

The Effect of Tasco (*Ascophyllum nodosum*) on Carcass Characteristics of Finishing Male Arabic Lambs

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Abstract: This experiment was conducted to evaluate the effect of different levels of brown seaweed (*Ascophyllum nodosum*) or Tasco on carcass characteristics of Arabic lambs in Khuzestan, Iran. This research was conducted as completely randomized design with 3 treatments, 3 replicates and 3 lambs in each replicates. The dietary treatments were formulated according to NRC and containing: control 0, 1 and 2% Tasco. The basic diet includes 16.5% crude protein and 76.6% TDN and Tasco was added top-dress to basic diet. The period of experiment was 10 weeks; Twenty-seven male Arabic lambs (3 months old and 16.09 ± 0.33 kg body weight) were assigned *ad libitum* to experimental diets. Supplementation of diets with Tasco resulted in decrease of tail-fat percentage (23%) and increased percentage of thigh (12.3%) than control ($p < 0.05$) but adding Tasco had no significant effect on other parameters of carcass characteristics ($p > 0.05$). Also, lambs fed diet contain 2% Tasco in comparison to control, had higher Hot Carcass Weight (HCW) (18.62 vs. 18.47 kg, respectively), Cold Carcass Weight (CCW) (18.20 vs. 17.83 kg, respectively) and Eye Muscle Area (EMA) (19.37 vs. 16.83 cm², respectively). Meanwhile, supplementation of Tasco in diets decreased abdominal fat weight than those fed no seaweed (0.420, 0.300 and 0.250, respectively).

Key words: Tasco, *Ascophyllum nodosum* (ANOD), carcass characteristics, Arabi lambs, Iran

INTRODUCTION

Tasco is a feed additive produced from brown seaweed that is commonly found in the coastal waters of the Northern Atlantic Ocean. Tasco is the trade name of an extract of the brown seaweed *Ascophyllum nodosum* (ANOD). The extract (a product of Acadian Seaplants, Ltd., Nova Scotia, Canada), has been marketed as Tasco Forage when applied to pastures and Tasco-EX when fed directly to livestock. Consumption of pastures treated with Tasco-Forage was reported beneficial for livestock production in a variety of ways. Tasco-Forage improved immune function of ruminants that were grazing or had previously grazed treated pastures (Allen *et al.*, 2001a; Saker *et al.*, 2001) and meat quality of beef cattle (Montgomery *et al.*, 2001) was also improved. Suggested mechanisms for the observed animal responses to Tasco include increased intake or bioavailability of trace minerals, vitamins, antioxidants, other metabolites or some combination thereof. Also, seaweed extracts are known to affect vitamin and antioxidant status of treated grasses (Zhang and Schmidt, 1999). Trace elements and vitamins found within ANOD have been shown to affect growth of cattle, milk production, color in eggs and wool color in sheep (Neeb and Jensen, 1965). An extract of the

ANOD has been reported to lower core body temperature of cattle in hot weather, while also stimulating a higher core body temperature in cold weather (Allen *et al.*, 2001a, b). Supplementation with ANOD has also demonstrated effects on carcass quality. An increase in meat shelf life, as a result of longer color preservation, was seen in which grazed on ANOD treated fescue prior to feedlot finishing (Montgomery *et al.*, 2001). Timing of feeding seems to play a role in the marbling score as feeding ANOD during the first 10 days in feedlot increased marbling but feeding during the last 14 days of finishing did not (Allen *et al.*, 2001b). Other forms of seaweed have also been observed to increase feed intake, increase carcass weight and decrease digestive tract (Al-Shorepy *et al.*, 2001).

There is a reported about benefits of Tasco, in ruminants that has shown increased weight gain with consumption of pasture treated with Tasco-Forage (Fike *et al.*, 2001) and no data are available regarding effects of Tasco or other seaweed-derived products on carcass characteristics and percentage of carcass components in finishing Arabic lambs. The object of present experiment was investigation the effect of Tasco on carcass characteristics and percentage of carcass components of finishing Arabic lambs.

MATERIALS AND METHODS

Twenty-seven male Arabic lambs (average weight 16.09±0.33 kg; 3 months of age; n = 9/treat) were assigned *ad libitum* to the diets containing Tasco at the different levels. The dietary treatments were formulated according to NRC (1985) (Table 1 and 2) and included: basic diet (control, without Tasco) and 1 and 2% of Tasco that top dressed to control treatment; the basic diet includes 16.5% crude protein and 76.6% TDN.

The experiment period was 10 weeks. Three lambs from each treatment were slain and Slaughter Weight (SW) recorded just prior to slaughter (Table 3). The feet, head and skin, viscera (intestine, liver, kidneys and so on) were separated and Hot Carcass Weight (HCW), Cold Carcass Weight (CCW) (after 24 h preservation in refrigerator) and weights of carcass components were measured immediately after slaughter and used for calculation of carcass efficiency and efficiency of carcass components (Table 3).

Rib cut of the 12th and 13th rib was dissected and used for measuring the area of eye muscle. The components of carcass include. Thigh, foreshank, Rib roast, Flank, Rib/Breast, Neck and tail-fat was cut and weighed. Percent of each part per hot carcass weight were calculated (Table 4).

The experimental design was completely randomized design with 3 treatments, 3 replicates and 3 lambs in each replicates. Data of present experiment were statistically analyzed by SAS (9.1).

