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Technical Service Manager

Agenda
• Company introduction
• Product and application
• Requirements fish based ingredients
• Conclusion - Research questions
Company AFB International
AFB International
Palatability enhancers (flavours) for pet foods.

We make pet food taste better
At AFB International, we’re serious about quality. We partner with pet food manufacturers to create better-tasting dog and cat foods, meeting the specific needs of the pets and pet owners.
Global Pet food Market

Dog and Cat Food

Global Figure
2018, EUR million
71,860,9

Regional Comparison
2018, EUR million

- Asia Pacific: 7,582,7
- Australasia: 2,245,9
- Eastern Europe: 4,970,3
- Latin America: 10,983,9
- Middle East and Africa: 693,5
- North America: 27,549,1
- Western Europe: 17,835,6

Source: Euromonitor
Pet food market EU 2018-2022

European* pet food market (x million)

* (EE) Albania (modelled), Belarus (modelled), Bosnia-Herzegovina (modelled), Bulgaria, Croatia (modelled), Czech Republic, Estonia (modelled), Georgia (modelled), Hungary, Kosovo (modelled), Latvia (modelled), Lithuania (modelled), Macedonia (modelled), Moldova (modelled), Montenegro (modelled), Poland, Romania, Russia, Serbia (modelled), Slovakia, Slovenia (modelled), Ukraine. (WE) Andorra, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Gibraltar, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom.

Source: Euromonitor
AFB Designs and Manufacturers Palatability Enhancers

**Hydrolysis**
- Proteins, Enzymes
- pH: 5-8
- Temperature: 50-65°C

**Reaction**
- Sugars, Amino Acids
- pH: 3-8
- Temperature: 70-130°C

**Top Notes**
- pH: 3-8
- Non-Reactants: 0-20%

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**Liquid Flavour**
- pH: 2.8-3.0

**Spray Dry**
- Temperature: 150-200°C

**Base Flavour**
- Packaged dry powder

**Dry Blended Flavour**
- Base Flavours
- Yeast
- Phosphates
- Fish ingredients
- Other Flavours

**Sold to Customer**
## AFB Products and Application

<table>
<thead>
<tr>
<th>Liquid Palatants</th>
<th>Dry Palatants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid palatants are</strong></td>
<td><strong>Dry palatants are</strong></td>
</tr>
<tr>
<td><strong>moderately viscous, low pH materials that are applied topically at 1 to 4% on kibble and treats.</strong></td>
<td><strong>flowable, low-moisture powders typically applied at 0.5 - 3% topically or inside the kibble.</strong></td>
</tr>
</tbody>
</table>
AFB’s Palatability Solutions | Process

AFB liquid and dry palatant solutions can be included inside or applied topically on the treat or kibble
AFB palatant solutions can be used inside the kibble or topically.

**Internal Application**
- AFB Dry Flavor & Functional Ingredients
- Kibble Ingredients

**Topical Application**
- Fish oil → nutrition / claim
- AFB Flavor Liquid and/or Dry

Fish → nutrition/claim/palatability

Fish → palatability
Requirements Fish Based Ingredients
Legislation

EU 32/2002 Undesirable substances in animal feed:
  • Heavy metals
  • Toxins
  • Dioxins

EU 1069/2009 Animal by-products and derived products not intended for human consumption:
  • EU 68/2013 Catalog of Feed Material
  • EU 1831/2003 Additives for use in animal nutrition
Additives used approved according EU 1831/2003.
- EFSA approval for cats and dogs

Most common are the antioxidants:
• BHA for dog products on final product max 150 ppm
• BHA for cat products it is under review, studies need to be done.
• Ethoxyquin can not be used for pet food application
• BHT like BHA but can not be used based on customer needs
• Tocopherol is approved, Rosemary is under review.

Trend (opportunity) in pet food is NATURAL which means natural antioxidants are preferred.
EU 142/2011
Treatment to guarantee:
- Clostridium perfringens absent in 1 g of the products
- Salmonella: absence in 25g: n=5, c=0, m=0, M=0
- Enterobacteriaceae: n=5, c=2; m=10; M=300 in 1 g

Ingredients for pet food palatants
→ Salmonella: absent in 25 g → finished product in 375 g
→ Enterobacteriaceae: <10 cfu/g
→ Yeast & moulds <500 cfu/g
→ Total plate count <25.000 cfu/g
Production, way of working
Audit observations in fishmeal/hydrolysate factories:
• Hygiene in the factory.
• Installation not designed / constructed according to hygiene standards.
• Not demonstrable that antioxidant is sufficiently homogeneously blended in the product.
• Validation temperature step insufficient.
• Analysis on microbiological parameters limited and not frequent enough.
• CIP not sufficient.

→ Good Manufacturing Practices
**Freshness - Biogenic Amines**

- **Histamine**: <200 ppm
- **Putrescine**: <100 ppm

Source: César A. Lázaro de la Torre, Carlos A. Conte-Junior; Chapter 6 - Detection of Biogenic Amines: Quality and Toxicity Indicators in Food of Animal Origin; In Handbook of Food Bioengineering, Food Control and Biosecurity, 2018
### Relationship between peroxide value and cat food palatability

*Effect of treating ingredients with BHA & BHT prior to inclusion in a cat food*

<table>
<thead>
<tr>
<th>Time</th>
<th>Antioxidant treatment</th>
<th>Peroxide Value (meq/kg fat)</th>
<th>Intake Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>BHA + BHT</td>
<td>4.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Initial</td>
<td>Untreated</td>
<td>7.3</td>
<td>1</td>
</tr>
<tr>
<td>3 months 35 °C</td>
<td>BHA + BHT</td>
<td>7.7</td>
<td>3.6</td>
</tr>
<tr>
<td>3 months 35 °C</td>
<td>Untreated</td>
<td>19.0</td>
<td>1</td>
</tr>
</tbody>
</table>

Food was coated with 4% tallow treated with antioxidant

*Source: Gross, K.L.(1993) “Effect of three different preservative systems on the stability and palatability of extruded pet food subjected to ambient and high temperature storage” Hill’s Pet Nutrition, Inc., Topeka, KS*
Export Requirements

• For salmonid fin fish (fish in the family Salmonidae) derived material - 100°C for at least 30 minutes or equivalent
• For non-salmonid fin fish derived material - 80°C for 20 minutes or 85°C for 15 minutes.

→ Some countries: Heat treatment fish ingredient >90°C
• No fish filet or body fish at all, but only fish byproducts-trimmings are allowed.
• Fish used to be known and well identified →
  • What species
  • Part of the fish
  • Fishing zone (wild catch)
Conclusion and Future work
Conclusion
For pet food (palatants) a higher demand for certain quality → more investments needed to reach the requirements.

Value of fishmeal/hydrolysate could be increased by fulfill needs for use in pet food palatants.

From commodity to added value products

Research questions
What research is needed to increase quality of the products?
Thank you