Effect of *Rosmarinus officinalis* on growth, blood factors and immune response of newborn goat kids

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Introduction

- Immunity in newborn is low due to not fully maturity in the first few weeks after birth

- Newborns are exposed to a lot of the physiological and environmental stressors

- The majority of newborn mortality takes place in the early weeks of their life because of various inducements including starvation, pneumonia, and diarrhea

- Colostrum is the only source of newborn nutrition, it contains the best possible collection of antibodies that discuss passive immunity to the kids

- Scientists are exploring additives that improve animal health passive immunity and productivity

- Rosemary (*Rosmarinus officinalis*) as an aromatic herb is one of the most widely commercialized plant

- Rosemary has been administered in the animals diet as a source of natural polyphenols, such as rosmanol, genikwanin, carnosol, rosmadial, caffeic, rosmarinic and carnosic acid

- The powerful antioxidant activity of this ingredient supports protection against damage induced by free radicals

- Other effects of rosemary:
- Antimicrobial,
- Anti-inflammatory
- Anticancer

- The objective of this study was to determine the effect of rosemary extract at different supplemental levels on growth rate , hematology and cell mediate immune response in newborn goat kids

Materials and Methods

- 24 Markhoz male newborn goat kids (about 7±3 days of age) were used in the this study

- Kids randomly allotted to four groups (Control, T1, T2 and T3). The treated groups (T1, T2 and T3) were fed by supplemented milk with 100, 200 and 400 mg rosemary extract /kg of live body weight/day for 42 day

- Rosemary extract supplemented milk was prepared by dissolving the required amount of rosemary extract with 70 cc milk which milked from dams.

- During the experimental period, kids were closely monitored to ensure enough sucking

- Kids were weighed weekly from the beginning to the end of the experiment

- Blood samples were collected from each kid through the jugular vein at the end of the study

- Cell-mediated immune response was evaluated to determine double skin thickness in response to phytohaemagglutinin (PHA) using the test procedure on days 21 and 42 after the beginning of the experiment

Results

Table 1: Mean (±SEM) of total gain and ADG in different groups

Item	Control	T1	T2	T3	P-value
Initial weight (kg)	5.60 ±0.377	5.49±0.326	5.50 ±0.250	5.90 ±0.278	NS
ADG (g/day)	68.8±11.36	62.9±13.27	85.3±7.89	70.2±5.69	NS
Total gain (kg)	2.89±0.477	2.64±0.557	3.58±0.332	2.95±0.239	NS

Table 2: Mean (±SEM) concentration of different blood biochemical and hematology factors in different groups

	Control	T1	T2	T3	P-value
Globulin (g/dl)	2.95±0.0483^{a}	2.825±0.0309^{ab}	2.825±0.0763^{ab}	2.65±0.0834^{b}	*
Hb (g/dl)	9.266±0.4356	8.75±0.3896	8.266±0.3887	8.866±0.4432	NS
PCV (%)	26.867±2.005	22.90±1.537	23.708±1.322	23.867±1.571	NS
RBC ($\times 10^{6}/\mu l$)	16.187±1.088	13.547±0.9627	13.497±1.205	14.195±0.9771	NS
WBC ($\times 10^{6}/\mu l$)	17.050±0.9225^{c}	20.975±1.1533^{b}	24.075±1.1878^{a}	17.850±1.0588^{c}	***
Neutrophiles (%)	34.5±1.602	35.5±1.8529	34.25±1.4818	35.5±1.2583	NS
Lymphocyte (%)	64.25±1.7969	62.75±1.9482	64.00±1.3964	63.50±1.3964	NS

Table 3: Mean (±SEM) of double skin thickness in different groups at the time of PHA injection (21 and 42 days of age)

	Control	T1	T2	T3	P-value
21-day	6.98±0.166	6.8±0.141	6.74±0.222	6.65±0.159	NS
42-day	6.22 ±0.218^{b}	6.93±0.266^{a}	6.69±0.128^{ab}	7.17±0.221^{a}	**

Fig. 1. Trends of double skin thickness in different groups at 0, 8, 16 and hours after PHA injection on day 21

