EFFECT OF FAT AND OIL COATING ON DRY CAT FOOD AROMA PROPERTIES

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Introduction

- Fats and oils are commonly used to coat extruded pet food, including cat foods. The effects of different fats and oils on the aromatics of cat food are largely unknown.
- The **objective** of this study was to understand the sensory aroma characteristics of dry cat food coated with fats and oils.

Study design

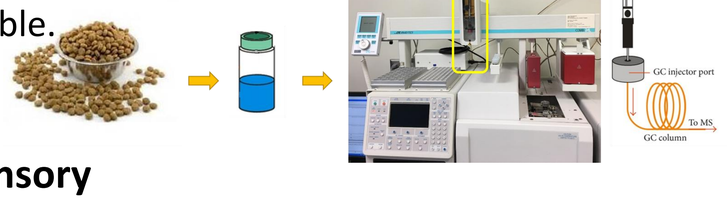
- A total of 28 dry cat food kibble samples produced with four different main grain ingredients (rice, corn, red sorghum and white sorghum) were coated with seven sources of fats / oils and being compared in terms of two aspects:
- Part I: Descriptive sensory analysis to understand if oil coating bring any impact on aroma profile.
- Part II: Gas Chromatography-Mass Spectrum, to compare the volatile compounds composition.

Materials and Methods

Samples:

Four cat food kibble samples produced in same production process with different grain ingredients: Rice, Corn, Red Sorghum (RS) and White Sorghum(WS) were produced by the Grain Science Department in KSU with industrial standard. Each four kibble samples were coated with seven different sources of fat (10% in weight), including: Chicken fat with antioxidants, Chicken fat without antioxidants, Sunflower oil, Salmon oil, Fish oil, Butter and Lard) using a panner to mimic the industrial production of coated kibble.





Part I – Descriptive sensory analysis

Panelists: Five professional panelists from the CSACB of KSU participated.

Test design: Samples were evaluated in three sessions: orientation, consensus evaluation and side by side evaluation.

Data analysis:

Mean values of aroma attributes were retained for PCA model building. Analysis was conducted on R 3.5.1.

Part II – Instrumental analysis: GC/MS

Extraction: Solid Phase Micro Extraction (SPME)

Identification of the volatile compounds were performed on GC-MS: Mass Spectra, Kovats Indices calculation and matching with standard compounds.

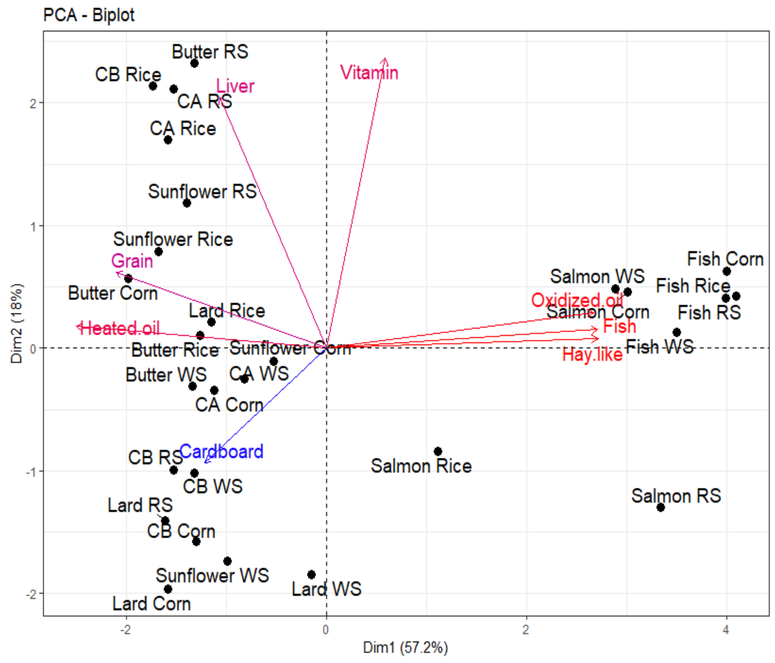
All samples were analyzed in duplicate.

Data analysis:

PLS-R model was built to understand the relationship between sensory and instrumental characteristics over the same samples on R 3.5.1.

Results

Part I – Descriptive sensory analysis



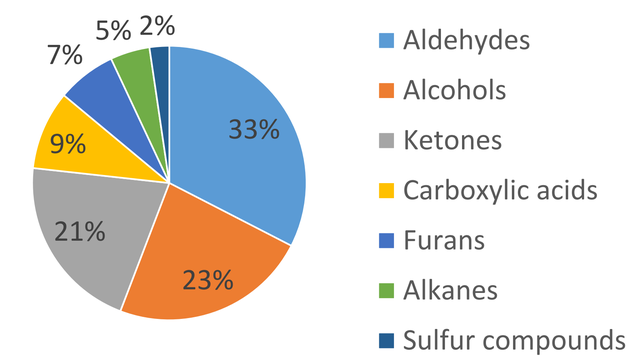
❖ All the four cat food kibbles coated with Fish oil and Salmon oil (except salmon rice), showed relatively high attribute intensities for aroma attributes of Oxidized oil, Fish and Hay-like.

