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Development and Quality Evaluation of High Value Pet Food (Pet Treat)

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ABSTRACT

Local availability of dog feeds is less and quite a big volume of dog feeds are being imported to city regularly from outside. Because of the higher cost of commercial dog feeds, most of the dog owners cannot afford to provide these feed to their pets. With this intention in mind, a few pet treats were developed taking pork by products as basic protein ingredient and incorporating vegetable by products as secondary ingredient. Four different pet treats were prepared combining meat and non-meat by products using four different binder combinations viz. Treatment- 1(Maida), Treatment-2 (Rice bran), Treatment- 3 (Wheat bran) and Treatment- 4 (Maida, Rice bran, Wheat bran and molasses). The products were dried in hot air oven at about 80oC for 24 hours. The products were vacuum packed in high density polyethylene packaging material and kept at room temperature for quality assessment. No significant differences in moisture, crude protein, ether extract, carbohydrate and calorie content of the prepared pet treats were observed. However, significant difference could be observed in pet treats prepared with addition of maida (Treatment 1) and wheat bran (Treatment 3) with respect to the ash content of the samples. The pet treats were found to be highly acceptable by different breeds of dogs. The costs of production of per kg pet treats were found to be Rs. 245.00, Rs. 240.00, Rs. 240.00 and Rs. 250.00 for treatment 1, treatment 2, treatment 3 and treatment 4 respectively. The products can be commercially developed and may be marketed locally for dog owners of Guwahati city.

Keywords: *Dog food, By-product, Quality evaluation, Cost, Acceptability.*

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INTRODUCTION

Pet food is a specialty food that is formulated for pet animals according to their nutritional needs. The pet food and treat products produced and sold today offer high-quality nutrition for companion animals. Pet treats are tasty and healthy added-value products that pet owners give to their animals to reward and comfort them. There is a huge diversity of products available in the market, in various shapes, textures, appearance and flavors. Pet food generally consists of meat, meat byproducts, cereals, grain, vitamins, and minerals. The types of treats being purchased range from jerky to chews to functional treats and beyond. Commercially produced pet food has its origin in a dry, biscuit-style dog food developed in England in 1860. Shortly afterwards, manufacturers produced more sophisticated formulas, which included nutrients considered essential for dogs at the time. The growing health-consciousness of the public led to an increased interest in more nutritious and scientific formulas for pet foods, such as life-cycle products for younger and aging pets, and therapeutic foods for special health conditions of the pet, such as weight loss and urinary problems. Pet food producers were also more inclined to use less fatty tissue and tallow and more protein-rich tissue. Finally, the pet snack category grew in popularity with products like jerky snacks, sausage-shaped pieces, biscuits, and biscuit pieces called kibbles.

India is a diversified and developing country and here those ingredients which make the pet food more nutritious, safe, healthy and cheap are easily available as byproducts and waste of food industries and slaughterhouse wastes. The pet food production system is highly interlinked and competitive with the human food system, because of the fact that many of the ingredients used for pet food are also used for human food production system. The Association of American Feed Control Officials (AAFCO) defines by-products as "secondary products produced in addition to the principal product" (AAFCO, 2011). Many ingredients that include "by-product" in their name exist. These ingredients can be generated from any food system, but are most commonly a secondary product of the human food system. In the case of pet foods, the products need to be culturally acceptable to the pet owners, while still being nutritious and palatable to the pets. A unique aspect of the pet food industry is that the foods are typically formulated to be "complete and balanced," meaning that the diet will meet all nutrient needs of the pet if the proper amount of food and water are consumed. Initial pet foods were not nutritionally complete and often resulted in gastrointestinal distress and nutrient deficiencies. Decades of research in dog and cat nutrition and manufacturing processes in the mid to late 1900s dramatically improved the quality of pet foods and the health and life span of pets that consumed them (Taylor et al.,1995; Kraft,1998; Watson,1996).

