CHAPTER SIX
RAT FEEDING EXPERIMENT
6.1. Introduction and Review of Literature

6.1.1. Introduction

Being heterotrophs, food is one of the basic requirements of animals. The food we consume have evolved at some point in our long stretch of civilization. The food of a community has its roots in its culture. India being the largest pleuristic country in the whole world is a rich source of dishes and cuisines. Inspite of the existence of extensive recommendations to the public, poor dietary and lifestyle habits are still aggravating mortality and morbidity in a host of nutrition affected diseases. Life style modification that encompasses healthier diet and exercise patterns remains a global challenge. New initiatives and partnerships amongst health authorities, non-governmental organizations and food manufacturers are emerging to address this (Roodenburg et al., 2008). Both the developed and the developing countries are facing a health crisis as a result of unhealthy diet and physical inactivity, with a global epidemic of obesity as a result. These risk factors are responsible for the growing burden of chronic diseases, including heart disease, stroke, diabetes and cancer, which are responsible for 60% of deaths, globally (WHO, 2003). Nutrition related factors are five of the six most important contributing factors of overall burden of disease in Europe (WHO, 2002). Hence, lifestyle improvements play a big part in both treatment and the prevention of these diseases. Having recognized this problem, the next step is to implement and co-ordinate strategies to improve general nutrition, promote exercise and discourage unhealthy behaviour (Branca, 2006; Waxman, 2004). The problems in terms of achieving recommended dietary guidelines in European countries were highlighted by results from the EORUDIET initiative, a strategy and action plan for developing and implementing European dietary guidelines (Kafatos & Codrington, 1999). Obesity is a growing health problem in developed nations and in country like India on its increase (Agarwal, 2002; Misra, 2001; Yoon et al., 2006). Recent studies
revealed that the food we eat have a direct influence even on the expression of genes-dealt under nutrigenomics (Munshi and Duvvuri, 2008). The availability of food is reduced due to several reasons such as drought, global warming, gene erosion, natural calamities, mismanagement of food and soil etc. So the food security is under severe threat and people are in search of new sources. It raises the critical question, when we recruit a new food source, what should be the modalities? The known biochemical constituents coming under nutritional and anti nutritional factors could be analysed. However there can be several unknown nutritional and antinutritional factors which are novel. There also arise the question of bioavailability. The evaluation of all these factors on the health of an individual is possible only if a feeding experiment is conducted. Grass grains are conventionally treated as non toxic and compatible. This is exemplified by the numerous cereals and millets we consume, the major source of energy for the 600 million human beings inhabiting the planet earth. The food is also influencing our health as a prebiotic, which in turn influence the microbial flora of intestine (Nomoto, 2008). The concept of functional food is also evolved. A food can be considered “functional” if besides its nutritious effects it has a demonstrated benefit for one or more functions of human organisms, improving the state of health or well being or reducing the risk of disease (Diplock et al., 1999).

6.1.2. Review of Literature

Park (2003) evaluated the effect of raw brown rice and Job’s tear supplemented diet on serum hepatic concentrations, antioxidative system and immune function of rats. Bioavailability of iron from super enriched bread was investigated by Ricketts and Kies in 1994. Ologunde et al. in 1994 investigated bioavailability of iron from fortified and unfortified grain amaranth meal and FeSO$_4$-fortified casein diet(control). Kapoor and Mehta (1993) investigated availability of Fe from Spirulina, whole wheat, whole egg and standard ferrous sulphate in terms of haemoglobin

Castro et al. (2003) conducted studies on the effects of diet supplementation with three soluble polysaccharides on serum lipid levels of hypercholesteromic rats. Cintra et al. (2006) studied the lipid profile of rats fed high fat diets based on flax seed peanut, trout, or chicken skin. Thirunavukkarasu et al. (2004) investigated the effect of (alpha) – lipoic acid on lipid profile in rats fed a high – fructose diet. Okwari et
6.2. Materials and Methods

The nutritive quality of grass grains was evaluated using weanling rats (*Rattus norvegicus*) (Plate VI) as a model, the grains were supplemented with the diet and feeding experiments were conducted. The sanction of the ethical committee was obtained before starting the experiment.

