ADVISORY COMMITTEE ON ANIMAL FEEDINGSTUFFS

Eighth ACAF Meeting 28 February 2001 - Information Paper

RESULTS OF AN INVESTIGATION INTO THE LEVELS OF DIOXINS AND POLYCHLORINATED BIPHENYLS (PCBs) IN ANIMAL FEED BINDERS, ANTI-CAKING AGENTS AND COAGULANTS AND ASSOCIATED FEED MATERIALS

Secretariat    February 2001
RESULTS OF AN INVESTIGATION INTO THE LEVELS OF DIOXINS AND POLYCHLORINATED BIPHENYLS (PCBs) IN ANIMAL FEED BINDERS, ANTI-CAKING AGENTS AND COAGULANTS AND ASSOCIATED FEED MATERIALS

Introduction

1. This is an information paper on an investigation initiated in October 1999 on the levels of dioxins (or polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans) and polychlorinated biphenyls (PCBs) in certain feed additives and materials.

Background

2. Besides the contamination of Belgian feed fats by dioxins and PCBs in 1999, the Austrians also found at that time elevated levels of dioxins in feed. These were traced back to kaolinitic clays mined in certain areas of Germany. The European Commission (EC) subsequently requested Member States to provide data on the sources and levels of dioxins in binders, anti-caking agents and coagulants used in animal feeds.

3. In November 1999, the EC imposed a limit of 0.5 ng WHO-TEQ/kg dry matter (upper bound) on kaolinitic clays (E559) - a commonly used feed binder - as an interim and precautionary measure. This limit (based on a limit of detection) is considered by Member States as a purity criterion rather than a safety limit. A revision is likely at the completion of a planned risk assessment. Apart from the limit of 0.5 ng WHO-TEQ/kg on kaolinitic clays and a similar one for citrus pulps, there are currently no other statutory limits on dioxins in animal feeding stuffs, and no limits for PCBs.

4. Dioxins, furans (generally referred to as dioxins) and dioxin-like PCBs are known to be ubiquitous and persistent environmental contaminants. The potential health problems associated with exposure to these chemicals in humans include effects on the immune system, reproduction and development. It has also been suggested that higher levels than that normally found in food may be associated with cancer in humans. The World Health Organization (WHO) has recommended tolerable daily intake (TDI) of 0.001 – 0.004 ng WHO-TEQ/kg body weight/day for these chemicals. More recently the European Commission’s Scientific Committee for Food (SCF) have recommended a temporary tolerable weekly intake of 0.007 ng TEQ/kg body weight per week (equivalent to 0.001 ng WHO-TEQ/kg body weight/day). The UK’s independent expert Committee on Toxicity of Chemicals in Food, Consumer Products and Environment (COT), which previously recommended a

*Please see the attached glossary for the definition of this and other terms used in the report.
TDI of 0.01 ng WHO-TEQ per kg body weight per day, is currently reviewing its recommendations and this is due for completion by mid-2001.

5. Feed binders, anti-caking agents and coagulants are authorised for use in the European Community only when they have successfully passed through the Community’s feed additive dossier approval system (assessment based on the product’s quality, safety and efficacy). These products in feed usually represent up to 2% of the total feed weight and are used during feed manufacture to aid pelleting and other similar technological functions. However in the last three years, their use in feed has been reported to be on the decline. This period also coincides with the emergence and use of alternative technologies for pelleting.

Results

6. As a result of the Commission’s request, the Animal Feed Division of the Food Standards Agency commissioned (in 1999) a preliminary investigation on the levels of dioxins and polychlorinated biphenyls (PCBs) on feed binders, anti-caking agents and coagulants mined, manufactured or sold in the UK. Results obtained from this study show that the levels of dioxins likely to be found in a final (processed) feed additive product are mostly below the limit set for kaolinitic clays. However 32% of the samples analysed, mainly unprocessed mined clay materials, contained levels above this limit. Most unprocessed materials contained levels ranging between 8 and 0.15 ng WHO-TEQ/kg dry matter with a reported level of 11 ng WHO-TEQ/kg dry matter in one sample which is reportedly no longer used in feed manufacture. Comparatively, levels reported for processed feed additives were mostly between 0.5 and 0.15 ng WHO-TEQ/kg dry matter.