The present study was undertaken for the development and quality evaluation of byproducts incorporated pet treat. Byproducts used were slaughter house byproducts along with byproducts of agricultural origin. Quality evaluation of the prepared pet treats has been done in terms of physicochemical analysis.

MATERIALS AND METHODS

Ethical Note: The present study was conducted in the laboratory of AICRP on PHET, College of Veterinary Science, Assam Agricultural University, Guwahati, India. The animal experimental protocol was approved by the Institutional Animal Ethics Committee (IAEC) and carried out as per the guidelines of Committee for the Purpose of Control and Supervision of Experiments in Animals (CPCSEA), Ministry of Environment, Forests and Climate Change, Government of India.

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Sample collection and experimental design: Freshly slaughtered pork by products such as oesophagus, trachea, lungs, stomach, and intestine etc. were collected from the departmental pig slaughter house. The samples were immediately transferred to the laboratory in ice for further processing. The samples were stored in a deep freezer at-20°C until further use.

Agricultural by products such as peels from potato, pumpkin, water gourd, cucumber, cabbage, cauli-flower, turnip, radish etc. from kitchen were collected and cut into pieces. Pork by products were also cut into pieces and the fat was removed by wet rendering process. After rendering the pork byproducts and the agricultural by products were dried in hot air oven at 70oC for about 48 hours and then both were pulverized separately.

For preparation of pet treat, vegetable powder and offal powder were mixed along with four different binders and water (qs) to produce four combinations respectively i.e., Treatment-1(Maida), Treatment-2 (Rice bran), Treatment- 3 (Wheat bran) and Treatment- 4 (Maida, Rice bran, Wheat bran and molasses) (Fig I. Pet treat with maida (a), rice-bran (b), wheat bran(c) and combination of all along with molasses (d))(Table.I). They were then moulded into suitable shapes and further dried in hot air oven at about 80oC for 24 hours. The products were vacuum packed in food grade HDPE packaging material and stored at an ambient temperature of 25-30oCfor further quality evaluation

Table 1: Percent ingredient composition for preparation of pet treat

Sl No.	Different meat and non-meat ingredients (%)	Treatment 1	Treatment 2	Treatment 3	Treatment 4
1.	Pork byproducts powder	70	70	70	70
2.	Vegetable waste powder	15	15	15	15
3.	Maida	15	-	-	4
4.	Rice bran	-	15	-	4
5.	Wheat bran	-	-	15	4
6.	Molasses	-	-	-	3
7.	Water	qs	qs	qs	qs
	Total	**100**	**100**	**100**	**100**

Proximate composition : Moisture, crude protein, crude fat and total ash contents of all the pet treats of different treatment groups were determined on the day of production by following the standard methods described by AOAC (2007).

Carbohydrate: Total carbohydrate values were calculated by difference using the following formula for 100 g of food
{100- (moisture% + fat% + protein % + ash %)}

Calorific values: Estimates of total calories in pet treats were calculated on the basis of 100g using the Atwater values for fat (9kcal/g), protein (4.02kcal/g) and carbohydrate (4.00 kcal/g) i.e., (Fat × 9 kcal + protein × 4.02 kcal+ carbohydrate × 4 kcal)

Shelf life Studies: The shelf life of the products was conducted up to a period of 6 months at monthly interval. The shelf life was decided on the basis of bacteriological quality, physical change and acceptability by the dogs.

Bacteriological Quality: The total bacterial load (mesophillic count) was assessed as per the method described by following the pour plate technique as described by Harrigan and McCance (1976).

Acceptability test: The pet treats were fed to five (5) different dogs reared by different owners as well as to street dogs. The feeds were presented to the dogs at least for 3 days in the morning hours

a

b

withdrawing the normal food provided by their owners, however, the street dogs were fed instantly without following any restriction to food. The test was conducted every month till 6 months of storage period. The palatability of the pet treats was determined on the basis of preference and acceptance by the dogs.

