Hemato-biochemical studies in crossbred (T&D) pigs on dietary supplementation of Indian gooseberry (Phyllanthus emblica) and multienzyme

Bidyut Jyoti Das, Bibeka Nanda Saikia, Robin Bhuyan, Abani K Das, Arundhati Bora, Jitendra Saharia and Rita Nath

Abstract
In a completely randomized block design, experimental rations of grower and finisher were fed to 4 groups of animals with 5 animals (11.39 kg ± 0.17 body wt.) in each group. The ration was supplemented with or without Indian gooseberry (amla) and multienzyme. Thus the 4 ration were a control (C), control with enzyme 0.05%(T1), control with 1.5% amla powder and 0.05% multienzyme(T2), control with 2% amla and 0.05% multi enzyme (T3) in both the stages. Blood was collected from 3 animals from each treatment group for hematobiochemical study at the beginning, final stage of grower and finisher pigs in the experiment. There were significantly (P<0.05) higher values of Haemoglobin (Hb), RBC, WBC, Transaminase) and significant increase in serum protein level in T3 group. The study therefore revealed that 2% amla along with 0.05% multienzyme is beneficial in improving health condition and production healthy crossbred (T&D) pigs

Keywords: Amla, multienzyme, haemato-biochemical and Crossbred pig

Introduction
In recent years, due to public concern over the use of antibiotic as feed additives had lead to research on alternative substances with antimicrobial properties and thus use of phytoenetic feed additives like herbs, residues, extracts, essential oils etc. are being explored and practiced in South-asian countries. Herbal plants are a new class of growth promoters and in recent years this feed additives have gained extensive attention in the feed industry. Herbal feed additives or growth promoters have been developed to improve growth rate, feed efficiency and product quality and to reduce feed cost. Though the studies related to herb supplementation have been done, there is little literature available on this aspect in pigs in this part of country. Indian gooseberries (Amla) have been used in Ayurvedic medicine for centuries to treat numerous ailments, including diabetes, although they are better-known in the West for their impressive antioxidant activity. Emblica (Phyllanthus emblica L.), an euphorbiaceous plant, is widely distributed in subtropical and tropical areas of China, India, Indonesia and the Malay Peninsula. Emblica fruit is reported to have hypolipidemic (Mathur et al., 1996) [7], hypoglycemic (Abesundara et al., 2004) [8], hepatoprotective (Panda and Kar, 2003) [9]. Therefore, present study was carried out to study effect on haemato-biochemical parameters in the Crossbred (T&D) Pigs on dietary supplementation of amla and multienzyme either alone or in combination.

Materials and Methods
Twenty crossbred (T & D) pigs of about 2 months of age and average body weight 11.39±0.17 kg, irrespective of sex were randomly divided into four groups with five animals in each group. The experiment was conducted in a randomized block design (RBD) design. The grower and finisher ration was prepared as per BIS 1992 [2]. Two experimental rations were prepared i.e. grower and finisher. The rations were designated as C, T1, T2 and T3. The ration was computed in following ways: in Control ration only feed ingredients, control ration with 0.05% multienzyme (T1), control with 1.5% amla and 0.05% multienzyme (T2) and control with 2.0 % amla and 0.05% multienzyme (T3).
At the beginning, final stages of grower and finisher pigs, 5 ml of blood was collected aseptically from anterior venacava as per guidance of Institutional Animal Ethics Committee. Out of 5 ml collected blood 1 ml blood was transferred to EDTA containing vial and was used for RBC, WBC, Hb. Simultaneously, remaining 4 ml of the blood collected was used for serum separation to evaluate glucose, serum protein, AST and ALT by commercial kit (Crest Biosystems). The results obtained in the present study were analyzed statistically using SAS [9].

Results
Haematological profile and serum biochemical profile are shown below in Table 1 and Table 2, respectively.

### Table 1: Effect of Amla and Multienzyme on Haematological Profile (Mean± Se) On Crossbred (T&D) Pigs

<table>
<thead>
<tr>
<th>Group</th>
<th>RBC(m/mm³)</th>
<th>WBC(m/mm³)</th>
<th>Hb(g/dl)</th>
<th>Monocytes (%)</th>
<th>Lymphocytes (%)</th>
<th>Granulocytes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>5.21±0.28</td>
<td>13.67±0.77</td>
<td>11.36±0.17</td>
<td>3.60±0.57</td>
<td>40.92±5.78</td>
<td>55.47±5.88</td>
</tr>
<tr>
<td>T1</td>
<td>6.08±0.61</td>
<td>14.46±0.66</td>
<td>12.89±0.69</td>
<td>4.20±1.15</td>
<td>40.84±6.54</td>
<td>54.95±6.63</td>
</tr>
<tr>
<td>T2</td>
<td>6.48±0.56</td>
<td>15.31±0.96</td>
<td>12.50±1.00</td>
<td>4.62±0.47</td>
<td>39.32±5.70</td>
<td>56.05±5.97</td>
</tr>
<tr>
<td>T3</td>
<td>6.71±0.62</td>
<td>19.16±0.80</td>
<td>13.92±1.32</td>
<td>3.91±0.36</td>
<td>48.86±5.82</td>
<td>47.22±5.66</td>
</tr>
</tbody>
</table>

