Plant Archives Vol. 20 No. 1, 2020 pp. 1331-1334 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF ANISE SEEDS TREATED AND UNTREATED WITH FORMALDEHYDE IN HEAT TOLERANCE AND SOME BIOCHEMECAL PARAMETERS OF HOLSTAIN COW UNDER HEAT STRESS

Mohammed Ahmed Shwayel* and Raghad Hazem Hamed Al-Mafraji

Department of Animal Production, College of Agriculture, University of Diyala, Iraq.

Abstract

This study was carried out at the Animal Farm pertaining to the Department of Animal Resources, College of Agriculture, University of Baghdad , during the period Summer to study the effect of Anise treated and untreated with formaldehyde in heat tolerance and some blood parameters . 18 multiparous Holstein cows after peak production of milk yield. The cows were randomly divided into three groups (6 cow per group) T1 control group and T2 , T3 adds 30 g / cow /day of Anise untreated and treated with formaldehyde to Diet Respectively, Temperature-Humidity Index (THI) During the months of the experiment was 79.34 and that Indicating that the cows were under the influence of heat stress, Results showed the Anise treated and untreated with formaldehyde didn't effect no GPT, HDL, Triglyceride and Heat Tolerance of Holstein dairy cow during July and August but in September GPT reduced in T2 compared with T1 and T3 as a result of anise.

Key word: Holstein , Heat Stress, anise, formaldehyde.

Introduction

Heat stress has negative effects on dairy cow and reduces milk yield, growth rate, reproductive performance and lead to physiological stress as well as costing dairy producers millions of dollars yearly (Thatcher *et al.,* 2010; Gaafar *et al.,* 2011; Boyd *et al.,* 2012; AL-Reyad *et al.,* 2016; Dalcin *et al.,* 2016) and to reduce the negative impact of heat stress used by many methods that can help Dairy cows to resist heat stress, such as use shade , water spraying and adding chamomile to diet (Schütz *et al.,* 2011; Van laer *et al.,* 2015; Shwayel and Raghad, 2018).

Anise (*Pimpinella anisum* L.) has been used to improve animal and human health and It has clearly estrogenic effect stimulates milk production and enhances sexual actors (Leung and Foster, 1996 and Chevallier, 1996) and his role in promoting the production of milk when adding to feed Dairy cattle (Nombekela *et al.,* 1994 and Morsy *et al.,* 2012), and is a useful accommodation in calm Neurological cases associated with stress and reduce body heat (Bown, 1995 and Duke, 2000) And anise seeds can stimulate immunity (Yazdi *et al.,* 2014) said Calsamiglia *et al.,* (2007) influenced protozoa and bacteria and fatty acids in the rumen negatively by anise seed oil, and for this purpose will be formaldehyde treatment of anise seeds to ensure cross anise seed area rumen without analyzing the possibility of a negative impact on the inhibitor Microbiological activity in the rumen.

Aimed of experiment to reducing the effect of heat stress on physiological performance of dairy cows by adding Anise treated and untreated with formaldehyde to Diet.

Materials and methods

This study was carried out at the Animal Farm pertaining to the Department of Animal Resources, College of Agriculture, University of Baghdad, using 18 multiparous Holstein cows after peak of milk yield. The cows were randomly divided into three groups (6 Cow per group: T1 control group (without adding Anise) ,T2 add 30 g/cow/day of Anise seeds and T3 adds 30 g/cow/day of Anise treated with formaldehyde to Diet.

The field part of the experiment was continued for the period from 1/7/2016 to 2/10/2016 to study the effect these treatments on the physiological performance under heat stress conditions in Summer and the Chemical compositions for concentrating diet fed to the animals

***Author for correspondence :** E-mail : mohammed_shwayel@agriculture.uodiyala.edu.iq

during the experiment are reported in Table 1. Addition hay and alfalfa hay, who was present when the availability of green fodder scarves and water was always available to the animals.

Anise seeds have been treated with formaldehyde (concentration 37%) in a quantity 1 liter/10 kg dry substance of anise by automatic grenade after anise brushes above a piece of nylon on the ground inside a closed Chamber with constant stirring to ensure the solution to seeds of anise used for all Homogeneous treatment then save large ammonia bags anise sealed and left for a period of 72 hours to the interaction between formaldehyde and anise with daily shaking of bags containing anise, then opened the bags and their contents published on its ceiling Hall and nylon ventilated For 48 hours to allow the unreacted formaldehyde solution after the volatility was mobilizing anise in special bags until used (Hasan *et al.*, 1990 and Hassan and Al_sultan 1995).

Temperature-Humidity Index (THI): Temperature and relative humidity were duly recorded by using a thermo hygrometer . THI values were also determined during the experimental period using the following equation, as described by Mader *et al.*, (2006).