Cost of production: The costs of the finished pet treats were determined on the basis of cost of raw materials and processing cost.

Statistical Analysis: The data collected for the various parameters were subjected to statistical analysis using analysis of variance method (SAS Enterprise Guide 4.2).

Figure 1 : Pet treat with maida (a), rice bran (b), wheat bran (c) and combination of all along with molassess (d)

RESULTS AND DISCUSSIONS

The results of the proximate composition, carbohydrate and calorific values of the prepared pet treat are presented in Table II.

Table 2: Proximate composition, carbohydrate (DM basis), calorific values and cost of production of the pet treats

Attributes	Treatment 1	Treatment 2	Treatment 3	Treatment 4
Moisture (%)	3.57 ± 0.34	3.39 ± 0.47	3.86 ± 0.54	3.56 ± 0.60
Crude Protein (%)	42.15 ± 0.78	42.29 ± 0.64	40.40 ± 1.27	40.25 ± 0.76
Ether Extract (%)	17.88 ± 0.74	16.44 ± 1.81	17.26 ± 1.96	19.21 ± 1.36
Total Ash (%)	10.90b ± 0.51	11.77ab ± 0.72	12.68a ± 0.40	11.93ab ± 0.45
Carbohydrate (%)	25.50 ± 1.55	25.07 ± 1.32	25.79 ± 3.15	26.11 ± 1.61
Calorie (per 100g)	431.53 ± 3.93	421.55 ± 10.73	420.13 ± 9.76	434.13 ± 6.03
Cost of production/kg (Rs.)	245.00	240.00	240.00	250.00

Means with different superscripts differ significantly within row at P<0.05. n=5

No significant differences could be observed among the pet treats of the different treatment groups in the case of moisture content. No significant differences in crude protein contents of the pet treats were also observed. However, the crude protein content of the pet treats prepared with the addition of rice bran was found to be highest amongst the samples. Dogs required relatively high proportion of protein because of carnivorous nature. The protein component in pet foods can constitute between 25 and 70% of the dry matter (DM) [Rokey and Plattner, 1995]. Thus, the present finding of crude protein fulfills the requirement of protein in the pet treats.

No significant difference in ether extract contents of the pet treats was also observed. With regards to the total ash content of the pet treats, significant difference was found between Treatment 1 and Treatment 3. Pet treats with wheat bran as binder (Treatment 3) was found to contain highest total ash percentage than the other samples which might be due to the fact that wheat bran contains high ash content (6.7%) (Agrobio, 2010). The percent of carbohydrate was found to be highest in pet treat with the combination of binders and molasses which might be due to high content of carbohydrate in molasses. The calorific value of the sample prepared with the addition of Maida, Rice bran, Wheat bran and molasses (Treatment 4) together as binders was found to be highest than the other treatments.

Cost of production per kg was found to be comparatively more in pet treats incorporated with all the binder combinations and molasses. The cost of pet treat prepared in the present study was slightly higher than the cost of commercially available pet foods.

However, the cost of pet treats could be reduced by appropriate combination of meat and non-meat ingredients in future studies.

Shelf-life studies of the pet treats:
The products were tested up to 6 months at monthly intervals of their storage life for total mesophillic counts and no bacterial growth could be observed in any of the samples till the end of the storage life.

In the present study, it was found that the pet treats were acceptable till 6 months of the study period. There is likely that the products could be stored beyond 6 months of storage period.

CONCLUSION

Based on the study, it can be concluded that the byproducts from slaughter house and vegetable byproducts which get wasted every day may be utilized for the preparation of cheaper high value pet treats. Although, the cost of the pet treats prepared in this study is slightly higher than the commercial pet foods, however, the cost could be reduced by suitable combination of meat and non-meat ingredients in future.

COMPETING INTERESTS: The authors have no known competing interests either financial or personal between themselves and others that might bias the work.

ETHICS STATEMENT: Not Applicable

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