RESEARCH REPORT

IMPROVE THE TEXTURE AND PALATABILITY OF KIBBLES

TECHNO-FUNCTIONAL

FUNCTIONAL POULTRY PROTEIN

WHERE WORLDS MEET

Natural Ingredients. Smart Solutions.

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DARLING INGREDIENTS

FUNCTIONAL POULTRY PROTEIN

Functional Poultry Protein (FPP) is a binder frequently used in food and pet food applications. Approximately 80% of it consists of pure poultry protein, of which a big part is collagen. Collagen proteins provide cold-set and reversible binding properties. FPP supports the expansion and hardness of extrudates. On top of that, this functional ingredient enriches formulas with nutritious, highly digestible and palatable protein.

EFFICIENT & NUTRITIOUS BINDING IN DRY PET FOOD EXTRUDATES

Speciality diets such as grain-free or starch-free continue to be a strong trend in pet food, thus limiting the use of starch-based binders. In addition, many of today's new dry pet foods include fresh meat, which requires techno-functional ingredients to achieve the desired texture.

In order to clarify how Functional Poultry Protein can be used, we investigated two potential advantages during a controlled trial. The first part of our research focused on how FPP improves the texture of kibbles. The second part focused on how it improves the palatability of the extruded kibbles.

1. FUNCTIONAL POULTRY PROTEIN IMPROVES THE TEXTURE OF KIBBLES

METHODOLOGY

During this first trial, the Functional Poultry Protein was added to dry pet food formulations to partially replace starch sources (corn and wheat) at two inclusion levels (5% and 10%). The aim of the study was to investigate how the functional protein affects the texture of extrudates. A standard formulation (Table 1) was used for the Control and basis for the treatments. A BakerPerkins MF50 co-rotating twin-screw extruder was used for the extrusion. All the parameters were kept as constant as possible during the process. Physical characteristics such as bulk density, expansion, hardness and durability were measured on dried and cooled kibbles.

Table 1. Composition of Control and Treatments

Ingredient %	Control	FPP 5%	FPP 10%
Functional Poultry Protein	0	5	10
Poultry meal 63%	22	22	22
Corn : wheat (0.51 : 0.49)	20	15	10
Beet : corn : wheat (0.1 : 0.46 : 0.44)	28	28	28
Greaves meal	12.2	12.2	12.2
Corn gluten	5.9	5.9	5.9
Poultry fat	1.5	1.5	1.5
Salmon oil	1	1	1
Vit/min Premix cat	1	1	1
Cellulose	0.6	0.6	0.6
KCl	0.5	0.5	0.5
Naturox	0.07	0.07	0.07
Coating			
Bovine fat	6	6	6
Digest cat	1.5	1.5	1.5

RESULTS

In this trial, the inclusion of FPP had a marginal influence on the bulk density of extruded dry pet food (Figure 1), but kibble expansion (Figure 2) and especially hardness (Figure 3) were positively correlated to the inclusion of Functional Poultry Protein. Increasing the amount of Functional Poultry Protein did not influence the product durability index (Figure 4).

Figure 1. Bulk density of kibbles with different inclusion of FPP

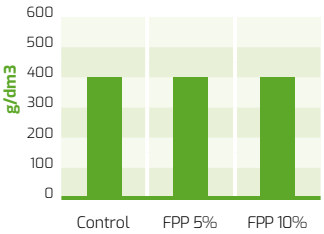


Figure 2. Expansion of kibbles with different inclusion of FPP

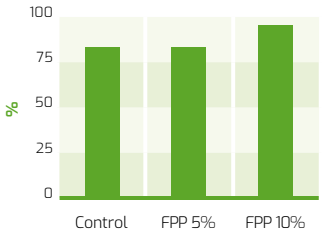


Figure 3. Hardness of kibbles with different inclusion of FPP

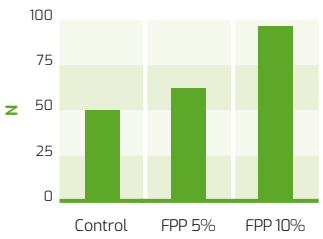
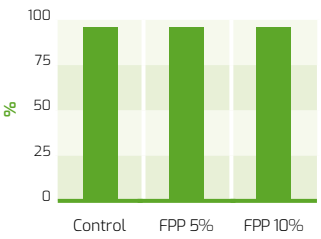


Figure 4. Durability of kibbles with different inclusion of FPP



Normally, an increased expansion of extrudates has a negative effect on bulk density, hardness and durability. It is rare to see a greater degree of expansion and hardness with no significant change in bulk density and durability. These outcomes might suggest that Functional Poultry Protein reinforced the cell walls within the kibbles and made them heavier. This could explain the hardness and bulk density results shown here.

