УДК 637.071

ПРИМЕНЕНИЕ КУРИНЫХ ПОЛУПРОДУКТОВ В КАЧЕСТВЕ ПИТАНИЯ ДОМАШНИХ ЖИВОТНЫХ

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Аннотация: Курица - самый популярный мясной продукт на Шри-Ланке. При производстве мясных продуктов, подвергающихся механической сепарации, в промышленности образуется большое количество побочных продуктов, что создает проблематичную ситуацию с утилизацией отходов. В Шри-Ланке он используется как единственный местный корм для домашних животных, не удовлетворяющий потребности домашних животных в питательных веществах. Поэтому целью данного исследования было разработать рацион собак для ранних стадий роста с использованием механически отделенных мясных субпродуктов для производства качественного местного продукта. Пробное кормление было проведено с шестью щенками из двух разных пометов. Щенки в возрасте пяти-шести недель были разделены на две группы. Группу А кормили новым приготовленным кормом для собак, а Группу В кормили смесью как механически отделенными побочными продуктами мяса (50%), так и приготовленным кормом (50%). Щенкам давали ежедневную дозу 10 процентов от массы тела, и потребление также измеряли еженедельно. Живую массу измеряли ежедневно, а длину тела и обхват груди измеряли еженедельно в течение четырех недель экспериментального периода. Были рассчитаны показатели роста, абсолютные и относительные (AGR и RGR). Масса тела показала значительную ($P < 0,05$) и положительно связанную взаимосвязь между массой тела и потреблением

корма в обеих группах. Средняя прибавка в весе в группе А составляла $0,078 + 0,02$ кг / день, а в группе В - $0,032 + 0,0066$ кг / день. Увеличение обхвата груди в группе А составило $3,03 + 0,34$ см в неделю, а в группе В - $1,67 + 0,76$ см в неделю, увеличение обхвата туловища в группе А составило $4,34 + 0,77$ см в неделю, а в группе В - $2,606 + 0,09$ см в неделю. Прирост длины тела в группе А составил $4,135 + 0,89$ см в неделю, а в группе В - $2,067 + 0,16$ см в неделю. Поскольку приготовленный корм произведен из дешевых ингредиентов на местном рынке, отмечается более высокое потребление корма (вкусовые качества) во время эксперимента и простота применения по сравнению с импортным кормом для домашних животных. Данный корм для собак можно рекомендовать в качестве наиболее подходящего корма для щенков.

Ключевые слова: Мясные субпродукты, Рацион для собак, Показатели роста, Мясо механической сепарации.

APPLICATION OF CHICKEN BYPRODUCTS AS A PET FOOD RATION

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Abstract: Chicken is the most popular meat item in Sri Lanka. While producing mechanically separated meat products, the industry generates a large amount of byproducts, which creates a problematic situation in waste disposal. . These byproducts are used for the production of fertilizers, bone meal and also as a pet food in Sri Lanka. Mechanically separated meat byproduct does not satisfy the energy, minerals and vitamin requirement and optimum growth performances of pets.. Therefore, the objective of this study was to develop a canine ration for early growth stages using mechanically separated meat byproducts to produce a quality local product. Feeding trial was performed with six puppies from two different litters. Five to six weeks aged puppies were divided into two groups. Group A was fed with newly formulated canine feed and Group B was fed with a mixture of both mechanically separated meat byproduct (50%) and formulated feed (50%). Puppies were fed with the daily amount of 10 percent of body weight and intake also was measured weekly. Live weight was measured daily and body length and heart girth measured weekly for four weeks of experimental period. Growth performances like absolute and relative growth rates (AGR and RGR) were calculated. Statistical

analysis was done by SAS system for windows9.0 software and followed two sample t-tests and regression analytical methods. The body weight showed significant ($P < 0.05$) and positively associated relationship between body weight and feed intake in both groups. The mean weight gain of group A was 0.078 ± 0.02 kg/day and group B was 0.032 ± 0.0066 kg/day. Heart girth gain in Group A was 3.03 ± 0.34 cm/week and group B was 1.67 ± 0.76 cm/week, Belly girth gain in group A was 4.34 ± 0.77 cm/week and group B was 2.606 ± 0.09 cm/week, Body length gain in group A was 4.135 ± 0.89 cm/week and group B was 2.067 ± 0.16 cm/week. As the formulated feed produced with all locally available cheap ingredients, higher feed intake (palatability) during the experiment and easiness of application comparing to imported pet feed, this formulated canine feed can recommend as the most appropriate feed for puppies.

Key words: Meat byproduct, Canine ration, Growth performances, Mechanically separated meat.

Introduction

Sri Lanka is one of the self-sufficient countries in broiler meat production. Mechanically separated meat byproduct is one of the major wastes which generate in poultry meat processing plants. In poultry meat processing plants, whole chicken as well as parts of chicken are produced. The parts which do not fulfill the product specifications go for grinding and separating meat part. The remaining is the mechanically separated meat byproduct. Many local pet foods available in the market contains only this byproduct meal. It contains fewer nutrients in higher volume, 12% protein, 15% fat etc. Generally, this byproduct meal has a market of nearly 1000kg per week according to the records of New Anthony's Farm. However, this meal does not satisfy the daily nutrient requirements of canine.

