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Research Note

Development of Shelf- Stable Pet Food Using Meat cum Bone Meal and Ghee Residue

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ABSTRACT

Shelf stable pet food (SSPF) was prepared by utilizing meat cum bone meal, refined wheat flour, blood serum, sugar, yeast, rendered fat (RF), and ghee residue (GR). Three formulations were prepared viz., 10% RF+0%GR (treatment-T1), 5%RF+5%GR (treatment-T2), and 0% RF+10% GR (treatment-T3) and analyzed for the proximate composition and acceptability test. The average moisture content of T1, T2 and T3 were 1.70%, 1.78% and 2.01% respectively and moisture of T3 was significantly ($P<0.05$) higher than T1, T2. Use of ghee residue significantly increased the protein content (from 26.83±0.16 to and reduced the fat content (from 14.37±0.17 to 9.92±0.12) in T_2 and T_3. The calcium and phosphorus ratio of T_1, T_2 and T_3 were 1.41, 1.62 and 1.67 respectively. Out of the three formulations T3 was more acceptable than T1 and T2.

Key words: *Pet food, shelf-stable, meat cum bone meal, rendered fat, ghee residue.*

The pet food industry is expanding tremendously in the past few decades in India. The ever rising cost of pet food has necessitated the introduction of cheap as well as nutritious byproducts of meat and dairy industries in pet food. Animal by-products and rendered animal fat are common in pet foods. The heat destroyed components in rendered fat are biologically less acceptable and it tend to get rancid easily. Therefore it would be advantageous to develop an alternative. With rapid increase in ghee production in the country, the disposal of ghee residue produced in huge amount becoming a challenge. The ghee residue obtained as a byproduct in ghee manufacture contains considerable amount of protein (17-25%), and minerals (2-6%) and it has good antioxidant properties (Pagote and Bhandari 1988) and rich flavor enhancing properties. Hence in this study, a scientific approach was made to develop shelf stable low moisture pet food of acceptable quality using byproducts of meat and dairy industries and to optimize the level of ghee residue (GR) in the formulation.

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***Preparation of shelf stable pet food*:** The shelf stable pet food (SSPF) samples for each treatment were prepared using the formulations T1, T2, T3 given in Table 1, by adding ingredients like Meat Cum Bone Meal prepared by dry rendering procured from Meat Technology Unit, College Of Veterinary and Animal Science, Thrissur, Kerala, refined wheat flour, cattle blood serum, sugar, yeast, rendered fat (RF) &/ ghee residue (GR). The dough prepared using the various ingredients in 3 treatments was kept for one hour at ambient temperature, then moulded into rectangular shaped biscuits, the biscuits were then baked in a hot air oven at 150°C for 45 minutes and then cooled to room temperature, and each biscuits weighing around 2 grams was packed in HDPE pouches.

Analysis: The products were evaluated for proximate analysis such as moisture, protein, fat, carbohydrate and ash according to the procedure of AOAC (1990). The gross energy was found out by the equation; GE= (Protein × 0.24) + (Fat × 0.38) + (Carbohydrates × 0.17) according to Kienzle *et al.*, (1998).The calcium and

phosphorus contents were estimated using atomic absorption spectrophotometer.

Palatability assessment: The palatability or acceptability assessment test was conducted in 5dogs. Biscuits of all treatments were given to dogs in different batches for every replication. The biscuits were fed to dogs at its normal feeding time before the routine feed was given. The reactions of dog towards the biscuits were observed. Observations were made giving stress towards the approach to foods, interest to eat and nature of eating. Observations were recorded in a score card (Rana Raj, 2006) (Appendix 1). The opinion of dog owners with respect to colour, odour, and appearance were also recorded in the same score card. The data obtained were tabulated and expressed in percentage for different treatments of dog biscuits

Statistical analysis: The preparation of pet food and proximate composition was repeated six times and the acceptability was studied using 5 dogs over a period of 3days per replication and the data were analysed statistically using IBM SPSS package (version 19) as per Snedecor and Cochran (1994).

The physico-chemical characteristic of SSPF of T1, T2, and T3 are presented in Table2. Significant ($P< 0.05$) effect of treatments on the contents of fat, proteins, carbohydrate, total calories and ash contents were noted. The addition of GR increased the moisture content of T3. The addition of ghee residue significantly ($P<0.05$) lowered the fat percentage in T2 and T3 and its antioxidant properties (Ramamurthy et al., 1969) may help to increase the shelf life. Use of ghee residue significantly enriched the treatments T_2 and T_3 with protein and minerals, respective

Table1: Shelf stable Pet food formulation

Ingredients/formulations used in the manufacture of shelf stable pet foods

Ingredients	Treatment1-T1 (%)	Treatment1-T2 (%)	Treatment1-T3 (%)
Meat cum bone meal	48.0	48.0	48.0
Refined wheat flour	34.0	34.0	34.0
Blood serum	6.5	6.5	6.5
Yeast	0.5	0.5	0.5
Sugar	1.0	1.0	1.0
Rendered fat **(RF)**	10.0	5.0	-
Ghee residue **(GH)**	-	5.0	10.0
Total	**100**	**100**	**100**

Table 2: Mean ± SE values of proximate composition ±% of Shelf Stable Pet Food of Various treatment

Treatments	Moisture	Fat	Protein	CHO	Ash	Ca	P	GrossEnergy (Kcal)
T1	1.70±0.58^{a}	17.32±0.32^{a}	18.05±0.27^{a}	46.57±0.58^{a}	16.03±0.21^{a}	6.06±0.01^{a}	4.3±0.17^{a}	18.39±0.1^{a}
T2	1.78±0.12^{a}	14.37±0.17^{b}	26.83±0.16^{b}	40.88±0.19^{b}	16.02±0.21^{a}	7.61±0.05^{b}	4.70±0.02^{b}	18.83±0.04^{b}
T3	2.012±0.15^{b}	9.92±0.12^{c}	36.1±0.35^{c}	35.10±0.50^{c}	17.2±0.12^{c}	7.86±0.89^{c}	4.71±0.07^{b}	18.85±0.05^{b}

Mean± SE with same superscript does not differ significantly ($P<0.05$).

Table3: Acceptability scores of shelf stable pet food

Treatments	Scores% (owner)			Scores% (Dogs)				Total
	Odour	Colour & appearance	Total	Approach to foods	Interest to eat	Nature of eating	Total	
T1	56	59	57	93	81	61	76	70
T2	67	59	63	92	83	64	79	73
T3	72	64	68	95	83	71	82	77

values for T2 and T3 for protein are 36.1±0.35, 26.83±0.16, which might be due considerable amount of protein (17-25%), and minerals (2-6%) present in GR as reported by Santha and Narayanan (1978) and subsequently less amount of fat and minerals in comparison with rendered fat. The calcium and phosphorus ratio were 1.41, 1.62 and 1.67 respectively for T1, T2 and T3 respectively. The palatability / acceptability of dog biscuit are shown in table 3. Owners gave high preference to T3 with respect to odour (72%) and appearance (64%). The approach of dog to the biscuit and the interest to eat were all most equal for all the treatments.

From the observations recorded in the study it can be concluded that shelf stable low moisture pet food of acceptable quality with 10% added GR and relatively lower in cost could be prepared. Usage of meat and dairy industries byproduct in pet foods, not only lowers the cost of pet food, it will also help to overcome the major problem of disposal of byproducts faced by these industries and it will be a remedy for the environmental contamination caused by such byproducts.

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