University of Zabol

Graduate school

Faculty of Agriculture

Department of Animal Science

The Thesis Submitted for the Degree of Doctor of Philosophy (Ph. D)

In the Field of Animal Nutrition

Title:

Effect of nutrition of different levels of *portulaca oleracea* on performance, carcass characteristics, blood and rumen parameters in Arabic sheep

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Abstract

The aim of this study was to investigate the effect of nutrition of different levels of *portulaca oleracea* on performance, carcass characteristics, blood and rumen parameters in Arabic sheep. In the first experiment, in order to determine the best levels of *portulaca oleracea* supplementation, experimental treatments including control diet (no *portulaca* supplement) and four diets containing levels of 7.5, 15, 22.5, 30% *portulaca oleracea* were prepared as Replaced for alfalfa. Gas production test and two-step digestion test were used to determine the appropriate level of *portulaca oleracea* substitution. In the second experiment, the best levels obtained from the first experiment (7.5 and 15%) were used in feeding 21 Arabic male lambs with an average weight of 24 ± 1.5 kg and an average age of 150 ± 15 days in a completely randomized design with 3 treatments and 7 repetitions over a period of 84 days. Digestion and feed intake, rumen fermentation parameters, protozoan population, bacterial population and blood parameters were measured. Weight lifting was performed to estimate the conversion factor and daily weight gain at the end of every 15 days by applying 12 hours of starvation. At the end of the period, carcasses were slaughtered and decomposed. Dry matter digestibility, NDF and ADF, total meat unsaturated fatty acids, ruminal pH, methane production, total blood protein, uric acid, *ruminococcus flavefaciens* bacteria, butyric, valeric and isovaleric volatile fatty acids, fat and crude protein There was no difference significance ($P>0.05$). Total live weight, daily weight gain, total period overweight, carcass weight, carcass weight yield and meat colorimetric indices were affected by *portulaca oleracea* treatments ($P <0.05$). Palmitic fatty acids (C16: 0), gamma linolenic acid (C18: 3 n-6), alpha linolenic acid (C18: 3 n-3) and Trans linoleic acid (C18: 2 n-6 Trans) were affected by the treatments ($P <0.05$). Blood glucose, triglyceride and cholesterol were affected by different treatments ($P <0.05$). *Portulaca oleracea* with a relatively high potential for optimal manipulation of ruminal fermentation, can be used as a suitable agent for rumen manipulation. *Portulaca oleracea* is a natural product rich in beneficial compounds for the body that can be successfully used in ruminant nutrition. The transfer of beneficial components of portulaca oleracea including omega acids to the final animal products can be one of its valuable benefits.

Keywords: Fatty acids, Meat color, *Portulaca oleracea*, Rumen, Arabian sheep, Microbial population