P-12-13

Impact Of The Composition In Macronutrient And Palatants On Meat-Based Wet Food Intake In Domestic Cats
(#296)

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Introduction

Belonging to strict carnivores, cats present specific physiological and anatomical characteristics such as large canines, lack of salivary amylase, and also reduced activities of pancreatic amylase and of intestinal dissaccharidases. Due to their physiology and anatomy cats need high-protein diet and specific nutrients such as Taurine, Arachidonic acid and Vitamin A. Contrariwise there is no carbohydrate requirement in cats. However, as results of domestication today's cats are fed with manufactured pet foods such as canned food elaborated mainly from meat and meat by-products, but contain various amounts of carbohydrates for technical and economical reasons. The objective of the present study was to examine food and macronutrients intakes in cats when canned foods are elaborated with various protein, fat and carbohydrate ratios and several kinds of palatants. The hypothesis was that the nature of the palatant may modify food intake and macronutrients intakes in cats during wet food meals.

Methods

Twelve wet diets were manufactured according to a standard process for canned cat foods. All diets were formulated with meat and meat by- products (pork liver, pork lung, chicken liver, chicken heart and chicken carcass). Wheat flour was used as the carbohydrate source. Vitamins and mineral mixes were added. All diets were formulated to have the same metabolizable energy (ME), approximately 80 Kcalories per 100g of total diet, while having variable protein, fat and carbohydrate contributions to the total ME (Fig.1). To evaluate the consumption of all diets, 40 cats were allocated to four groups of 10. For each group, the order of diet presentation was randomized using a Latin square design so that cats were cycled through three 2-days periods in which they were assigned to a single food. Uneaten food was collected every day and weighed. Results were expressed in g or kcal per kg of cat body weight in order to allow comparison of individual data for food or nutrient intake of cats with various body weights.

Results

Our results (Fig.2) showed that diets food, macronutrients and corresponding energy intakes were significantly affected by the type of diet, the nature of palatant and also by the interaction between the two factors ($p< 0.0001$). Diets with high carbohydrate content were the less consumed (except diet D2P3). The results showed that food and energy intakes of these diets remain low even with the addition of several kinds of palatants. However, the palatant P3 significantly increased the food and energy intake of the carbohydrate-rich-diet showing that palatant nature can impact food and energy intakes from carbohydrate rich-diet. The higher food intake was observed with diet D3P3, followed by diets D3P0, D3P1 and D1P0. Consequently, the highest energy intakes were observed with these diets. This showed that food and energy intakes depend both on the diet composition and on the nature of palatant. Concerning macronutrients intakes (Fig.3), although diets D1P0 to D1P3 had the highest protein content, they led to approximately the same protein intake as diets D3P0 to D3P3. For these diets, protein intake amounted to 3.8 - 6g.Kg_{BW}^{-1} (14-20Kcal.Kg_{BW}^{-1}:). The lowest protein intakes came from diets D2P0 to D2P3 with around (1-2 Kcal.Kg_{BW}^{-1}). None of the palatants tested was able to increase protein intake from these diets to an acceptable nutritional level. The Anova showed that protein intake was affected by the type of diet, the nature of the palatant and also by their interaction ($p< 0.0001$).Our results showed also that fat intake was affected by the type of diet, the nature of the palatant and also by their interaction ($p< 0.0001$). For diets D1P0 to D1P3 the fat intake was around 1.3-1.5g.Kg_{BW}^{-1}. The highest fat intakes came from diets D3P0 to D3P3 with an average of 2.4 g.Kg_{BW}^{-1}. The lowest fat intakes came from diets D2P0 to D2P3 that were rich in carbohydrate and were the least consumed products. For these diets, the fat intake was 0.8-1.2 g.Kg_{BW}^{-1}. Finally, our results demonstrated that regardless of the inclusion of palatants, the highest carbohydrate intake came from diets D2P0 to D2P3, followed by diets D1P0 to D1P3. The lowest carbohydrate intake came from diets D3P0 to D3P3. From a nutritional standpoint, there is no recommendation for carbohydrate intake because cats are strict carnivores. However, according to several studies, in cats there is a limit for carbohydrate intake at 250-300KJ per day. In the present study, the average of ingested carbohydrate with diets D2P0 to D2P3 was 12Kcal.Kg_{BW}^{-1}.day which is equivalent to 250 KJ per day. Therefore, regardless of the nature of the included palatant, it seems that carbohydrate ceiling and macronutrient selection remain a critical factor in food intake in domestic cats.

