V. SUMMARY AND CONCLUSION

A broiler study was conducted to evaluate the nutritive value of ragi and sorghum individually at 50 per cent or 25 per cent each in combination either with soy oil or fish oil as the energy source. Further certain groups received diets with enzyme supplementation. The samples of ragi and sorghum procured from local market were subjected to laboratory analysis. The results revealed that:

- The ragi variety analysed revealed the dry matter, crude protein, crude fiber, ether extract, total ash, nitrogen free extract, calcium and phosphorus content of 90.23, 9.13, 3.63, 2.28, 5.11, 70.08, 0.70 and 0.33 per cent, respectively.
- The corresponding values for sorghum were 90.74, 9.65, 2.78, 2.33, 4.23, 71.75, 0.61 and 0.18 per cent, respectively, while the chemical composition of maize had dry matter, crude protein, crude fiber, ether extract, total ash, nitrogen free extract, calcium and phosphorus were 90.10, 9.41, 1.71, 3.33, 0.75, 74.90, 0.35 and 0.25 per cent respectively.
- The GE content was lower in ragi (4215.00 kcal/kg) when compared to that of maize (4523.00 kcal/kg) whereas, sorghum had 4375.00 kcal/kg.
- All the three cereals had variable levels of crude fibre, ether extract, total ash, nitrogen free extract, calcium and phosphorus.
- The fish oil had 87 per cent ether extract and soy oil of 99 per cent, respectively.
- The gross energy was 7800 kcal/kg in fish oil and 9500 kcal/kg in soy oil.

- The first experiment was conducted to determine dry matter metabolizability and metabolizable energy of the said cereals by total collection method using a practical basal diet in 240 day-old chicks (Vencobb). Totally 12 experimental diets (T₁ to T₁₂) with T₁ being maize soy were formulated at fixed calorie protein ratio. Each dietary treatment was offered to two groups of 10 chicks each reared in battery cages from day old to three weeks of age.
The test ingredient ragi and sorghum were included individually and in combination at 50 and 25 per cent level replacing yellow maize with or without enzyme supplementation @0.05 per cent.

DMM of experimental diets was non-significantly (P≥0.05) similar among different treatment groups and the values ranged from 61.71 per cent in 25 per cent ragi and sorghum + enzyme fish oil fed group replacement of maize by ragi (T_{12}) to 74.13 per cent in maize-soy diet (T_7). The per cent dry matter metabolizability of various experimental diets were 65.56, 62.07, 64.00, 62.80, 62.34, 68.91, 74.13, 73.33, 73.33, 64.90, 69.66 and 61.71 through T_1 to T_{12}, respectively. As regards the oils, the fish oil group had as high as (P≤0.05) 69.51 per cent to 64.28 per cent in soy oil group.

Ragi 50 per cent diet without enzyme supplementation (T_1) had the lowest classical ME (3050 kcal/kg), whereas T_{12} had the highest (P≤0.05) ME (3132 kcal/kg), as regards the oils the fish oil fed groups recorded as high as (P≤0.05) 3106 kcal/kg to that of 3072 kcal/kg of soy oil fed groups. The predicted ME was ranged from 3051 kcal/kg (T_1) to as high as (P≤0.05) 3135 kcal/kg (T_{12}), as regards the oil the fish oil fed groups recorded as high as (P≤0.05) 3111 kcal/kg to 3071 kcal/kg in soy oil fed groups.

The second experiment was conducted by using 480 day-old commercial broiler chicks (Vencobb) to evaluate the optimum level of inclusion of ragi, sorghum individually and in combination of ragi and sorghum with or without supplementation of enzyme in broiler ration. Each dietary treatment was offered to randomly divided groups of 20 chicks each reared on deep litter system from day-old to six weeks of age.

Broilers fed 100 per cent maize-soy diet (T_5) supplemented with enzyme had the highest body weight of 1893.98g a significantly (P≤0.05) higher body weight to that of 1736.28g (T_1) 100 per cent maize-soy diet without enzyme supplementation under soy oil. The rest of the treatment groups were statistically
non-significant ($P_{>0.05}$). As regards the oils, the final body weights recorded as high as ($P_{\leq 0.05}$) 1839.03g to that of 1808.90g under soy oil fed groups.