Grains of the grasses were collected, dried and mixed with standard feed obtained from Agricultural University, Mannuthy. Composition of standard feed given in appendix-I. 20 % grain and 80 % standard feed was mixed for feeding the rats.

6.2.1. Experimental Design, Animals and Diets

Thirty days old male wistar rats were used in this study. Six rats were housed together in standard plastic laboratory cages with stainless steel covers. One group was fed with standard meal which was considered as control. The other six groups of rats in 6 cages were given diets prepared by mixing 20 % grass grain and 80 % standard meal. Each rat was given 20 g per day. The rats were fed these diets and water ad libitum. When the experiment was initiated, the rats were with an average wt of 90 – 100 gm. The experiment lasted for 28 days. One group fed with *Dactyloctenium aegyptium* and other groups with *Eleusine indica, Setaria intermedia, Setaria pumila*, *Echinochloa crus-galli*, *Sporobolus indicus* and one set was treated as control. The weight of the rats were taken before starting the experiment and in fixed intervals and recorded. After 28 days the animals were sacrificed and blood samples were collected from the control and experimental rats. The blood was kept in two vials, one coated with anticoagulant EDTA and the other without EDTA. This sample was subjected to various biochemical analysis. Blood samples were stored in refrigerator and analysed within 24 hours.
6.2.2. Analysis of Haematological Parameters

Standard methods were used for the estimation of haematological parameters: blood smear (Hesser, 1960), total erythrocyte counts (TECs) (Hendricks, 1952) and total leucocytes counts (TLCs) (Shaw, 1930). Haemoglobin content was measured spectrophotometrically as per the diagnostic protocol of Boerhinger Manheim GmbH. Using the diagnostic kits made by BMK laboratories. The mean values of the results for the various parameters were found out, tabulated and recorded.

6.2.2.1. Blood Cell Count

Red blood corpuscles (RBC) were counted by Neubauer double haemocytometer using Hymen’s and Turk’s solution as diluting fluid described by Dacie and Lewis (1977). White blood corpuscles (WBC) differential count was carried out after staining the smear with Wright stain.

6.2.2.2. Haemoglobin

The Hb count of blood was determined by spectrophotometry (Drabkin et al., 1932).

6.2.2.3. Packed Cell Volume (PCV) or Haematocrit Value

PCV may be defined as the volume of packed red cells in a given sample of blood and is expressed in percentage. It was determined using Wintrobe’s method (3000 rpm) (Carman, 1993).
6.2.2.4. Erythrocyte Sedimentation Rate (ESR)

Westergren method was adopted. When anticoagulated blood is allowed to stand undisturbed for a period of time the cells tend to sink spontaneously to the bottom, displacing plasma, which moves to the top. The rate at which the sedimentation takes place is called ESR (Carman, 1993).

6.2.3. Bio-Chemistry

6.2.3.1. Random blood sugar was determined by Glucose oxidase method (GOD / POD) (Carman, 1993).

6.2.3.2. Blood urea was estimated by Diacetyle – monoxime / Thiosemi carbazide method (DAM/ TSC) (Carman, 1993)

6.2.3.3. Serum creatinine was estimated using modified method based on Jaffe’s reaction (Carman, 1993)

6.2.4. Liver Fuction Test

6.2.4.1. Serum bilirubin-total was estimated by the method of Jendrassik and Grof. (Carman, 1993)

6.2.4.2. Serum bilirubin-indirect was calculated from total bilirubin – direct bilirubin (Carman, 1993)

6.2.4.3. Total protein was estimated by Biuret method (Carman, 1993).

6.2.4.4. Serum albumin was estimated by Bromocresol Green method (Carman, 1993).
6.2.4.5. Globulin was determined by subtracting albumin from total protein. (Carman, 1993).

6.2.4.6. S.G.O.T. and S.G.P.T. were estimated by the method of Reitman and Frankel using 2,4 – Dinitro phenyl hydrazine (Carman, 1993).