❖ In contrast, cat food coated with Butter (except Butter RS) were characterized by aroma attributes of Grain and Heated oil.

❖ PC2 contrasted between coated cat food from Butter RS, Sunflower RS and CB Rice, which are perceived high intensity in liver and vitamin versus cat food of WS coated with Lard and Sunflower (Fig.1).

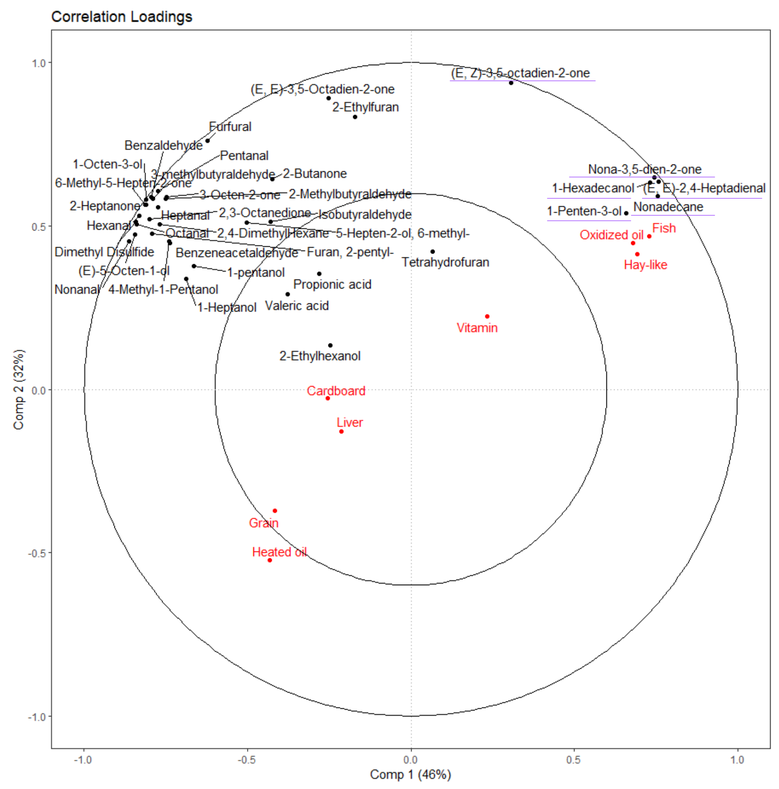
Fig. 1 Biplot of variables and individuals from correlation matrix: PC1 vs. PC2

Part II – Instrumental analysis: GC/MS



❖ In total, 43 volatile compounds were tentatively identified among the 28 coated kibble samples, covering 7 compounds groups (Fig.2).

Fig. 2 Identified volatile compounds composition



❖ PLS-R could explain 78% of instrumental data. Four sensory attributes (Fish, Oxidized oil, Hay-like and Heated oil) were predicted well.

❖ By considering another criteria of VIP > 1, six volatile compounds were classified in terms of their explanatory power (highlighted with underline in Fig.3).

Fig. 3 Correlation circle for instrumental – sensory PLS-R

Table 1. Odor description of the effective predictors

Volatile compounds	Odor description *
1-Penten-3-ol	**Fish**, **Oxidized**, **Wet-earth**
Nonadecane	**Oily**
(E,E)-2,4-Heptadienal	**Fish,** Greasy, Oily
Nona-3,5-dien-2-one	Detected in cooked asparagus
1-Hexadecanol	Faint odor
(E,Z)-3,5-Octadien-2-one	**Hay**, Fatty, Fruity, Green

* Record available from website of Pubmed and The Good Scents Company

Conclusion

❖PCA of the descriptive sensory data showed that coating with fish and salmon oil dominantly separated the coated cat food samples from other samples by higher intensity in aroma attributes of oxidized oil, hay-like and fish notes.

❖PLS-R was proved useful in predicting some variables. Specific volatiles with fishy odor, such as (E, E)-2,4-Heptadienal and 1-Penten-3-ol could explain the Fish note found in fish and salmon oil samples. Volatiles of Nonadecane, (E,Z)-3,5-Octadien-2-one could explain the Oxidized oil aroma and the Hay-like aroma, respectively.

❖Overall, coating fat could change the aroma impression of the cat food to a degree. Further research is needed to address fat interaction with kibble and added flavoring, which could be useful for predicting preference of cats.

Acknowledgement

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