VI. SUMMARY

This study was taken up with the objectives of evaluating the canine diets by using gas production technique and to assess the changes in hindgut microbial populations of adult dogs fed different diets. The experiment was conducted at the Department of Animal Nutrition, Veterinary College, Karnataka Veterinary, Animal and Fisheries Sciences University, Hebbal campus, Bangalore, India. The experiment comprised of in-vitro digestibility and hindgut fermentation study, in-vivo feeding and digestibility trial and enumeration of fecal microbiota.

Four adult maintenance type canine diets viz. homemade vegetable (HV), homemade non vegetarian (HNV), commercial vegetable (CV) and commercial non vegetarian (CNV) were selected. In vitro digestibility was completed by incubating the food samples with enzymes (pepsin, amylase and pancreatin) to simulate digestion in the stomach and small intestine. The residue obtained from enzymatic digestion was subjected to in vitro gas test to simulate the hindgut fermentation. Fecal samples from dogs fed experimental diets were used as the source of inoculum for incubating the food samples in gas production test. The fecal samples obtained from dogs fed different experimental diets were subjected for bacterial enumeration (Coliforms, Streptococci, Lactobacilli, Clostridia, Bifidobacteria, Bacteroides and Total anaerobes) by pour plate and spread plate methods.

The overall digestibilities of DM and OM observed in the in vivo trials were higher than those estimated in the in vitro experiment (p<0.05). Since the digestion in large intestines of dogs average to about 8 per cent, It was oncluded that the in vitro
procedures used in the presented study could be used to predict the digestibility of dog foods when the values are corrected to the digestibility in large intestines.

Among the experimental diets, HV diets resulted in highest fermentation and gas production (37.70 mL/g DM of food), followed by HNV (31.29), CV (12.37) and CNV (5.79) (p<0.05). Higher gas production by the HV diets was be attributed to the inclusion of pulses and vegetables in these diets. Among the experimental diets compared, CNV diet showed lowest gas production, which was partly due to less substrate (higher digestibility) available for fermentation in the large intestine. Lowered gas production levels in CNV diet, was considered to be normal and optimal from the beneficial point of view. It was concluded that the feeding of home made diets (HV or HNV) which resulted in significantly higher volume of gas (causing irritation, flatulence problems and frequent defaecations) as undesirable from the point of evaluation of canine diets.

Findings of the present study have indicated that a change in the type of diet reflected in a change in microbiota of the hindgut. The enumeration of total anaerobic bacterial count was not consistent with the volume of gas produced by feeding different diets. Nevertheless, the count of bacteroides species was concomitant with the total volume of gas produced in the respective diets. Bacteroides, being a dominant species in the hindgut, reflecting the anaerobic bacteria, it was concluded that the bacteroides count could be an index in the evaluation of canine diets to reflect the fermentation and gas production.
Hindgut fermentation and gas production offer a new concept in the nutritional evaluation of canine foods. While these parameters are important not only to provide nutrition and good health of dogs but also of concern by the dog owners in terms of frequency of defaecation and flatulence problems. Based on these criteria, evaluation of homemade or commercial diets can be viewed since feeding of homemade diets (HV or HNV), resulted in significantly higher gas production while the commercial diets (CV and CNV) resulted in the lowest gas production. Secondly, from the present study on microbiota of the hindgut, it was concluded that enumeration of total anaerobic bacteria may not reflect the fermentation characteristic of hindgut, while the enumeration of Bacteroides species can be microbiological index to reflect the fermentation and hindgut health of dogs.

Future studies may focus on standardising the technique and establishing a database on the total gas production by different feed ingredients used in preparing canine diets.