EVALUATION OF EMBLICA OFFICINALIS AND MENTHA PIPERATA SUPPLEMENTATION ON BIOCHEMICAL PARAMETERS IN GROWING BEETAL KIDS

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Abstract: A ninety days trial was conducted on 36 growing beetal kids (3-4 months age) to evaluate the effect of Emblica officinalis and Mentha piperata supplementation on biochemical parameters at Goat farm, Animal Genetics & Breeding, LUVAS, Hisar. The experiment was conducted from June to August. The maximum environmental temperature ranged from 24.6°C to 45.0°C. The overall mean Thermal humidity index values were 81.21 in the morning and 88.80 in the evening. All the experimental animals were under mild heat stress. The kids were randomly divided into three groups each comprising of six male & six female. The groups were assigned to treatment as T1 -concentrate feed, T2 -98% concentrate feed + 2% Emblica powder, T 3 -98% concentrate feed + 2% Mentha powder. Blood samples were collected at 0, 30, 60 and 90 days and plasma was separated for analysis of various parameters. A significant decrease was observed in blood glucose, total cholesterol, triglyceride, lactate dehydrogenase, alanine amino transferase and aspartate amino transferase by feeding Emblica officinalis in kids. Supplementation of Mentha has shown no alteration in total protein, triglyceride, urea and enzymatic activity (Alanine amino transferase and aspartate amino transferase), however, a significant decrease was observed in glucose, cholesterol and lactate dehydrogenase. The results revealed that feeding of Emblica officinalis and Mentha piperata has hypoglycemic, hypolipidemic effects in goat kids. It may be concluded that supplementation of Emblica and Mentha have shown beneficial effects, however the effect was more significant in kids fed Emblica officinalis. As these supplements are easily available and they can be used as feed supplements in growing kids to achieve their maximum potential.

Key words: Emblica officinalis, Mentha piperata, Goat kids

INTRODUCTION

Normal nature of the herbs causes more compatibility with the body, having medicinal homologues components together, lacking side effects; therefore they are most suitable, especially in cases of long consumption as well as in chronic diseases [1]. One of the main approaches in using herbal medicinal plants is to increase the body’s natural resistance to disease/stress causing agents rather than directly neutralizing the agent itself. During growth period animals undergo various kinds of stresses such as physical, nutritional, chemical, psychological and climatic stress. Because of these reasons, browsing with supplementation is nowadays being tried by the farmers in kids rearing to fight against stress and to enhance their immunity thus improving their growth and production performance. A number of indigenous medicinal plants have been claimed to be effective in improving the growth and production
performance of kids. Among medicinal herbs, mentha leaves are considered to contain natural flavanoids, or antioxidants that may trigger natural enzymes to fight against stress under natural conditions. Similarly Amla (*Embla officinalis*), well known for its high content of vitamin C, its potent antioxidative activity and one of the strongest rejuvenator. It is known to possess the antimicrobial and antiviral properties. Keeping all these points in view, the experiment was conducted to evaluate the efficacy of Emblica and Mentha feeding on blood biochemical parameters in growing goat kids.

**MATERIALS AND METHODS**

The present study was conducted on thirty six growing Beetal kids (3-4 month old) in the month of June to August for a period of 90 days at the Goat farm, Department of Animal Genetics and Breeding, LUVAS, Hisar. Temperature humidity index was recorded daily to quantify the stress level on animals. The maximum environmental temperature ranged from 24.6°C to 45.0°C. All the experimental animals were under mild heat stress. The kids were randomly selected and distributed equally into three groups (six female + six males) each. Kids were browsed four hours daily with adlib concentrate feeding. The percent composition of concentrate feed mixture was maize (35) barley (35), ground nut cake (18), deoiled soyabean (9), mineral mixture (2) and salt (1). The groups were assigned to treatment as T₁ – concentrate feed (control), T₂-98% concentrate feed + 2% *Embla officinalis* powder and T₃-98% concentrate feed + 2% *Mentha piperata* powder. Ten ml of venous blood samples was collected from each kid at 0, 30, 60 and 90 days into sample vials containing disodium salt of EDTA and plasma was separated for analysis of various parameters. Blood glucose and enzyme assay in the plasma was done on the same day and rest of plasma was stored at-20°C for other biochemical analysis. Triglycerides, cholesterol, total protein, albumin, urea, alanine amino transferase (ALT), aspartate amino transferase (AST) and lactate dehydrogenase (LDH) were estimated using Agappe diagnostic kit with clinical chemistry analyser (MISPA UNO, Agappe). The data was statistically analysed by Snedecor and Cochran [2].