2. FUNCTIONAL POULTRY PROTEIN POSITIVELY INFLUENCES FLAVOR

METHODOLOGY

Kibbles used for palatability tests (FPP 5%) were coated with digest diluted in fat, 1.5% and 6% of total formulation, respectively. Two bowl tests were carried out for 4 days with 20 cats.
The cats were individually housed at the feeding time. Each animal had to choose between two bowls. Every day the products were switched from left to right and the other way around. Both the first-choice preference (Figure 5) and the intake ratio (Figure 6) by the animals were recorded.

RESULTS

Kibbles extruded with Functional Poultry Protein were significantly preferred by cats over the Control kibbles. The intake ratio between the kibbles extruded with FPP and the Control kibbles was 2.8 to 1, and the first choice preference was 2.6 to 1, respectively. This shows that adding Functional Poultry Protein to extruded pet food recipes has a positive influence on the palatability of the final product.

Figure 5. First choice of kibbles containing 5% Functional Poultry Protein in comparison to Control

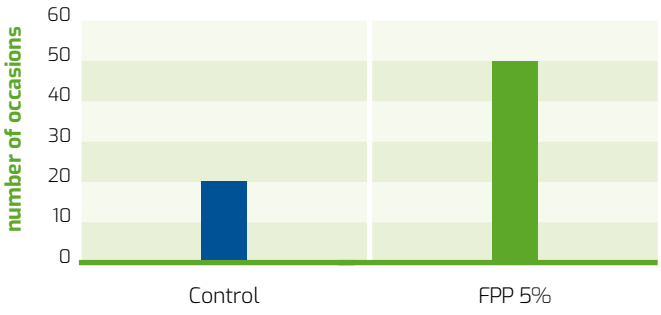
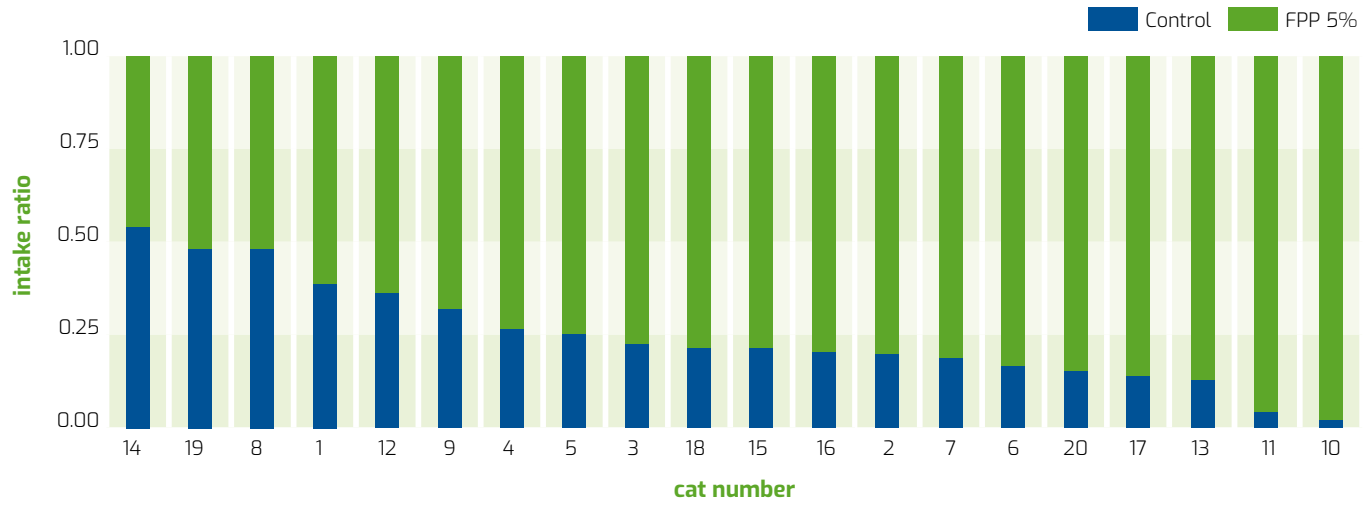


Figure 6. Intake ratio of kibbles containing 5% Functional Poultry Protein in comparison to Control



CONCLUSION

Functional Poultry Protein has a positive influence on the textural properties of extruded dry pet food when used as a replacement for starch. It improves the hardness and expansion qualities, with no detrimental effect on bulk density and durability. What's more, FPP significantly improves the palatability of extruded cat food. Due to its high protein and low ash content, it can help to balance the macronutrient profile. It is a pure poultry, food-grade, halal-certified ingredient that is suitable for all premium pet food, snacks and treats.

BRINGING TOGETHER PRODUCTS, PEOPLE AND PETS

WHERE **WORLDS** MEET

Operating on a unique residuals-to-resources concept, Sonac develops bio-functional, techno-functional and nutritional ingredients that benefit the pet food industry, pet owners and pets. We operate at the intersection of these three different stakeholders' worlds.

We are a leading producer of reliable, sustainable ingredients worldwide, with representation on 4 continents and activities in 60 different locations. As a dependable one-stop shop for smart, volume-driven, ingredient solutions, our constant aim is to help manufacturers improve recipes and reach the highest levels of quality and environmental performance.

Sonac is part of Darling Ingredients.

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