Mean values in a row not sharing common superscripts differ significantly (P<0.05)

### Table 2: Effect of Amla and Multienzyme on Serum Biochemical Profile (Mean± Se) On Crossbred (T&D) Pigs

<table>
<thead>
<tr>
<th>Group</th>
<th>Glucose(mg/dl)</th>
<th>Cholesterol(mg/dl)</th>
<th>ALT(IU/L)</th>
<th>AST(IU/L)</th>
<th>Serum protein(g/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>84.28±1.36</td>
<td>47.77±1.56</td>
<td>57.00±2.14</td>
<td>67.00±2.59</td>
<td>5.66±0.07</td>
</tr>
<tr>
<td>T1</td>
<td>83.19±1.24</td>
<td>44.83±1.71</td>
<td>44.48±1.44</td>
<td>65.77±2.42</td>
<td>5.84±0.11</td>
</tr>
<tr>
<td>T2</td>
<td>76.04±2.15</td>
<td>43.22±1.45</td>
<td>41.71±2.64</td>
<td>59.88±2.32</td>
<td>6.02±0.15</td>
</tr>
<tr>
<td>T3</td>
<td>74.50±2.20</td>
<td>41.77±1.74</td>
<td>40.22±3.20</td>
<td>54.73±3.70</td>
<td>6.28±0.21</td>
</tr>
</tbody>
</table>

Mean values in a row not sharing common superscripts differ significantly (P<0.05)

### Discussions

RBC values in T3 was significantly (P<0.05) different than control but there was no significant difference between C and T1, T2 and T3. Similar finding was reported by Zhou et al. (2013) [11] who found that due to supplementation of Chinese Herbal Extract there was increased in plasma erythrocyte that received 1.0g/kg CHE. Similarly WBC count revealed a significant impact (P<0.05%) showing maximum value in T3 group while minimum value in group C and T1. Similar finding was reported by Maneewan et al. (2012) [6] who found increasing the level of turmeric there was increased in WBC count in pigs. Amla (2%) and multienzyme (0.05%) supplemented T3 group had significantly higher Hb value than the C, T1 and T2 groups. In respect of lymphocyte and granulocytes count there was increased percentage in T1 group than the C, T1 and T2. Similar finding was observed by Yan et al. (2012) [10] where he found that HEM (herbal extract mixture) incorporation increase in lymphocyte count in weaned pigs. Monocytes count was found to be nonsignificant (P<0.05) between the experimental groups. There was significant decrease in serum glucose and cholesterol level in Crossbred (T&D) Pigs supplemented with 2% amla and 0.05% multienzyme. Minimum glucose and cholesterol were observed in T1 group while the maximum was in Control group. Kalita (2012) [5] and Bora (2013) [3] reported similar findings where they found reduced level of serum glucose and cholesterol level in supplemented group than the control group. ALT and AST level was decreased in T3 group than the control (C) group. Similar finding was observed by Kalita (2012) [5] and Bora (2013) [3] where they reported that decreased level of ALT and AST due to supplementation of turmeric and curry leaves powder in the experimental diet. The serum protein was increased in the T3 group which was significantly (P<0.05%) different between the groups and highest value was observed in T1 group. Similar observation was reported by Ding et al. (2011) [4] due to supplementation of Chinese herbal medicine in the experimental diet.

### Conclusion

The results of the study indicated that there was significant(P<0.05) increase in RBC, WBC, Hb and lymphocyte count in 2% amla and 0.05% multienzyme supplemented group (T3) and no significant difference was observed in monocyte count in the experimental groups. There was significant decrease in serum glucose, cholesterol in the experimental group compared to control group. On the other hand there was marked increased in serum protein concentration. There was significant (P<0.05) decrease in ALT and AST values in 2% amla and 0.05% multienzyme supplemented groups compared to control group. It can be concluded that 2% amla and 0.05% multienzyme in crossbred (T & D) pigs through feed supplementation can be used to improve health condition as well as production of healthy pig.

### Acknowledgement

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