Blood parameters: 5 ml of Blood was collected from the jugular vein in July, August and September during the experimental period. blood samples were stored in clean glass tubes and centrifuged at 3000 RPM for 15 minutes after clot at 25°C, serum was stored at –20ºC and after a period thawed this serum to measure High-density lipoprotein (HDL), Triglyceride (TG) and glutamic-pyruvate transaminase (GPT) was determined by the enzymatic colorimetric method and using Spectrophotometer by number ready (Human Kit German) containing solutions ready for measuring by following the instructions that came with the kit analysis.

Heat Tolerance was calculated according to Rhoad (1944) and Used the following equation:

HT = 100-10 (Average of Rectal Temperature -38.3)

Statistical analysis : The data were subjected to statistical analysis using Complete Random Design (CRD) were used in the analysis of experimental data to Study the effect of the treatments studied and compared the differences between the test averages (Duncan, 1955)

Table 1: Chemical Compositions of Concentrate diet and Anise.

Compositions %	Concentrate diet *	Anise
Dry matter	90.79	96.72
Crud Protein	15.81	29.00
Fat	3.00	4.32
Ash	7.44	7.44

* according to AOAC (1975)

Table 2: THI* During the months of the experiment.

THI	Month
81.85	July
79.70	August
76.48	September
79.34	Mean

* Temperature-Humidity Index (Mader *et al.*, 2006).

Table 3: Effect of adding Anise treated and untreated with formaldehyde to feed on Heat Tolerance in Holstein dairy cow during July , August and September in summer (mean ± SE).

Heat Tolerance	treatment	Month
89.00 ± 0.73	T1	July
89.00 ± 0.73	T2	
89.00 ± 0.73	T3	
93.00 ± 2.87	T1	August
97.38 ± 0.83	T2	
97.50± 1.38	T3	
98.00 ± 1.31	T1	September
99.83 ± 1.27	T2	
98.16± 0.38	T3	

- T1 control group and T2 , T3 adds 30 g/cow/day of Anise untreated and treated with formaldehyde to Diet Respectively.

Table 4: Effect of adding Anise treated and untreated with formaldehyde to feed on GPT, HDL and TG* in Holstein dairy cow during July , August and September (mean ± SE).

Treatment	GPTu/l	HDLmg/dl	TGmg/dl
July			
T1	4.00 ± 0.36	66.83 ± 6.42	70.50 ± 5.82
T2	6.50 ± 1.31	67.16 ± 6.36	62.33 ± 9.25
T3	4.83 ± 0.74	65.33 ± 4.68	48.50 ± 9.00
August			
T1	6.35 ± 0.23	43.66 ± 2.34	81.50 ± 11.75
T2	6.33 ± 0.21	42.83 ± 2.46	91.33 ± 5.67
T3	4.30 ± 0.21	41.50 ± 1.62	88.16 ± 4.70
September			
T1	12.83 ± 2.52a	59.33 ± 3.96	90.17 ± 3.95
T2	7.50 ± 2.12b	49.00 ± 1.67	94.83± 7.56
T3	11.50 ± 1.36a	57.33 ± 4.09	102.67 ± 5.45

- T1 control group and T2 , T3 adds 30 g / cow / day of Anise untreated and treated with formaldehyde to Diet Respectively.
- Means in Colum with different letters significantly different at P≤0.05.

* High-density lipoprotein (HDL), Triglyceride (TG) and glutamic-pyruvate transaminase (GPT).

polynomial and use the program SPSS (2011) in the statistical analysis.

Results and Discussion

Average ambient temperature (ºC), relative humidity (%) and temperature, humidity index (THI) during 1/7/ 2016 to 1/10/2016 are shown in table 2. The THI of July, August and September was 81.85, 79.70 and 76.48, respectively and that indicating higher heat stress on dairy cows during this month.

Also, there is no significant effect of anise on Heat Tolerance in Holstein dairy cow during July , August and September (Table 3).

The absence of a significant effect in some parameters may be attributed to the small number of observations in the treatments of the experiment.

Results in Table 4 show effect of adding Anise treated and untreated with formaldehyde to feed on GPT, HDL and TG of Holstein dairy cow there is no significant effect of treatments on GPT, HDL and TG during July and August . during September the level of GPT was significantly reduced in T2 (adding Anise untreated with formaldehyde) compared with T1 and T3 and reached 12.83, 7.50 and 11.50 u/l in T1, T2 and T3 Respectively. in that pointed direction Srikandakumar and Johanson (2004) to increase the effectiveness of the moral GOT enzyme in serum of cows exposed to thermal stress, which shows that non-thermally stressful cows low enzyme GPT and that its treatment of anise by their effective role in materials, Reduce the effects of stress and contain anti-oxidant that's the role to decrease stress for cow (Bown, 1995 and Duke, 2000).

Conclusions

Through past experience, we conclude that add anise to diet for cow's milk had a small role in reducing the impact of thermal stress in summer in the month of September by decreasing effective stress enzyme GPT by virtue of its contents of effective materials and antioxidants.

References

AL Reyad, Mahmud , Md. Abid Hasan Sarker, Md. Elias Uddin, Raihan Habib and Md. Harun-ur-Rashid (2016). Effect of heat stress on milk production and its composition of Holstein Friesian crossbred dairy cows. *Asian J. Med. Biol. Res.,* **2(2):** 190-195.