**RESULTS AND DISCUSSION**

The overall mean THI values were 81.21 in the morning and 88.80 in the evening. The maximum environmental temperature ranged from 24.6°C to 45.0°C. All the experimental animals were under moderate heat stress as THI value of 78-88 causes’ moderate stress in cattle [3].

The overall mean ±S.E. values of biochemical parameters in three treatment groups have been presented in table 1. The glucose concentration was 63.13±0.84, 56.88±1.07 and 56.43±1.19mg/dl in T₁, T₂ and T₃ groups respectively at 90 days as compared to 59.6 ± 1.0, 61.52 ± 1.08 and 61.15 ± 0.84 in three groups respectively at 0 day. The statistical analysis revealed that glucose concentration decreased significantly in T₂ and T₃ groups as compared to T₁ group, whereas no significant variation was observed between T₂ and T₃ groups. The results are in accordance with the findings of Mehta et al [4], who reported a significant fall of about 34-40% in blood glucose level indicating hypoglycemic potential as well as antidiabetic activity of *Embla officinalis* in diabetic rats. Sujatha et al. [5] also reported a significant decrease in glucose concentration in broilers fed *Embla officinalis*. The results are in accordance with the findings of Badal et al. [6] and Angel et al. [7] that *Mentha piperata* extract had produced a significant decrease in elevated levels of glucose in fructose and alloxan fed rats respectively. The results revealed lowest triglyceride concentration (P d” 0.05) in T₂ group (9.02±0.52mg/dl) at 90 days, however no significant difference was observed between T₁(10.47±0.79) and T₃ group(10.17±0.82). The overall mean plasma cholesterol concentration decreased significantly at 60 day (99.5±1.91mg/dl) and at 90 days (90.83 ± 2.65) in T₂ group as compared to T₁ group 116.0 ± 1.81mg/dl and 112.83 ± 3.56 mg/dl respectively, however no significant difference was observed between T₂ and T₃ groups. The results are in agreement with the findings of Mishra et al. [8] who reported lower serum cholesterol levels in rabbit by feeding *Embla officinalis*. Sairam et al. [9] also suggested that active tannoid principles of *Embla officinalis* are an important hypolipidaemic agent that directly acts upon the sympatho-adrenal axis and lowers the synthesis of corticosterone. The hypolipidaemic and hypocholesterolaemic effect of *E. officinalis* has been attributed to its potential in reducing lipid peroxidation and enhancing the clearance of endogenous cholesterol [10]. In the present study the cholesterol was also decreased significantly in mentha fed group (T₃) which is in accordance with the findings of Badal et al. [6],
Table 1: Blood biochemical profile in goat kids fed diet supplemented with E. officinalis(T2) and Mentha leaves powder(T3). The values in a column bearing different superscripts vary significantly (P<0.05).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Parameters</th>
<th>Glucose (mg/dl)</th>
<th>Triglyceride (mg/dl)</th>
<th>Total Cholesterol (mg/dl)</th>
<th>Total Protein (g/dl)</th>
<th>Albumin (mg/dl)</th>
<th>Urea (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 day</td>
<td>T1</td>
<td>59.6±1.0</td>
<td>10.5±0.8</td>
<td>102.4±1.64</td>
<td>7.06±0.27</td>
<td>2.95±0.23</td>
<td>33.3±1.54</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>61.52±1.08</td>
<td>10.33±0.62</td>
<td>108.83±3.57</td>
<td>7.20±0.19</td>
<td>2.8±0.15</td>
<td>34.78±1.65</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>61.15±0.84</td>
<td>10.65±0.67</td>
<td>103.58±3.51</td>
<td>7.43±0.19</td>
<td>2.76±0.22</td>
<td>33.45±1.53</td>
</tr>
<tr>
<td>30 day</td>
<td>T1</td>
<td>58.83±1.31</td>
<td>10.2±0.49</td>
<td>106.33±1.84</td>
<td>7.3±0.21</td>
<td>2.92±0.12</td>
<td>37.06±1.80</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>59.48±0.83</td>
<td>9.47±0.34</td>
<td>102.17±2.33</td>
<td>7.38±0.24</td>
<td>2.94±0.16</td>
<td>33.86±1.14</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>60.27±1.09</td>
<td>10.27±0.44</td>
<td>105±2.41</td>
<td>7.16±0.20</td>
<td>3.03±0.15</td>
<td>36.61±2.02</td>
</tr>
<tr>
<td>60 days</td>
<td>T1</td>
<td>60.3±0.74</td>
<td>9.9±0.51</td>
<td>116±1.81</td>
<td>7.27±0.18</td>
<td>2.96±0.14</td>
<td>35.83±1.73</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>60.17±0.91</td>
<td>9.08±0.35</td>
<td>99.5±1.91</td>
<td>7.31±0.18</td>
<td>3.13±0.09</td>
<td>35.46±1.26</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>60.67±0.58</td>
<td>10.1±0.98</td>
<td>98.33±1.29</td>
<td>7.86±0.24</td>
<td>3.16±0.15</td>
<td>35.35±1.52</td>
</tr>
<tr>
<td>90 days</td>
<td>T1</td>
<td>63.13±0.84</td>
<td>10.47±0.79</td>
<td>112.83±3.56</td>
<td>7.59±0.22</td>
<td>2.94±0.17</td>
<td>32.67±1.62</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>56.88±1.07</td>
<td>9.02±0.52</td>
<td>90.83±2.65</td>
<td>7.81±0.21</td>
<td>3.32±0.16</td>
<td>32.49±1.34</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>56.43±1.19</td>
<td>10.17±0.82</td>
<td>94.17±3.03</td>
<td>7.57±0.27</td>
<td>3.27±0.15</td>
<td>34.67±1.32</td>
</tr>
</tbody>
</table>

