

Poultry meals in pet food: relevant parameters to evaluate composition and preference

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Poultry meal is a collective term to describe processed animal meals produced exclusively from poultry slaughter by-products. Depending on the raw materials used the name on the label can vary, e.g. poultry meat meal, poultry by-product meal, chicken, turkey or duck meal. Meaning that composition, nutritional judgement, and preference vary as well. Evaluating poultry meal can be done using several in vitro and in vivo methods.

For pet food parameters like smell, taste, freshness, color and digestibility are very important. In fact, evaluating parameters can be categorized in three groups: based on fat quality, protein quality and preference.

	Fat quality	Protein quality	Preference
TASTE	Free fatty acids in the fat (FFA)	Amino acids (AA)	Odor and color check <i>(human nose and eyes)</i>
	Peroxide value (po)	Total volatile Nitrogen (TVN)	Preference trials with cats
	Rancimat <i>(swift test to evaluate oxidative stability of the product)</i>	Biogenic amines (BA)	
	Aroma profiles (Tot Aro)	Aroma profiles (Tot Aro) <i>(nitrogen containing compounds)</i>	
DIGESTIBILITY		In vitro digestibility: pepsin and Boisen	
		Available lysine (Carpenter)	
		In vivo digestibility with the model animal mink ¹	

Table - Parameters to evaluate

¹ Mink trials performed at the Copenhagen Fur Centre, Copenhagen, Denmark.

Taste

In a preference trial with 20 cats several poultry meals from different European factories (figure 1) were compared. The parameters related to the freshness of the poultry meals were FFA and po (fat related), TVN and BA (protein related), and total aroma profile (Tot Aro) (related to both fat and protein degradation).

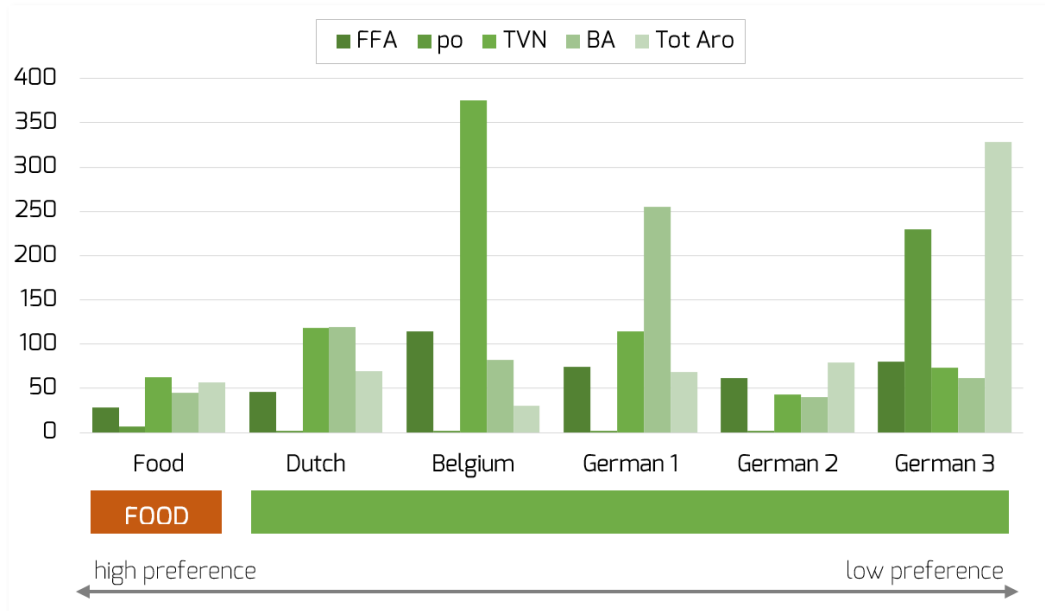


Figure 1 - Preference of 20 cats in relation to taste

The trial shows the most preferred poultry meal was poultry meal produced out of food grade materials, with extremely fresh poultry offals. Of course the cost price of such a poultry meal is significantly higher compared to an average product. From this trial it can be concluded that cats seem to be more sensitive to fat oxidation than to protein deterioration. The sample with the highest peroxide level and the highest total aromatic components was the least attractive.