RESULTS AND DISCUSSION

The effect of diets containing Tasco (*Ascophyllum nodosum*) on carcass characteristics of finishing male Arabic lambs is shown in Table 3. The experimental treatments had no effect on hot and cold carcass weight ($p>0.05$). The lambs fed diets supplemented with Tasco tended to have a better slaughter weight than control ($p>0.05$). Carcass length significantly affected by treatments (62.33, 60.33 and 59.00 cm, respectively for treatment 1, 2 and 3), as treatments containing Tasco was shorter ($p<0.05$).

Supplementing diets with Tasco decreased the weight of abdominal fat (0.30 and 0.25 vs. 0.420 kg, respectively) ($p<0.05$). In this sense, the results of present study confirm Al-Shorepy *et al.* (2001); they observed that lambs fed no seaweed tended to have a greater amount of fat than those supplemented with seaweed. Montgomery *et al.* (2001) suggested that Tasco may

Table 1: The ingredients of experimental diets (%)

Feed	Tasco (%)		
	0	1	2
Barely grain	25.0	24.5	24.0
Soybean meal	12.0	12.0	12.0
Corn grain	24.5	24.0	23.5
Wheat bran	11.0	11.0	11.0
Corn silage	12.5	12.5	12.5
Alfalfa	8.5	8.5	8.5
Tasco	0.0	1.0	2.0
SSP*	4.5	4.5	4.5
Mineral and Vitamin premix	0.9	0.9	0.9
NaHCO ₃	0.3	0.3	0.3
Salt	0.3	0.3	0.3
Urea	0.5	0.5	0.5
Total	100.0	100.0	100.0

*SSP: 10% molasses+Steam Sugarcane Pith

Table 2: Chemical composition of experimental diet

Items	Amount
ME (Mcal kg ⁻¹ DM)	2.70
TDN (DM %)	76.00
NEg (Mcal kg ⁻¹ DM)	1.20
CP (DM %)	16.50
NDF (DM %)	31.00
ADF (DM %)	14.10
Ca (DM %)	0.50
P (DM %)	0.30

TDN: Total Digestible Nutrient

affect lipid metabolism. Fike *et al.* (2005) and Braden *et al.* (2007) reported that seaweed extract increased muscle fatty acids in ruminants. Wong *et al.* (1999) cited several studies in which seaweeds were shown to have antilipidemic and anticholesterolemic effects in rats and rabbits. Compounds in Tasco, which may affect lipid metabolism include antioxidants, soluble alginates and betaines (Fike *et al.*, 2005).

Betaines have been shown to reduce fat thickness and increase concentration of mono-unsaturated neutral lipids (Fernandez *et al.*, 1998). The seaweed *Ascophyllum nodosum* contains 0.03% betaine (Blunden *et al.*, 1992). As a methyl donor, betaine suppresses the increase of homocysteine (Yagisawa *et al.*, 2004). Betaine has also been reported to increase growth (Wray-Cahen *et al.*, 2004) and improve carcass quality (Siljander-Rasi *et al.*, 2003) in swine.

The effect of different level of Tasco on percentage of carcass components in finishing Arabic lambs is presented in Table 4.

Adding Tasco to diets decreased tail-fat percent and increased thigh percent in comparison with control ($p<0.05$) and the least tail-fat percentage (19.45 vs. 15.00%, respectively) and the most thigh percent (26.43 vs. 29.70%, respectively) was belong to diets containing 2% Tasco. As mentioned, these positive effects of Tasco may

Table 3: The effect of Tasco (*Ascophyllum nodosum*) on carcass characteristics of finishing male Arabic lambs

Items	Tasco (added to diet %)			SEM	p-value
	0	1	2		
Slaughter weight (kg)	36.16	36.96	37.06	1.255	0.864
Hot body weight (kg)	18.47	18.22	18.62	0.656	0.911
Cold carcass weight (kg)	17.83	17.79	18.20	0.710	0.904
Efficiency of hot carcass weight (%)	51.09	49.33	50.26	0.557	0.164
Efficiency of cold carcass weight (%)	49.30	48.14	49.11	0.721	0.516
Abdominal fat (kg)	0.42	0.30	0.25	0.080	0.382
Abdominal fat (%)	1.12	0.80	0.67	0.181	0.277
Carcass length (cm)	62.33 ^a	60.33 ^{ab}	59.00 ^b	0.923	0.043
EMA* (cm ²)	16.83	18.80	19.37	1.583	0.569

^{a,b}Means in each column with different superscripts are significantly different (p<0.05); *Eye muscle area

Table 4: The effect of Tasco (*Ascophyllum nodosum*) on percentage of carcass components in finishing male Arabic lambs

Components	Tasco (added to diet %)			SEM	p-value
	0	1	2		
Thigh	26.43 ^b	27.83 ^{ab}	29.70 ^a	0.854	0.035
Foreshank	13.39	14.48	14.46	0.508	0.297
Rib roast	11.06	11.64	10.06	0.967	0.542
Flank	8.66	8.54	9.56	0.832	0.658
RIB/Breast	14.15	13.87	13.54	0.601	0.783
Neck	7.09	7.22	7.67	0.389	0.568
Tail-fat	19.45 ^a	16.62 ^b	15.00 ^b	0.650	0.007

Means in each column with different superscripts are significantly different (p<0.05)

be referred to its compounds such as betaine which improve carcass quality (Siljander-Rasi *et al.*, 2003) and reduce fat thickness in body (Fernandez *et al.*, 1998).

CONCLUSION

In this study, supplementation with 2% Tasco had some positive effects such as decrease abdominal fat and increased EMA and the weight of thigh.

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