The effects of supplemental lipoic acid on body weight and rectal temperature in different breeds of goats

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Abstract: The effects of supplemental Lipoic Acid (LA) on body weight, rectal temperature and mineral profile were assessed in relation to stress of transportation in different breeds of Saudi goats. Twenty-four apparently healthy goats (12 from each breed, Aardi and Hejazi) were used in this trail, which was conducted during the months of November and December, when the ambient temperature was about 16–24°C. The experimental goats; aged from 9-12 months, and weighing 33.50 to 40.50 kgs. The conditions of transport for all goats were identical. Half on goats will be treated with lipoic acid (LA) acid prior transportation, and the rest were treated with 10 ml normal saline. Twenty five mgs per ml of Lipoic acid was dissolved as the tromethamol salt and injected intravenously for three consecutive days prior transportation. Goats were transported for 12 hours, and blood samples were collected on prior transportation; 0 hr of arrival, 12 hrs post transportation, and 24 hrs post transportation. Transportation resulted in body weight loss and increase in rectal temperature in both breeds, with Aardi being less affected compared to Hejazi. Supplemental LA could prove effective in ameliorating these effects. Future studies should use different doses and at different time of transportation; Goats; Body weight; rectal temperature

INTRODUCTION

Goats are important animal in Saudi Arabia, and mainly used for meat production. Pre-slaughter stress (transportation) is a must animal production practices, with proven alteration in blood metabolites, and with negative impact meat quality and animal welfare [1]. The possible impact on such stress on body weight loss and body temperature is evident. Different antioxidants proved effects in the melioration of the bad effects of transportation, for instance the use of ascorbic acid in racing horses. Lipoic acid, an antioxidant helps during exercise stress in horses [2]. However, to the best of our knowledge, no studies are available regarding its use, as potential antioxidant in stress conditions of farm animals. The objective of this study was to see whether supplemental LA in transportation-stressed different breeds of Saudi goats, in an attempt to help to improve goat welfare and productivity under harsh condition.

MATERIALS AND METHODS

Twenty-four apparently healthy goats (12 from each breed, Aardi and Hejazi) were used in this trail, which was conducted during the months of November and December, when the ambient temperature was about 16–24°C. The experimental goats; aged from 9-12 months, and weighing 33.50 to 40.50 kgs. The conditions of transport for all goats were identical. Half on goats will be treated with lipoic acid (LA) acid prior transportation, and the rest were treated with 10 ml normal saline. Twenty five mgs per ml of Lipoic acid was dissolved as the tromethamol salt and injected intravenously for three consecutive days prior transportation. Goats were transported for 12 hours, and blood samples were collected on prior transportation; 0 hr of arrival, 12 hrs post transportation, and 24 hrs post transportation. The experimental protocol consisted of a two-way repeated measure analysis of variance (ANOVA) to determine the effects of sampling time, the difference between treatments, and the interaction between time and treatment.

RESULTS AND DISCUSSION

The main aim of this study was to assess the effects of transportation with or without LA supplementation on body weight and rectal temperature in different breeds of Saudi goats. Several scientific attempts have been carried out to ameliorate the stress of transportation. Studies are focusing on identifying beneficial supplements to reduce the negative impact of transportation stress on blood metabolites, for instance, the administration of Stresomix premix®) [3]; ascorbic acid to goats [4,5]. Our interest here is on the use of free radical scavengers, LA, with proven effects as a replacement of vitamin C and E in body fluids.

The current study indicated a clear breed-related difference in terms of body weight loss post-
transportation, with loss was greater in Hejazi than in Aardi goats (Table 1). The weight loss was affected by the supplemental LA. Similar trend of effects of transportation was reported in goats [6], pigs and cattle [7].

Table 2 shows that rectal temperature increased with the advancement of time post-transportation, with LA reduce further increase. Similar data were obtained in Malaysian oats [8]. In another study, using Saudi Arabian Aardi goats, rectal temperature increased significantly post transportation [9].

In conclusion, lipoic acid supplementation reduced the loss in body weight and minimizes the increase in rectal temperature in the two examined breed of goats.

### Table-1: The effects of transportation stress on live weight (kg) in different breeds of Saudi goats

<table>
<thead>
<tr>
<th>Time of sampling</th>
<th>Aardi</th>
<th>Hejazi</th>
<th>Significant</th>
<th>Treatment</th>
<th>Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior transportation</td>
<td>35.80</td>
<td>36.89</td>
<td>1.00</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>0.5 hr post arrival</td>
<td>34.90</td>
<td>35.60</td>
<td>0.89</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>12 hrs post arrival</td>
<td>34.00</td>
<td>35.00</td>
<td>0.78</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>24hrs post arrival</td>
<td>33.90</td>
<td>35.60</td>
<td>0.90</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

NS; not significant, LA; Lipoic acid; RSD, Residual Standard Deviation; * P < 0.05

### Table-2: The effects of transportation stress on rectal temperature (ºC) in different breeds of Saudi goats pretreated lipoic acid (LA)

<table>
<thead>
<tr>
<th>Time of sampling</th>
<th>Aardi</th>
<th>Hejazi</th>
<th>Significant</th>
<th>Treatment</th>
<th>Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior transportation</td>
<td>38.5</td>
<td>38.0</td>
<td>0.6</td>
<td>NS</td>
<td>*</td>
</tr>
<tr>
<td>0.5 hr post arrival</td>
<td>39.0</td>
<td>40.0</td>
<td>0.7</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>12 hrs post arrival</td>
<td>39.6</td>
<td>39.0</td>
<td>0.6</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>24hrs post arrival</td>
<td>38.5</td>
<td>39.0</td>
<td>0.5</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

NS; not significant, LA; Lipoic acid; RSD, Residual Standard Deviation; * P < 0.05

### REFERENCES

5. Minka NS, Ayon JO; Assessment of thermal load on transported goats administered with ascorbic acid during the hot-dry conditions. Int J Biometeorol, 2012; 56(2): 333-341.

