dietary protein and animal performance. Also, using Acacia as feed for livestock is considered to be partially and cheaper solution to the problem of feed shortage in arid and semi-arid areas.

Keywords: Pregnant Barki ewes, feed intake, digestibility, nitrogen utilization, body weight change, birth weight, milk yield, growing lambs, carcass traits, ruminal parameters and blood parameters.

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LIST OF ABBREVIATIONS

A/G ratio	:	Albumin/globulin ratio
ADF	:	Acid-detergent fiber
ADG	:	Average daily gain
ADL	:	Acid detergent lignin
ALH	:	Acacia leaves hay
BH	:	Berseem hay
CF	:	Crude fiber
CFM	:	Concentrate feed mixture
CP	:	Crude protein
CT	:	Condensed tannins
DCP	:	Digestible crude protein
DM	:	Dry matter
DMI	:	Dry matter intake
EE	:	Ether extract
HT	:	Hydrolysable tannins
MP	:	Microbial protein
NDF	:	Neutral detergent fiber
NFE	:	Nitrogen free extract
NH3-N	:	Ammonia nitrogen
OM	:	Organic matter
PEG	:	Poly ethylene glycol
TDN	:	Total digestible nutrient
VFAs	:	Volatile fatty acids

1. INTRODUCTION

Increasing populations, economic growth and urbanization are increasing demands for livestock products, which in turn are driving demand for increasing feed, and generating additional pressure on natural grazing resources. In addition, lack of regulatory mechanisms to control grazing combined with the expansion of cultivation into previously uncultivated areas is aggravating degradation of rangelands worldwide. It has been proposed that fodder shrubs and trees can be integrated into production systems to provide additional feed resources for livestock, to provide a source of fuel, to reduce wind erosion when planted as wind breaks and to stabilize or rehabilitate degraded areas, so, these plants have a potential to prevent desertification and mitigating the effects of droughts **(Robles *et al.*, 2008; Mulas and Mulas, 2009 and chentli *et al.*, 2014).**

A major part of diets for ruminants in arid, semi-arid and mountainous areas is derived from shrubby vegetation. Recent research into the constituents of many of these shrubby plants has shown these plants to contain appreciable quantities of secondary compounds. The presence of these anti-nutritional secondary compounds (e.g. tannins, oxalates, phenols,…), with potential adverse effects on rumen microbial fermentation, feed digestibility and animal performance, could restrict nutrient utilization of shrubby vegetation **(Waghorn and McNabb, 2003; Mueller-Harvey, 2006).**

Under African conditions, *Acacia saligna* and *Acacia nilotica*, leguminous trees are present in sufficient quantities to contribute to ruminant diets **(Degen *et al.*, 1995 and Mlambo *et al.*, 2008).** Their foliage may be used as a protein and energy supplement when animals are given low quality roughage **(Krebs, 2007). Tamir and Asefa (2009)** reported that *Acacia saligna* grows on different soils but does best on light to medium loam and well drained soils **(Azene *et al.*, 1993).** The digestibility of dry matter (DM), organic matter (OM) and energy contents of fresh A. saligna has been reported to be generally low mainly