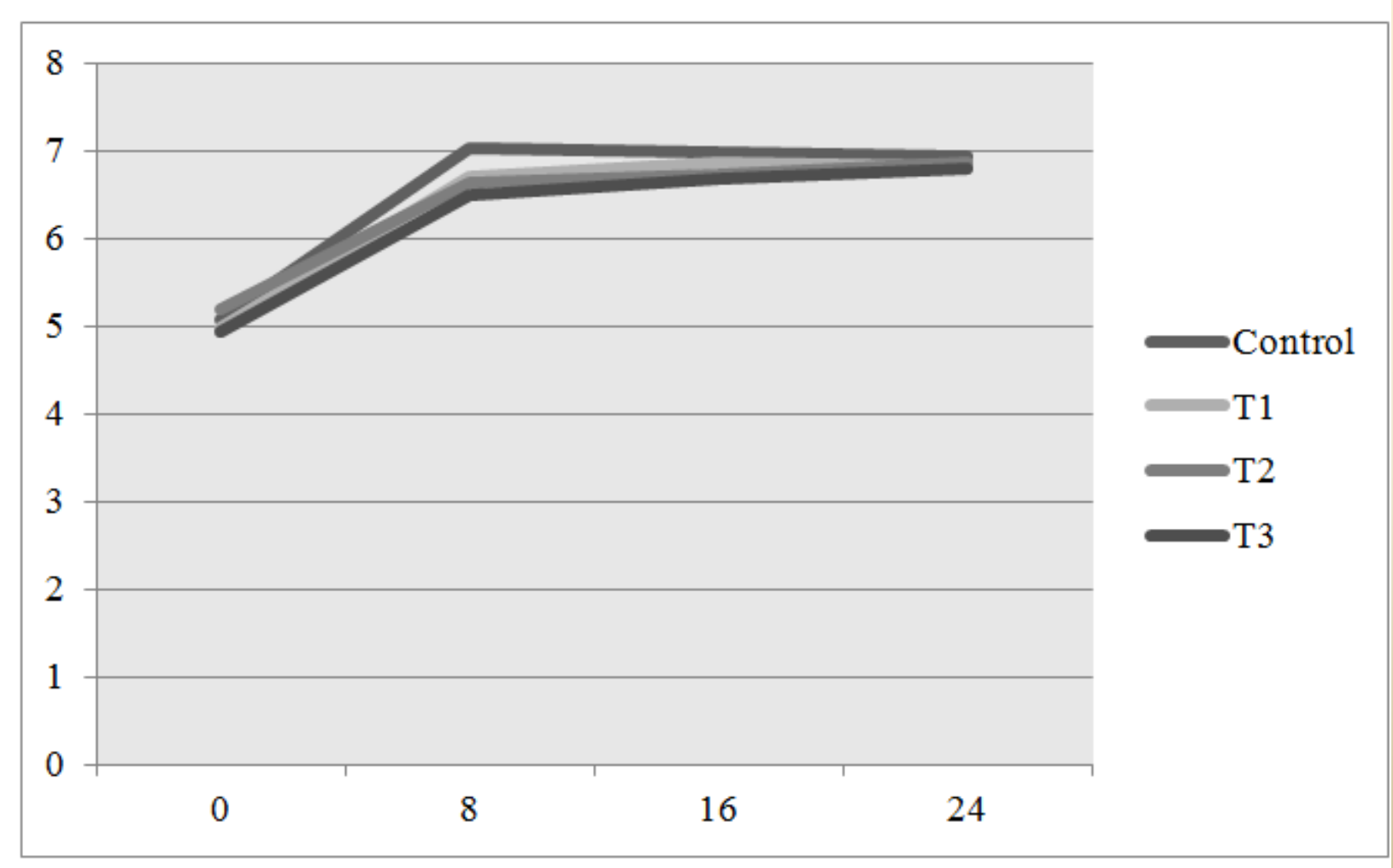
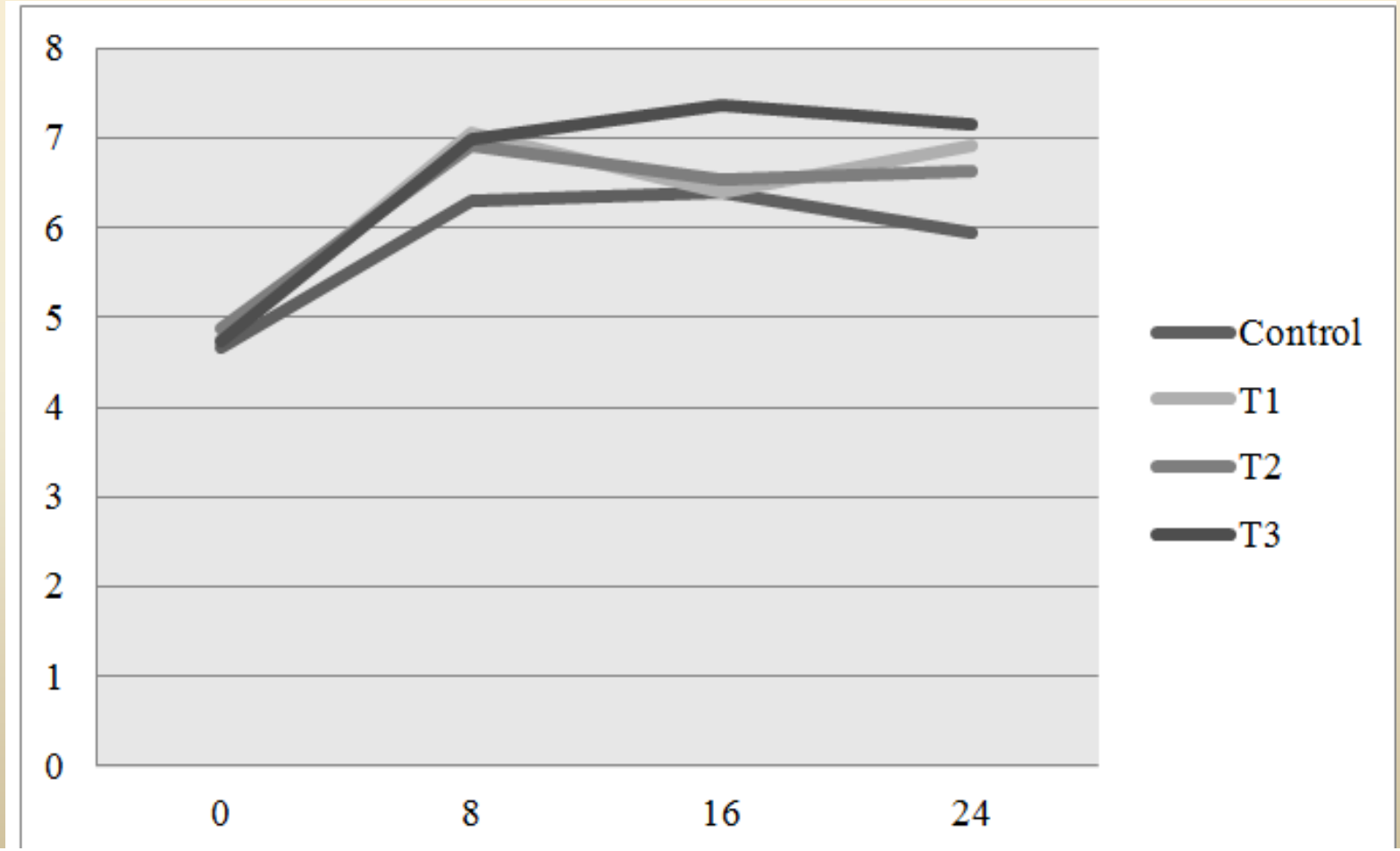


Fig. 2. Trends of double skin thickness in different groups at 0, 8, 16 and hours after PHA injection on day 42



In conclusion, our results suggest *Rosmarinus officinalis* supplementation had not significant effect on ADG, total gain Hb, PCV, RBC, lymphocytes, neutrophils. The supplemented milk with aqueous rosemary extract was able to improve significantly WBC counts and double skin thickness in response to PHA injection on 42-day of the study

Future studies involving the investigation bioavailability of rosemary phenolic elements and their effect on immune enhancing parameters may help to clarify their role in physiological and environmental stressors in newborn animals


Thanks!