A.O.A.C. (1975). Officials Methods of Analysis. Association of Official Analytical Chemists. 12th.ed. Washington D.C.USA.

Boyd J., J.W. West, J.K. Bernard and S.S. Block (2012). Effects of plant extracts on milk yield and apparent efficiency of lactating dairy cows during hot weather. *The Professional Animal Scientist,* **28:** 338–343.

Bown, D. (1995). Encyclopedia of herbs and their uses. New York Dk Publishing, Inc. PP. 364.

Calsamiglia S., M. Busquet, P.W. Cardozo, L. Castillejos and A. Ferret (2007). Essential oils as modifiers of rumen microbial fermentation . Invited Review*: J. Dairy Sci.,* **90:** 2580-2595.

Dalcin V.C., F. Vivian, S.D. Darlene dos, P.M. Evelyn, T.S. Marcelo, J.K. Giovani, V. Marcos, B.S. Gualberto and M. Concepta (2016). Physiological parameters for thermal stress in dairy cattle. *R. Bras. Zootec.*, **45(8):** 458-465.

Duke, J.A. (2000). Handbook of Medicinal phospholipids vesicles containing glycerol on the fertilizing ability of rabbit spermatozoa. Pro. Soc. *Exp. Biol. Med.,* **152:** 257-261.

Dunncan, D.B. (1955). Multiple range and multiple F test. *Biometrics,* **11:** 1-42.

Gaafar, H.M.A., M.E. El-Gendy, M.I. Bassiouni, Sh.M. Shamiah, A.A. Halawa and M.A. Abu El-Hamd (2011). Effect Of Heat Stress On Performance Of Dairy Friesian Cows 1- Milk Production and Composition. *Researcher,* **3(5):** 85-93.

Hassan, S.A. and A.A. Al-Sultan (1995). Awssi lambs responses to dietary supplement of rumen degradable protein 1-Effect of forage to concentration ratio. *IPA. J. Agric. Res.,* **5:** 80-99.

Hassan, S.A., A.N. Al-Ani, R.A. Al-Jassim and N.S. Abdullah (1990). Effects of roughage to concentrate ratios and rumen undegradable protein supplementation on growth of lambs. Small Rumin. *Res.,* **3:** 317-324.

Leung, A.Y. and S. Foster (1996). Encyclopedia of common natural ingredients used in food, Drugs and cosmetics, 2nd ed, New York; John Wiley and Sons, Inc. pp. 36.

Mader, T.L., L.J. Johnson and J.B. Gaughan (2006). A comprehensive index for assessing environmental stress in animals. *Journal of Animal Science,* **88:** 2153-2165.

Morsy, T.A., S.M. Kholif, O.H. Matloup, M.M. Abdo and M.H. El_Shafie (2012). Impact of Anise, Clove and Juniper Oils as feed additives on the productive performance of lactating Goats. *Int. J. Dairy Sci.,* **7:** 20-28.

Nombekela, S.W., M.R. Murphy, H.W. Gonyou and J.I. Marden (1994). Dietary preferences in early lactation cows as affected by primary tastes and some common feed flavors. *J. Dairy Sci.,* **77:** 2393–2399.

Rhoad, A.O. (1944). The Iberia heat tolerance test for cattle. *Trop. Agric.*, **21:** 162-164.

Schütz, K.E., A.R. Rogers, N.R. Cox, J.R. Webster and C.B. Tucker (2011). Dairy cattle prefer shade over sprinklers: Effects on behavior and physiology. *J. Dairy Sci.,* **94:** 273–283.

Shwayel, M.A. and H.H. Raghad (2018). Effect of adding chamomile to Diet and Water Spraying on the Physiological performance of Holstein cow under heat stress . *Plant Archives,* **18(2):** 2398-2402.

SPSS (2011). Statistical Package For Social Science. User's Guide For Statistics.

Srikandakumar, A. and E.H. Johanson (2004). Effect of heat stress on milk production , rectal temperature, respiratory rate and blood chemistry in Holstein, Jersey and Australian milking Zebu cow. *Trop. Anim. Health and Prod.*, **36:** 685-692.

Thatcher, W.W., I. Flamenbaum, J. Block and T.R. Bilby (2010). Interrelationships of Heat Stress and Reproduction in Lactating Dairy Cows. High Plains Dairy Conference.

Van laer, E., F.A.M. Tuyttens, B. Ampe, B. Sonck, C.P.H Moons and L. Vandaele (2015). Effect of summer conditions and shade on the production and metabolism of Holstein dairy cows on pasture in temperate climate. *Animal,* **9(9):** 1547–1558.

Yazdi, F.F., G. Ghalamkari, M. Toghiani, M. Modaresi and N. Landy (2014). Anise seed (*Pimpinella anisum* L.) as an alternative to antibiotic growth promoters on performance, carcass traits and immune responses in broiler chicks. *Asian Pacific Journal of Tropical Disease,* **4(6):** 447-451.