Conclusion

This study confirms that cats select foods to maintain adequate macronutrients intakes and prefer protein and fat to carbohydrate. They limit food consumption to avoid excessive carbohydrate intake even if several kinds of palatants are added in the diet.

Notes

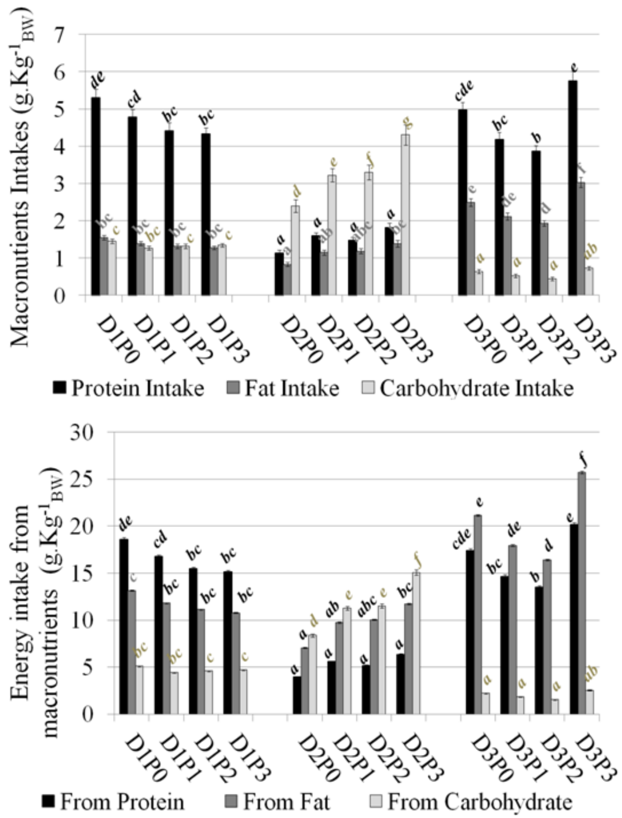

Fig.3 : Macronutrients and corresponding energy intakes

Values : means _ SEM, n = 80

Kg_{BW} = Kg of body weight

Kcalories = kcalories of ME.

Atwater coefficients of 3.5 kcal ME/g protein and carbohydrate and 8.5 kcal ME/g fat were used to calculate the contribution to metabolizable energy; Kg_{BW} = Kg of body weight

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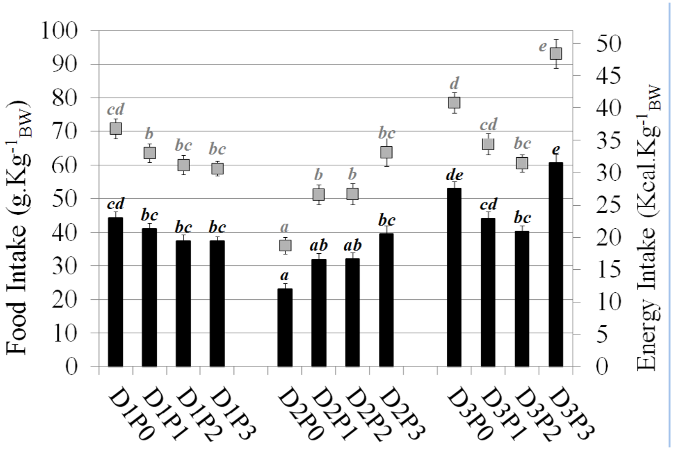

Fig.2 : Food intake (bars) and corresponding energy intake (▪ squares)

Values : means _ SEM, n = 80
Kg_{BW} = Kg of body weight
Kcalories = kcalories of ME.
Atwater coefficients of 3.5 kcal ME/g protein and carbohydrate and 8.5 kcal ME/g fat were used to calculate the contribution to metabolizable energy; Kg_{BW} = Kg of body weight

Diets	D1P0 D1P1 D1P2 D1P3	D2 D2P1 D2P2 D2P3	D3P0 D3P1 D3P2 D3P3
ME ($Kcal.100g^{-1}$)	80	80	80
P/ME (%)	52	23	43
F/ME (%)	36	36	52
C/ME (%)	12	41	5

Fig.1 : Individual contribution of macronutrient to metabolizable energy (ME) of experimental diets

P/ME, F/ME, C/ME are respectively the individual contribution of macronutrient to Metabolizable energy. P0 :Without palatant; P1 : a powder palatant; P2 another powder palatant and P3 : a liquid palatant

Notes