Use of Long Chain Calcium Salt of Fatty Acid Plant in Holstein calves ration on performance and plasma concentration of thyroid hormones

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Introduction

A normal and comfortable range of environmental temperature for cattle is from 5 to 25o^{C}. Above that, they are not able to adjust their body temperature and heat stress occur (3). It leads to a reduced feed intake, performance and thyroid hormones (2, 10). Long Chain Calcium Salt of Fatty Acid Plant is a bypass fat and will increase the energy content of ration without disrupting in fiber levels or adding to the heat, which caused by forage digestion (5, 6).

The objective of this study was to measure the effect of calcium salt of fatty acid plant on dry matter intake, daily body weight gain, feed conversion ratio and concentration of thyroid hormones (T3 and T4) in blood plasma of males Holstein calves.

Materials and Methods

12 male calves with an average body weight of 200 $\pm$ 25 Kg were selected in Damoon Parvar farm, Gillan during summer with an average environmental temperature of 28.25o^{C} and a humidity of 75.5%. Calves were fed with three rations containing three levels of 0, 3 and 5% LCCSFAP for 84 days as Total Mixed Rations using NRC, 2000 (4). The feedstuffs were wheat straws, Alfa Alfa dried forage, cottonseed meal, wheat and rice bran, vegetable fatty powder , salt and calcium di-phosphate.

Nutrients compositions of each ration was measured by the method of AOAC (1) and shown in Table 1.

Table 1. Rations composition.

Rations composition	Ration one	Ration two	Ration three
Net Maintenance Energy (Mcal/kg)	1.74	1.76	1.77
Net growth Energy (Mcal/kg)	1.08	1.11	1.13
Crude protein (%)	15	15	15
Rumen Dig. protein(%)	11.03	11.04	11.00
Calcium %	1.46	1.49	1.47
Phosphor %	0.714	0.745	0.735

Calves feed intake were measured every day and they were weighted in each 21 days. Blood samples were collected from jugular vein of calves using vacuum test tubes in every 21 days during experiment. Those were kept in a flask at $4o^{C}$ until to transfer to laboratory for measuring thyroid hormones using radioimmunoassay technique. Data were analyzed using SPSS program and comparison of means were carried out using Duncan test.

Results and discussion

Effect of three rations containing three levels of LCCSFAP on Holstein male calves performance was shown in Table 2.

Table 2. Means and standard errors of daily dry matter intake, daily weight gains and feed conversion ratios of Holstein males calves.

Traits	Ration one	Ration two	Ration three
Daily dry matter intake (kg)	5.81(0.31)	5.83(0.25)	5.72(0.27)
Daily weight gain (kg)	$0.72(0.04)^{c}$	$0.82(0.03)^{b}$	$0.91(0.04)^{a}$
Feed conversion ratio (kg)	$8.14(0.46)^{a}$	$7.11(0.40)^{b}$	$6.29(0.31)^{c}$

Effect of three rations containing three levels of LCCSFAP on Holstein males calves plasma thyroid hormones was shown in Table 3.

Table 3. Means and standard errors of T3 and T4 hormones of Holstein males calves were fed using three rations containing three levels of LCCSFAP.

Thyroid hormones	Ration one	Ration two	Ration three
T3 (nmol/lit)	$2.65(0.15)^{b}$	$2.78(0.25)^{b}$	$3.17(0.25)^{a}$
T4 (nmol/lit)	$92.77(0.37)^{a}$	$90.71(0.79)^{a}$	$68.79(3.90)^{b}$

The results showed that an addition of 3 to 5% of LCCSFAP to diet has increased daily body weight gain and feed conversion ratio ($p<0.01$). The effect of three diets on mean of daily dry matter intake was not significant ($p>0.05$). The effect of four periods of measurements on mean of daily body weight gain, feed conversion ratio and daily dry matter intake was not significant ($p>0.05$). Ration containing 5% LCCSFAP has increased T3 concentration in blood plasma significantly ($p<0.01$). T4 hormone has been declined in blood plasma significantly ($p<0.01$). The effect of periods of measurements on the amount of T3 and T4 was not differing significantly ($p>0.05$). In conclusion, the use of 5% LCCSFAP in male Holstein calves ration is recommended for fattening in summer season in Gillan province, Iran.

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