During the period of rapid growth, especially in puppies of the fastest growing breeds, it is essential to feed an optimal diet in an optimal way. It is now known that 'proper' and 'optimal' in this respect does not mean the maximum content of nutrients in a diet and the maximal amount of such a diet [4]. According to National Research Council recommendations, the nutrient requirement for the entire life cycle of all breeds of dogs was 22% protein, 5% fat, 1.1% calcium and 0.9% phosphorus [5] on dry matter basis.

The early stage of canine is the critical period in their life cycle. During this period, they require more nutrients than 28% protein and 1000kcal per day. Although high nutritious imported pet food formulas are available in the market, it is difficult to

access them due to higher market price levels. This study was carried out to formulate a nutritionally balanced pet food diet with a low volume by using highly available mechanically separated meat byproduct meal. And also to produce a value added quality product by using the Poultry byproduct and introduce a local product into the pet food market by facilitating easy access for all pet owners with any income level.

Materials and Methods

Six healthy puppies from two separate litters belonging to the age range of 5 to 6 weeks were selected. Puppies were divided into two groups based on sex and individual body weight.

All ingredients which were required to prepare a canine ration (mechanically separated chicken meat byproduct, mechanically separated chicken meat, fish meal, maize, bread crumble) were purchased from commercial stores and chicken meat byproducts were gathered from the poultry processing plant. Maize and bread crumble were ground into powder form. Chicken meat byproduct was ground twice by meat mincer.

Preparation of canine ration:

The ingredients were weighted using a digital scale.

Figure 1. Preparation procedure for new canine pet food ration

Feeding schedule:

Daily feed requirements of puppies were calculated separately by measuring individual body weights on a daily basis. It was 10% of the puppy's body weight. Feeding was done at morning and evening sessions. Each puppy received 150ml of milk every morning at 9.00a.m. and 5.00p.m. Puppies received their own feed separately.

Table 1**Nutrient values in two feed utilized for group-A and Group-B**

Nutrient	Standard nutrient requirement for puppies	New formulated feed - nutrient profile (Group- A feed)
Protein	31%	31.7%
Fat	7%-10%	9.41%
Moisture	30%-40%	42%
Energy	3.5kcal/g	3.1kcal/g

*NRC (AAFCO) dog nutrient profiles published in 2008

Analysis of Physical body parameters of puppies

Body weight, heart girth, body length and belly girth were measured I daily basis as growth parameters.

Chemical analysis of feed:

Determination of moisture content - method specified in AOAC (2000).

Determination of Fat content - method specified in AOAC (2000) and the Soxtherm manual.

Determination of crude protein content - kjeldahl method.

Results and Discussion

The mean growth rate of puppies in group-A which were fed using formulated canine ration, showed significantly higher value in mean weight ($0.078 \text{ kg/day} \pm 0.02$) than puppies in group-B ($0.032 \text{ kg/day} \pm 0.0066$) which were fed using the mixture of 50% mechanically separated meat byproduct + 50% formulated feed (figure 02). The initial average weight difference between group-A and group-B was 0.141kg. By the end of the four weeks feeding trial, the difference was 1.080kg. The reason for the difference was higher nutritional value in newly formulated canine ration. When considering the relationship between feed intake and body weight, both groups showed a positive relationship. In regression analysis the R-square values were

99.44% in group-A and 98.25% in group-B. There was a strong statistical relationship between the two variables in both groups. When t-test was performed for mean values of weight gain, heart girth gain, body weight gain and belly girth gain. . These results indicate that group-A performances were significantly different ($P>0.05$) from group-B performances.

Figure 02. Average weight gain for group A and B

Body weight is not only the parameter which indicates the growth. For accurate growth measuring, body parameters also should be considered. When considering the difference of average heart girth between the two groups it was 0.10cm at the beginning of the feeding trial and it was 3.5cm by the end of feeding trial. This indicates the high growth rate changes happened during four weeks of the feeding trial. At the beginning the difference of average belly girth of the group-B was higher from 1.20cm. By the end of the feeding trial, group-A has a higher average value (the difference was 4.00 cm) than group-B.

Figure 03. Average body length gain rate for group A and B

The difference of initial average body length was 2.00cm and the higher average value was indicated by group-B. After the four weeks of feeding trial, the average difference body length was 4.30cm and it was showed by group-A. According to the dog food nutrient profile published in 2008 by the Association of American Feed Control Official (AAFCO), puppy food should contain an energy density less than 3.5-4.0 Kcal ME/g DM (metabolizable energy/ gram dry matter) and 28% minimum protein [2]. The formulated feed contains 3.1kcal ME/g DM, 31.7% protein, 9.45% fat and 42% moisture (table 1). Cost analysis is also important when introducing a new product into the market. This should be of higher performance with low cost of production. To produce 1.0kg of formulated canine ration, the cost was around 156 Rupees/ kilogram at present price levels. The price of the cheapest imported formulated canine feed was Rs500/kg and it contains 32% protein and 4.5kcal/g.

The newly formulated canine ration is a precooked feed item. It can be easily prepared within two minutes. It can be made more palatable by adding milk. This product was highly accepted by puppies. Due to the semisolid nature of this product it can be preserved by freezing. The production of this formulated feed does not need drying so that it saves energy in production. Finally, it can be concluded that the formulated canine ration has a significant effect on growth performance of puppies. This low cost product can replace existing local pet food which contains mechanically separated byproduct meal in Sri Lankan market

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