6.2.4.7. Serum alkaline phosphatase was estimated by 4 – Nitrophenol method (Carman, 1993).

6.2.5. **Statistical Analysis**

The weight of the animals at specific intervals taken was analysed using ANOVA -Instat software (Table 13).
6.3. Results and Discussion

Table-10, Fig-21 shows the haematological parameters of the experimental animals consumed the food mix. The following parameters were observed. HB g%, TC cells/column, Polymorphs %, Lymphocytes %, Eosinophils %, ESR % and PCV% in *Dactyloctenium aegyptium* as (10.8, 5600, 17, 81, 02, 01, 28) and in *Eleusine indica* as (12, 6400, 16, 80, 04, 01, 34) and in *Setaria intermedia* as (12, 4600, 29, 70, 01, 01, 31) and in *Setaria pumila* as (13, 6000, 21, 78, 01, 01, 34) and in *Sporobolus indicus* as (13, 4900, 16, 82, 02, 01, 34) and in *Echinochloa crus-galli* as (12, 4800, 16, 82, 02, 01, 33) and in Control as (11, 5900, 16, 83, 01, 01, 29) respectively.

In Haematological parameters *Setaria pumila* and *Sporobolus indicus* showed high HB (13g%) and *Dactyloctenium aegyptium* low HB (10.8g%). All members except *Dactyloctenium aegyptium* showed higher HB than control (11g%). *Eleusine indica, Setaria intermedia* and *Echinochloa crus-galli* fed rats had the same value (12g%). TC is highest in *Eleusine indica* (6400 cells/column) and lowest in *Setaria intermedia* (4600 cells/column). *Eleusine indica* and *Setaria pumila* exhibited higher value than control (5900 cells/column). *Dactyloctenium aegyptium* (5600 cells/column), *Sporobolus indicus* (4900 cells/column) and *Echinochloa crus-galli* (4800 cells/column) exhibited variations. Total count values exhibited by *Setaria pumila, Dactyloctenium aegyptium, Sporobolus indicus* and *Echinochloa crus-galli* are lower than control, nevertheless they are within the normal limits.

*Setaria intermedia* shows higher polymorphs (29%) followed by *Setaria pumila* (21%) *Dactyloctenium aegyptium* (17%) and others *Echinochloa crus-galli, Eleusine indica* and *Sporobolus indicus* had similar values to that of control (16%).
In lymphocytes control showed highest value (83%) and others *Echinochloa crus-galli* and *Sporobolus indicus* (82%), *Dactyloctenium aegyptium* (81%), *Eleusine indica* (80%) and *Setaria pumila* (78%). *Setaria intermedia* fed rats had the lowest lymphocyte content-70%.

Eosinophils is higher in *Eleusine indica* (04%) and lesser value was shown by control, *Setaria intermedia* and *setaria pumila* (01%). *Sporobolus indicus, Echinochloa crus-galli* and *Dactyloctenium aegyptium* shows 02%). However all the values were normal.

All the members show similar ESR value to that of control (01%).

Packed cell volume was greater in members *Eleusine indica*, *Setaria pumila* and *Sporobolus indicus* (34%), followed by *Echinochloa crus-galli* (33%) and *Setaria intermedia* (31%). *Dactyloctenium aegyptium* fed rats had lowest ESR value (28%). All members except *Dactyloctenium aegyptium* had higher value than control. However, when compared to the normal value, the differences are negligible.

Table-11, Fig-22 shows the biochemistry of the experimental animals which had consumed the feed mix containing the grains of the different grass species. Random blood sugar, Blood urea, and serum creatinine observed in *Dactyloctenium aegyptium* fed rats were 83mg, 36mg, 0.3mg and in *Eleusine indica* fed rats were 101mg, 38mg, 0.5mg and in *Setaria intermedia* fed rats were 86mg, 41mg, 0.3mg and in *Setaria pumila* fed rats were 109mg, 39mg, 0.3mg and in *Sporobolus indicus* fed rats were 78mg, 35mg, 0.3mg and in *Echinochloa crus-galli* fed rats were 125mg, 38mg, 0.2mg and in Control rats 83mg, 34mg, 0.1mg respectively.
*Echinochloa crus-galli* shows highest random blood sugar (125mg%) than all other members and control. *Setaria pumila* showed (109 mg%), *Eleusine indica* (101mg%), *Setaria intermedia* (86mg%), *Dactyloctenium aegyptium* (83mg%) which was same as that of control. *Sporobolus indicus* showed lowest blood sugar (78mg%). In the case of blood urea *Setaria intermedia* showed highest value (41mg%) followed by *Setaria pumila* (39mg%), *Echinochloa crus-galli* and *Eleusine indica* (38mg%), *Dactyloctenium aegyptium* (36mg%), *Sporobolus indicus* (35mg%). All the members show higher value than control (34mg%). Nevertheless compared to normal value the difference is negligible.