who demonstrated the efficacy of Mentha piperata in improving the lipid profile of wistar rats when given in the form of tea or juice prepared with fresh mentha leaves. A significant decrease in plasma cholesterol concentration in steers fed peppermint herbs has also been reported by Hosoda et al. [11], whereas the concentration of glucose, triglycerides, total protein, GOT and GPT were unaffected by the herb treatment.

No significant difference was observed in total protein (g/dl) and urea concentration (mg/dl) in all three groups at 60 and 90 days, however a significant decrease in urea concentration was observed in T2 group at 30 day (33.86±1.14) as compared to T1 and T3 groups. Albumin concentration was observed to be increased significantly in T2 group at 60 days (3.13 ± 0.09) and at 90 days (3.32 ± 0.16) as compared to T1 and in T3 group at 60 day (2.96 ± 1.14; 3.16 ± 0.15) and at 90 days (2.94 ± 0.17; 3.27 ± 0.15mg/dl) as compared to T1 group, however no significant difference was observed between T2 and T3 groups. Supplementation of polyherbal mix and synthetic vitamin C in broilers had caused a significant
increase in total protein and albumin concentration in poultry birds [5] which is in agreement with the present study.

The overall mean ±S.E. values of enzymes in three treatment groups have been presented in table 2. The plasma AST values were significantly decreased at 60 day (79.29±2.84U/l) and at 90 day (70.73±3.38) in T_2 group, however no significant difference was observed between groups T_1 and T_3 at 60 day and between T_2 and T_3 at 90 day. A significant decrease was observed in ALT enzyme activity in T_2 group as compared to T_1 and T_3 groups at 60 and 90 day. Plasma LDH (U/l) values decreased significantly in T_2 and T_3 groups at different intervals as compared to T_1 group. Plasma AST (U/l) values increased under heat stress but the values were within normal range. Temizel et al. [12] and Haq et al. [13] also reported a significant decrease in AST values of goat and crossbred dairy cows in ascorbic acid and _Emblica_ powder supplemented groups as compared to control group which is in agreement with present study.

It can be concluded that _Emblica_ and _Mentha_ powder supplementation produces more or less similar biochemical changes in growing kids. Both _Emblica_ and _Mentha_ have shown hypoglycaemic and hypolipidemic effects however the effect was more significant in kids fed _Emblica officinalis_ compared to _Mentha piperata_. As these supplements are available easily, they can be used as feed supplement in growing kids to have their maximum potential during growing stage.

REFERENCES