- The feed conversion ratio values recorded at the end of sixth week was ranges from 1.71 ($T_{12}$) to as high as ($P_{\leq 0.05}$) 1.99 ($T_2$ and $T_6$). As regards the oils the soy oil fed groups recorded as high as ($P_{\leq 0.05}$) 1.91 Vs. 1.81 in fish oil fed groups.

- The livability percentage of birds at the end of the experiment ranged from 92.5 per cent ($T_1$) to as high as ($P_{\leq 0.05}$) 100 per cent in $T_4$, $T_6$, $T_8$, $T_9$, $T_{11}$ and $T_{12}$. As regards the oils the fish oil fed groups recorded as high as ($P_{\leq 0.05}$) 99.16 per cent Vs. 96.25 per cent in soy oil fed groups.

- The mean dressing percentage broiler fed different experimental diets under growth trial revealed non-significant ($P_{>0.05}$) difference among various dietary treatments. The values were 71.78, 72.91, 72.39, 71.78, 71.93, 73.64, 74.82, 72.35, 73.14, 73.38, 73.55 and 73.41 from $T_1$ through $T_{12}$, respectively.

- The organoleptic scores for various quality characteristics of chicken meat viz., texture, taste, flavour, juiciness and overall quality were non-significant different among dietary treatments. The organoleptic scores ranged from 3.19 to 3.69 for texture, 3.29 to 3.66 for taste, 3.23 to 3.65 for juiciness, 3.28 to 3.58 for flavour and 3.33 to 3.60 for overall acceptance, respectively.

- Inclusion of ragi and sorghum at various levels with or without enzyme supplementation of soy oil in 50 per cent diets and remaining 50 per cent fish oil diets did show significant changes in serum triglycerides, total cholesterol, low density and high density lipoproteins concentrations. Among all the dietary experimental groups triglyceride values recorded non-significantly ($P_{>0.05}$), but maize-soy diets recorded numerically higher values than ragi and sorghum with soy oil and fish oil dietary fed groups. For cholesterol all the dietary fed groups of soy oil had higher and significant ($P_{\leq 0.05}$) to fish oil based dietary fed groups, but among fish oil diets values were non-significant ($P_{>0.05}$) except 50
per cent ragi fed group (T₂) and its combination at 25 per cent levels with sorghum soy oil fed groups with the least (T₄). Among fish oil dietary fed groups (T₇ to T₁₂) recorded lesser values than the counter parts and all were non-significant (P≥0.05). Among soy oil fed groups (T₁ to T₆) the HDL values were non-significant (P≥0.05) except (T₂) 50 per cent ragi fed groups with least value. Among fish oil fed groups (T₈ to T₁₂) all were non-significant (P≥0.05) except (T₇) a maize based diet fed groups.

- Among soy oil fed groups highest VLDL values recorded in T₁ of maize-soy fed groups and lesser significant (P≤0.05) values recorded in enzyme supplemented groups (T₅ and T₆) including non-supplemented enzyme group (T₄) among fish oil dietary fed groups all were recorded higher values than their counter parts and all were non-significant among experimental groups except in (T₁₂) 25 per cent ragi, sorghum combination supplemented with enzyme.

- The mean net returns of broilers fed different experimental diets showed as high as (P≤0.05) Rs.19.36 (T₁₂) to as low as (P≥0.05) Rs. 14.35 (T₂). As regards the oils the fish oil fed groups recorded as high as (P≤0.05) Rs. 17.83 Vs. Rs. 15.37 in soy oil fed groups.

Conclusion

The results of the present study shows that replacement of yellow maize with ragi and sorghum individually at 50 per cent and 25 per cent in combination with a soy oil in 50 per cent diet fed groups and rest 50 per cent with fish oil fed groups on equal crude protein ratio basis containing adequate level of protein could support the body weight, feed intake and feed efficiency in broiler chicks from one to six weeks of age comparable to that of maize-soy fed dietary groups. Ragi and sorghum are comparable to that of maize in terms of proximate composition. Replacement of yellow maize by ragi and sorghum in presence of enzyme (Anazyme) at constant level of soy oil and fish oil could be replaced upto 50 per cent of maize by weight basis in broiler diets without affecting the broiler performance. However, enzyme supplementation could not show any benefit over unsupplemented group (50% ragi / sorghum). Fish oil proved to be better than soyoil along with cereals like ragi and sorghum.