In the case of serum creatinine, control shows lowest value (0.1mg%) and *Eleusine indica* exhibited highest value (0.5mg%). *Dactyloctenium aegyptium, Setaria intermedia, Setaria pumila* and *Sporobolus indicus* exhibited similar values(0.3mg%) and *Echinochloa crus-galli* -0.2mg%.

Table-12,Fig-23 shows the liver functioning of the experimental animals undergone feeding experiment. Serum bilirubin- total (mg), serum bilirubin -direct (mg), serum bilirubin - indirect (mg), total proteins (mg), serum albumin (g), serum globulin (g), S.G.O.T (IU/L), S.G.P.T ( IU/L), and Alkaline phosphatase (IU/L) were observed. In *Dactyloctenium aegyptium* fed rats the above values were 0.3, 0.2, 0.1, 6.3, 4.4, 1.9, 192, 61, 441, in *Eleusine indica* fed rats were 0.4 ,0.3 , 0.1, 5.7, 4, 1.7, 236, 48, 521, in *Setaria intermedia* fed rats were 0.2, 0.1, 0.1, 5.8, 4.1, 1.7, 250,43, 608, in *Setaria pumila* fed rats were 0.2, 0.1, 0.1, 6, 4.4, 1.6, 221, 54, 618, in *Sporobolus indicus* fed rats were 0.3, 0.2, 0.1, 5.8, 4.3, 1.5, 195, 53, 426, in *Echinochloa crus-galli* fed rats were 0.4, 0.2, 0.2, 5.8, 4.2, 1.6, 158, 50, 521 and in Control 0.3, 0.2, 0.1, 5.0, 4.2, 0.8, 236, 66 and 398 respectively.
In liver function test, *Eleusine indica* and *Echinochloa crus-galli* showed higher value (0.4mg%) for serum bilirubin- total compared to all others including control. *Dactyloctenium aegyptium* and *Sporobolus indicus* exhibited similar values to control (0.3mg%). *Setaria intermedia* and *Setaria pumila* shows lesser value (0.2mg%) than all members and control.

In the case of serum bilirubin –direct, *Eleusine indica* showed higher value (0.3mg%), *Setaria intermedia* and *Setaria pumila* showed lower value (0.1mg%) and other members show similar value to that of control (0.2mg%). When compared to the normal value (0.3%) the difference exhibited by the treatments is negligible.

In the case of serum bilirubin –indirect, all the members except *Echinochloa crus-galli* (0.2mg%) shows similar value to the control (0.1mg%).

Total protein content was high in *Dactyloctenium aegyptium* (6.3g %) followed by *Setaria pumila* (6g%), *Setaria intermedia*, *Sporobolus indicus* and *Echinochloa crus-galli* (5.8g%), *Eleusine indica* (5.7g%) and control (5g%). All the members show greater protein value than control and *Eleusine indica* shows lowest value among the members.

Serum albumin content is higher in *Dactyloctenium aegyptium* and *Setaria pumila* (4.4g%) followed by *Sporobolus indicus* (4.3g%), *Echinochloa crus-galli* (4.2g%), *Setaria intermedia* (4.1g%) and *Eleusine indica* (4g%). *Eleusine indica* shows lesser value than control and all others. The values exhibited by the treatments exhibit only negligible difference with the control (4.2g%).