7. The same samples analysed for their dioxins content were also submitted for PCB analysis. Levels determined ranged between 0.1 and 140 µg/kg dry matter and the highest level was recorded in a processed kaolinitic clay sample which again is reported to be no longer used in the manufacture of animal feeds. It is noteworthy to mention that the reported PCBs levels were the sum of 7 congeners of which only one is known to exhibit similar toxicity mechanisms to the most toxic dioxin.

Further work

8. The reported dioxin levels suggest that the contributions to an animal’s dioxins burden via ingestion of these feed additives is likely to be small. The results have been reflected in the Report of the Scientific Committee on Animal Nutrition (SCAN) on Dioxin Contamination of Feedingstuffs and their Contribution to the Contamination of Food of Animal Origin. In the light of this Report and one by the Commission’s Scientific Committee for Food, the Food Standards Agency is considering an integrated dioxins and PCBs survey
programme covering food and animal feed to determine the implications for food safety. This is likely to commence in the next financial year.

9. The results of the small study on certain feed additives have been announced in the February edition of the Food Standards Agency News.

Animal Feed Division
Food Standards Agency
February 2001
GLOSSARY OF ABBREVIATIONS AND TERMS USED IN THIS PAPER

COT  Committee on Toxicity of Chemicals in Food, Consumer products and the Environment

EC  European Commission

PCB  Polychlorinated biphenyls

SCAN  Scientific Committee on Animal Nutrition

SCF  Scientific Committee on Food

WHO  World Health Organization

Congeners  A specific member of a group of structurally related compounds such as polychlorinated dibenzo-p-dioxins.

Dioxins  Collective name for a group of chemicals namely polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

Limit of Detection  The minimum level of a particular substance that is distinguishable with reasonable confidence from a background noise at a particular time using a particular analytical method. Due to difficulty in analysing dioxins this figure sometimes varies.

Tolerable Daily Intake (TDI)  The maximum amount of a contaminant which can be eaten every day over a whole lifetime without incurring appreciable risk to health. TDIs may be given per person or more and more usually on a body weight basis. For example the UK TDI for dioxins and dioxin-like PCBs is 0.01ng WHO-TEQ/kg bodyweight/day.

Tolerable Weekly Intake (TDI)  The maximum amount of a contaminant which can be eaten every week over a whole lifetime without incurring appreciable risk to health. As with TDIs, TWIs may be given per person and is also based on body weight. The temporary TWI set by the EC Scientific Community for Food (SCF) for dioxins and dioxin-like PCB is 0.07ng WHO-TEQ/kg bodyweight/week.
**Toxic Equivalent Factor (TEF)**

TEF reflects the toxicity of the individual dioxin or dioxin-like substance relative to that of the most toxic dioxin. The system of TEFs set by WHO in 1997 is used in this report.

**Toxic Equivalent (TEQ)**

Dioxins and dioxin-like PCBs in food occur as mixtures of a number of different individual chemicals which have different degrees of dioxin-like toxicity. The concentration of each individual dioxin and dioxin-like PCB is multiplied by a weighting factor (referred to as a Toxic Equivalent Factor (TEF). (Please see above for definition). The weighted concentrations are then added together to give the Toxic Equivalent (TEQ) of the mixture.

**Upper Bound**

Values are expressed as upper bound when it is assumed that the values of those congeners which could not be measured or below the limit of detection are present at the limit of detection of that congener.

**SUMMARY OF UNITS**

**ng**

A nanogram is one thousand millionth of a gram \((i.e. \ 10^{-9} \text{ g})\).

**ng WHO-TEQ/kg**

Nanograms of WHO Toxic Equivalents per kilogram; equivalent to parts per million million (parts per trillion) by weight.