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FEEDFATSAFETY

Quality and safety of feeding fats obtained from waste or by-products from the food chain

The Challenge

Consumer safety depends on assessing and monitoring the entire food chain to prevent public health risks. To ensure traceability, it is important to assess the composition, quality and contamination of fat materials used in animal feed for safe meat production. The scarcity of information on these fats leaves a number of health and safety questions unanswered.

There is a lack of basic chemical information on these fats. Scientists, commercial companies and policy makers do not yet know if fat by-products¹ and/or co-products² can be used safely in animal feeds. Little is known about the nutritional quality of fats for different animal production systems, the ability of fats to modify the lipid composition of meat, and how fats affect the level of oxidation in meat and other tissues. The toxicological or physiological effects of certain fat degradation compounds are unknown, and has it not been established how these fats contribute to the overall intake of contaminants through the diet. This observation includes contaminants such as dioxins, Polychlorinated Biphenyls (PCB), Polybrominated Diphenyl Ethers (PBDE) and Polycyclic Aromatic Hydrocarbons (PAH's).

These characteristics and their effects on food safety must be quantified in order to assess whether it is safe to use these fats in animal production. This information will ultimately protect consumers and animals alike.

Project Objective

The primary aim of 'FEEDFATSAFETY' was to ensure that meeting animal nutrition requirements also matches the safety and quality standards required for certain types of meat production. This is particularly relevant to the use of fats originating from by-products or co-products of the food chain. This aim needed to be achieved in accordance with the demands for consumer satisfaction and animal health, and with regard to environmental protection.

Key Points

- Characterise the different kinds of fat materials coming from by-products or co-products of the food chain
- Identify the effects of selected fats on poultry and rabbit production
- Determine if there was a transfer of contaminants from feed to meat and other tissues

EATiP Thematic Area of Relevance

TA1: Product Quality, Consumer Safety and Health

TA2: Technology and Systems

TA3: Managing the Biological Lifecycle

TA4: Sustainable Feed Production

TA5: Integration with the Environment

TA6: Knowledge Management

TA7: Aquatic Animal Health and Welfare

TA8: Socio-Economics and Management

Key Words

Feed, Fats, By-products, co-products, Waste management

Project Information

Contract number:

7020

Contract type:

Specific Targeted Research Project

Action line:

FOOD-2003-T6.6 Recycling and upgrading organic wastes from the food chain in environmentally friendly healthy food production

Duration:

39 months (01/01/2005 – 31/03/2008)

Coordinator:

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- Standardise the quality of these fats
- Improve quality control of these fats
- Assess consumer confidence in the use of fats in feed

Output Highlights

Fatty acid composition

Fat materials obtained as co- and by-products of the food chain can provide valuable nutritional characteristics in feeds for animals but it is important to ensure a suitable level of quality and safety. New knowledge has been generated on how the relevance of the fatty acid composition of feed fats can help meat producers to achieve a particular and desirable fatty acid profile in meat and meat products.

Contaminants

New knowledge is now available on the transfer of main contaminants from feed to meat, plasma and to other target animal tissues. The use of less polluted fats could promote a lower level of contaminants in the animal carcasses and their residues. This knowledge will allow feed and meat producers to produce safer higher quality products. It may also help policy makers set new maximum contaminant levels in feeds and meats.

Classification

A system of classification of fats in feed stocks (raw materials) from co-products and by-products has been developed (Gasparini et al. European Journal Lipid Science and Technology 109, 673-681, 2007). This will help feed manufacturers better identify and control their fat feed stocks. At the policy level, it could be used as the basis of a recommended control procedure.

Analytical methods

A "Handbook of analytical methods for fat control" has been produced collating the procedures recommended for the control parameters assessed in fats. This has the potential to improve the standardisation of control methods for these types of fats.

Safety concerns

The principal investigators recommend limiting the presence of polycyclic aromatic hydrocarbons (PAH) through additional processing. New data identified the need to improve fish oil safety especially oil analysis when PCB and dioxins of environmental origin are of concern. The relationship between regulated maximum feed levels of lipo-soluble dioxin and dioxin like Polychlorinated Biphenyls in fish oils used in feeds and the maximum levels permitted in meat and other foods still has yet to be established.

Economically viable alternatives

Conclusions from the research indicate that some co-products obtained from acid oils from chemical refining, acid oils from physical refining and animal fats are economically viable alternatives for feed and meat producers when compared with conventional oils such as soybean, rape, sunflower and palm oil.

The Full Report:

For a comprehensive description of the research project, visit <http://www.ub.edu/feedfat/>

Next Steps – Suggested Actions/Follow On



Policy

- The standards and guideline developed by the project could be adopted by policy makers to improve the regulations in the subject area.



RTD

- For some feed fat categories, an adequate system of purification should be studied in order to increase quality and safety of their use. Other fats need only a better system of traceability control and good manufacturing practices to reach suitable quality levels.
- Dioxins and DL-PCBs are highly accumulated in animal tissues because of their liposolubility. This fact poses a question about the need of new studies establishing relationships between the regulated feed maximum levels and the regulated meat and another food maximum levels of dioxins and DL-PCBs.

- A new project initiated at national level (Spain) has already started to develop new technologies to transform some fat by products obtain fats with altered animal nutritional properties with a specific aquaculture application.



Knowledge Transfer

- Dissemination to industry is essential as this was not a task within original project.

Related Publications/Projects

Abalos et al, Chemosphere 2008; Nuchi et al, J Agr Food Chem 2009, Gasperini et al, Eur J Lip Sci Technol 2007