All the members show high serum globulin than control (0.8g%). *Dactyloctenium aegyptium* (1.9g%), *Eleusine indica* and *Setaria intermedia* (1.7g%), *Setaria pumila* and *Echinochloa crus-galli* (1.6g%) and *Sporobolus indicus* (1.5g%) respectively.
There is a substantial increase in the globulin level for different treatments. Further estimation of the subgroups of globulin is required to make a final comment on this enhancement.

*Setaria intermedia* shows higher S.G.O.T value (250 IU/L) than all members and control (236 IU/L). *Echinochloa crus-galli* shows the lowest value (158 IU/L). *Eleusine indica* (236 IU/L), *Setaria pumila* (221 IU/L), *Sporobolus indicus* (195 IU/L) and *Dactyloctenium aegyptium* (192 IU/L).

S.G.P.T value is highest in control (66 IU/L) and *Setaria intermedia* shows the lowest value (43 IU/L). All others are in the order *Dactyloctenium aegyptium* (61 IU/L), *Setaria pumila* (54 IU/L), *Sporobolus indicus* (53 IU/L), *Echinochloa crus-galli* (50 IU/L), *Eleusine indica* (48 IU/L) respectively.

Serum alkaline phosphatase was highest in *Setaria pumila* (618 IU/L) and lowest in *Sporobolus indicus* (426 IU/L). All the members show higher value than control (398 IU/L). *Setaria intermedia* (608 IU/L), *Eleusine indica* and *Echinochloa crus-galli* (521 IU/L) and *Dactyloctenium aegyptium* (441 IU/L). Compared to the control value, the members exhibited only insignificant difference.

The table-13, Fig-24 shows the weight gain of the experimental animals during the feeding experiment. The average weight recorded for rats fed on *Dactyloctenium aegyptium* feed mix was 100.2g, 114.4g, 132g, 142.8g, 162g on the 7th, 14th, 21st and 28th day and the weight for rats fed *Eleusine indica* was 101g, 117.6g, 133g, 144g, 164g, for rats fed *Setaria intermedia* was 96.4g, 116.4g, 136g, 148.8g, 164g, for rats fed *Setaria pumila* was 94.4g, 119.6g, 137g, 150.4g, 171g, and for rats fed on *Sporobolus indicus* was 99.6g, 22g, 142g, 153g, 168g, and the rats fed *Echinochloa crus-galli* was 100.8g, 123.2g, 144g, 156g, 171g, and the rats fed on control diet was 100.2g, 125.6g, 141g, 160g and 178g respectively.
The rats consumed control food showed highest weight gain (178g) on the 28th day of the experiment followed by *Setaria pumila* and *Echinochloa crus-galli* (171g), *Sporobolus indicus* (168g), *Setaria intermedia* and *Eleusine indica* (164g), *Dactyloctenium aegyptium* (162g) respectively.

Haematological analysis, biochemical tests and liver function tests revealed that there was no significant toxicity due to the consumption of the food.

The P value is 0.9949, considered not significant. Variation among column means is not significantly greater than expected by chance. Post tests were not calculated because the P value was greater than 0.05. ANOVA assumes that the data are sampled from populations with identical SDs. Barlett’s test suggest that the differences among the SDs is not significant.
Table-10