The influence of production process - dry rendering compared to more wet rendering - seems to show a preference for the dry rendering process in which the poultry offals are fried in their own oil (sample "Food" and sample "Dutch"). In general, this dry rendering process results in so called Maillard-type reactions, where the resulting meals and oils get a more brownish color.

Digestibility

Looking at the protein digestibility (figure 2) it is difficult to determine whether there is a clear link between in vivo mink (animal test) digestibility and the two types of in vitro tests (laboratory; pepsin and Boisen) used.

The pepsin test tries to mimic the digestibility step in the stomach, whereas the Boisen test² uses enzymes pepsin and pancreatin to mimic both the stomach and the small intestine step. For the in vivo digestibility the mink is used as a model animal because a mink has a digestion tract resembling that of the cat.

² Boisen test: Laerke, H.N. , Boisen, S.&C. Hejlesen (2003). An in vitro method for estimating protein digestibility in mink feed. Annual report 2002, 65-75. Danish Fur Breeders Research Centre, Holstebro, Denmark.

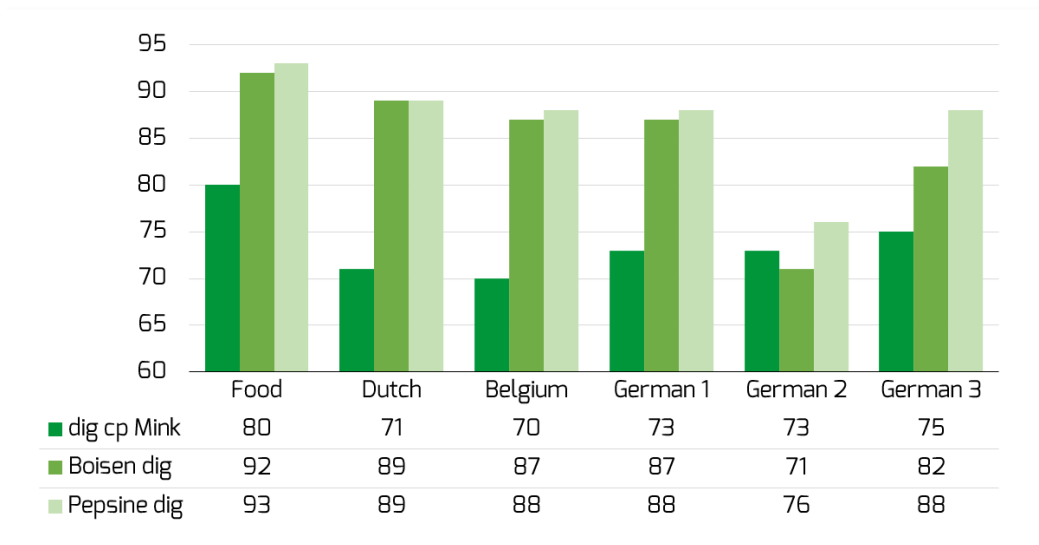


Figure 2 - In vivo and in vitro digestibility

In this case the in vivo digestibility seems to be more influenced by the type of raw material used than by the processing conditions. The sample “Food” and “Dutch” have been produced on exactly the same production facility in which a dry rendering type of process has been applied. So more wet rendering based processes like the Belgian and German 2 process are not significantly superior to the dry process as used for the Dutch samples (“Food” and “Dutch”). For the “German 1 and 3” samples there was no data of the rendering process available to compare.

Conclusion

When selecting poultry meals for cat diets it is relevant to check for freshness of raw materials. In this trial parameters to evaluate the oxidative status of poultry meals show to be of more relevance to the preference of cats than to protein related parameters. The production process used can also further influence the preference of the cats. In this project the more “fried” type of poultry meal turned out to be preferred by the cats, without negatively influencing the protein digestibility. ■