<table>
<thead>
<tr>
<th>Parameters</th>
<th><em>Dactyloctenium aegyptium</em></th>
<th><em>Eleusine indica</em></th>
<th><em>Setaria intermedia</em></th>
<th><em>Setaria pumila</em></th>
<th><em>Sporobolus indicus</em></th>
<th><em>Echinochloa crus – galli</em></th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB (g%)</td>
<td>10.8±0.12</td>
<td>12±1.41</td>
<td>12±1.41</td>
<td>13±0.71</td>
<td>13±0.71</td>
<td>12±1.14</td>
<td>11±1.14</td>
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<tr>
<td>TC (cells/column)</td>
<td>5600±228.04</td>
<td>6400±228.04</td>
<td>4600±228.04</td>
<td>6000±141.4</td>
<td>4900±141.4</td>
<td>4800±141.4</td>
<td>5900±219.1</td>
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<tr>
<td>Polymorphs (%)</td>
<td>17±1.41</td>
<td>16±2.09</td>
<td>29±1.41</td>
<td>21±2.19</td>
<td>16±1.79</td>
<td>16±2.00</td>
<td>16±2.00</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>81±2.10</td>
<td>80±1.79</td>
<td>70±1.79</td>
<td>78±3.85</td>
<td>82±1.79</td>
<td>82±1.41</td>
<td>83±2.28</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>2±0.32</td>
<td>4±0.55</td>
<td>1±00</td>
<td>1±00</td>
<td>2±0.45</td>
<td>2±0.55</td>
<td>1±00</td>
</tr>
<tr>
<td>ESR (%)</td>
<td>1±00</td>
<td>1±00</td>
<td>1±00</td>
<td>1±00</td>
<td>1±00</td>
<td>1±00</td>
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</tr>
<tr>
<td>PCV (%)</td>
<td>28±1.41</td>
<td>34±1.41</td>
<td>31±1.27</td>
<td>34±1.41</td>
<td>34±1.41</td>
<td>33±2.53</td>
<td>29±1.79</td>
</tr>
</tbody>
</table>

Haematology of the rats fed on the control and other diets
Figure-21a-g. Haematology of the rats fed on the control and other diets.
1. Dactyloctenium aegyptium
2. Eleusine indica
3. Setaria intermedia
4. Setaria pumila
5. Sporobolus indicus
6. Echinochloa crus-galli
7. Control
Table-11

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Name of Plants</th>
<th>Random blood sugar (mg %)</th>
<th>Blood urea (mg %)</th>
<th>Serum creatinine (mg %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Dactyloctenium aegyptium</em></td>
<td>83±1.67</td>
<td>36±2.53</td>
<td>0.3±0.06</td>
</tr>
<tr>
<td>2</td>
<td><em>Eleusine indica</em></td>
<td>101±1.67</td>
<td>38±2.28</td>
<td>0.5±0.06</td>
</tr>
<tr>
<td>3</td>
<td><em>Setaria intermedia</em></td>
<td>86±1.41</td>
<td>41±1.79</td>
<td>0.3±0.06</td>
</tr>
<tr>
<td>4</td>
<td><em>Setaria pumila</em></td>
<td>109±1.55</td>
<td>39±2.28</td>
<td>0.3±0.09</td>
</tr>
<tr>
<td>5</td>
<td><em>Sporobolus indicus</em></td>
<td>78±2.83</td>
<td>35±0.63</td>
<td>0.3±0.09</td>
</tr>
<tr>
<td>6</td>
<td><em>Echinochloa crus – galli</em></td>
<td>125±2.28</td>
<td>38±0.89</td>
<td>0.2±00</td>
</tr>
<tr>
<td>7</td>
<td>Control</td>
<td>83±1.79</td>
<td>34±1.41</td>
<td>0.1±00</td>
</tr>
</tbody>
</table>

Biochemistry of the rats fed on the control and other diets

![Random blood sugar](image)

**Fig-22a**  
(Fig-22 continued)
Fig-22a-c Graph showing biochemistry of the rats fed on the control and other diets


### Table-12

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Dactyloctenium aegyptium</th>
<th>Eleusine indica</th>
<th>Setaria intermedia</th>
<th>Setaria pumila</th>
<th>Sporobolus indicus</th>
<th>Echinochloa crus–galli</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum bilirubin-total mg%</td>
<td>0.3±0.09</td>
<td>0.4±0.09</td>
<td>0.2±0.00</td>
<td>0.2±0.06</td>
<td>0.3±0.04</td>
<td>0.4±0.09</td>
<td>0.3±0.09</td>
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<tr>
<td>Serum bilirubin-direct mg%</td>
<td>0.2±0.032</td>
<td>0.3±0.063</td>
<td>0.1±0.00</td>
<td>0.1±0.00</td>
<td>0.2±0.063</td>
<td>0.2±0.063</td>
<td>0.2±0.091</td>
</tr>
<tr>
<td>Serum bilirubin-indirect mg%</td>
<td>0.1±0.00</td>
<td>0.1±0.00</td>
<td>0.1±0.00</td>
<td>0.1±0.00</td>
<td>0.1±0.00</td>
<td>0.2±0.00</td>
<td>0.1±0.00</td>
</tr>
<tr>
<td>Total proteins mg%</td>
<td>6.3±0.23</td>
<td>5.7±0.17</td>
<td>5.8±0.23</td>
<td>6.0±0.091</td>
<td>5.8±0.11</td>
<td>5.8±0.11</td>
<td>5.0±0.11</td>
</tr>
<tr>
<td>Serum Albumin g%</td>
<td>4.4±0.06</td>
<td>4.0±0.06</td>
<td>4.1±0.13</td>
<td>4.4±0.09</td>
<td>4.3±0.06</td>
<td>4.2±0.14</td>
<td>4.2±0.09</td>
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<tr>
<td>Serum globulin g%</td>
<td>1.9±0.09</td>
<td>1.7±0.09</td>
<td>1.7±0.09</td>
<td>1.6±0.09</td>
<td>1.5±0.09</td>
<td>1.6±0.09</td>
<td>0.8±0.14</td>
</tr>
<tr>
<td>S.G.O.T IU/L</td>
<td>192±1.79</td>
<td>236±1.41</td>
<td>250±1.41</td>
<td>221±0.89</td>
<td>195±0.89</td>
<td>158±2.82</td>
<td>236±1.14</td>
</tr>
<tr>
<td>S.G.P. T IU/L</td>
<td>61±0.89</td>
<td>48±1.41</td>
<td>43±1.41</td>
<td>54±1.67</td>
<td>53±1.67</td>
<td>50±0.89</td>
<td>66±1.41</td>
</tr>
<tr>
<td>Serum alkaline Phosphatase - IU/L</td>
<td>441±1.79</td>
<td>521±1.79</td>
<td>608±4.56</td>
<td>618±5.22</td>
<td>426±4.00</td>
<td>521±0.89</td>
<td>398±1.86</td>
</tr>
</tbody>
</table>

Liver function of the rats fed on control and other diets
Figure-23a-i. Graph showing liver function of the rats fed on the control and other diets


Table-13

<table>
<thead>
<tr>
<th>Feed</th>
<th>1st day</th>
<th>7th day</th>
<th>14th day</th>
<th>21st day</th>
<th>28th day</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dactyloctenium aegyptium</em></td>
<td>100.2±5.93</td>
<td>114.4±7.79</td>
<td>132±19.24</td>
<td>142.8±20.77</td>
<td>162±20.19</td>
</tr>
<tr>
<td><em>Eleusine indica</em></td>
<td>101±8.94</td>
<td>117.6±14.52</td>
<td>133±19.24</td>
<td>144±13.87</td>
<td>164±18.17</td>
</tr>
<tr>
<td><em>Setaria intermedia</em></td>
<td>96.4±7.79</td>
<td>116.4±8.99</td>
<td>136±8.22</td>
<td>148.8±13.16</td>
<td>164±9.62</td>
</tr>
<tr>
<td><em>Setaria pumila</em></td>
<td>94.4±5.73</td>
<td>119.6±11.08</td>
<td>137±10.95</td>
<td>150.4±9.84</td>
<td>171±9.62</td>
</tr>
<tr>
<td><em>Sporobolus indicus</em></td>
<td>99.6±5.73</td>
<td>122±7.89</td>
<td>142±10.95</td>
<td>153±9.75</td>
<td>168±16.43</td>
</tr>
<tr>
<td><em>Echinochloa crus-galli</em></td>
<td>100.8±9.12</td>
<td>123.2±10.26</td>
<td>144±5.48</td>
<td>156±5.48</td>
<td>171±7.42</td>
</tr>
<tr>
<td>Control</td>
<td>100.2±5.76</td>
<td>125.6±9.32</td>
<td>141±11.40</td>
<td>160±7.07</td>
<td>178±4.47</td>
</tr>
</tbody>
</table>

Weight gain of rats fed on the control and other diets and statistical analysis

Figure-24 Weight gain of the rats during the feeding experiment