

# Scientific Opinion on the safety of organic fertilisers derived from mammalian animals, adopted by the Scientific Steering Committee at its meeting of 24-25 September 1998

## Opinion of the Scientific Steering Committee on the safety of organic fertilisers derived from mammalian animals

### Executive Summary

#### *The question*

The scientific Steering Committee was invited to address the following question:

*"Can organic fertilisers derived from materials from mammalian animals, naturally or experimentally susceptible to Transmissible Spongiform Encephalopathies, be safely used? If so, under what conditions?"*

#### *The opinion*

*As a matter of general principle the SSC wants to state that neither organic fertiliser nor any other product should be produced from material coming from animals suspect or confirmed to carry the BSE agent.*

- a) No organic fertiliser should be produced from bovine material originating from countries carrying a high BSE risk.*
- b) Organic fertilisers derived from mammals originating from BSE free (negligible BSE-risk) regions/countries carry a zero or negligible BSE-risk for man, animals or the environment. They may be used as a fertiliser.*

#### *c) For other countries:*

*- Organic fertilisers, derived from mammalian tissues that are known to have the potential to carry the BSE-agent, should always be produced in accordance with the criteria laid down by the SSC for the safe production of MBM (Opinion of the SSC on the safety of MBM, 26-27 March, 1998; Updated Report on the Safety of Meat-and-bone Meal derived from Mammalian Animals Fed to Non-Ruminant Food-Producing Farm Animals, prepared for the Scientific Steering Committee and presented at its meeting of 24-25 September 1998) or hydrolysed proteins. They may be used as fertiliser. Ingestion by man or ruminants must be prevented.*

*- Organic fertilisers derived from mammalian tissues which have not been found to be infected by the BSE-agent (e.g. blood, horn, hoof) may be used as fertiliser. Ingestion by man or ruminants must be prevented.*

*: The SSC does not exclude the possibility that exist production systems may exist which can produce safe organic fertilisers also from infected material, e.g. by more severe temperature/time/pressure combinations. Such processes should be evaluated on a case by case basis.*

*: The above opinion of the SSC is based on the attached report of the working group of the TSE/BSE ad hoc Group, which was accepted by the TSE/BSE ad-hoc group and then by the SSC, following critical discussion and review.*

### Report of the Working Group

#### 1. The question

*"Can organic fertilisers derived from materials from mammalian animals, naturally or experimentally susceptible to Transmissible Spongiform Encephalopathies, be safely used? If so, under what conditions?"*

#### 2. Definitions

For the purpose of the present report and opinion, the following definitions are used:

### **Fit for human consumption**

The wording "Fit for human consumption" hereafter refers to material from animals that passed both pre- and post mortem inspection by a competent veterinary authority and that is certified and identifiable as fit for human consumption on the basis of the existing national and EU legislation. The Working Group stresses that positive identification of material from animals not fit for human consumption should be possible, to avoid such material entering the food or feed chains. This definition implies that material which was originally derived from animals fit for human consumption, may become unfit for consumption, for example because of inadequate storage or transport conditions. The latter risks should be dealt with in specific opinions or legislation.

### **Meat and bone meal derived from mammalian animals (MMBM).**

The definition and report hereafter do not refer to blood meal.

Meat and bone meal, derived from mammalian animals (MMBM), is defined as processed animal protein intended for animal consumption, or as intermediate product for the production of organic fertiliser or other derived products.

### **Organic fertilisers from slaughter residues of mammalian animals**

Organic fertilisers obtained from slaughter residues of animals which are not / can not be used to feed ruminants animals. For the purpose of the present report, the slaughter residues are limited to the following mammalian products: dried blood, Bones, Bone dicalcium phosphate, Bone meal, Bone waste, Bone waste meal, Bone degelatinized, Bone degelatinized meal, Hides, Hoofs and/or horns, Hoof and/or horn meal, Hair hydrolyzed, Leather meal, Leather roasted, Meat, Meat and bone meal, Meat meal, Mixed animal origin, Hydrolyzed proteins or amino-acids and peptides, Wool and/or hair.

### **Safely use**

In the context of these opinions, only the safety aspects relating to the BSE agent are taken into account. Unless otherwise stated, the microbiological safety of organic fertiliser is not addressed by this opinion.

### **Specified risk materials or SRMs**

Unless otherwise specified, the wordings "SRMs or Specified risk materials" refers to all tissues listed in the opinion of the Scientific Steering Committee (SSC) adopted on 9 December 1997. However, the SSC intends to consider the possibility of making a selection of specified risk materials on the basis of the results of a risk assessment, which takes into account the geographical origin of the animals, their species and their age.

### **"133°C/20'/3 bars"**

The wording "133°C/20'/3 bars" refers to hyperbaric production process of not less than 133°C during not less than 20 minutes, without air entrapped in the sterilising chamber conditions at not less than 3 bar or an equivalent process with demonstrated efficacy in terms of inactivating TSE agents. The lag time needed to reach the core temperature is not included in the time requirement for correct rendering.

Remark: Further clarifications on the above definition are provided in the *Updated Report on the Safety of Meat-and-bone Meal derived from Mammalian Animals Fed to Non-Ruminant Food-Producing Farm Animals*, which was prepared for the Scientific Steering Committee and presented at its meeting of 24-25 September 1998.

## **3. Background**

A tentative list of the various organic fertilisers of mammalian animal origin is:

Dried blood, Bones, Bone dicalcium phosphate, Bone meal, Bone waste, Bonewaste meal, Bone degelatinized, Bone degelatinized meal, Hides, Hoofs and/or horns, Hoof and/or horn meal, Hair hydrolyzed, Leather meal, Leather roasted, Meat, Meat and bone meal, Meat meal, Mixed animal origin, Protein hydrolyzed or aminoacids-peptides, Wool and/or hair

Slaughter residues are an excellent substrate for the production of fertilisers. They are produced by processes that:

- imply practically no transformation (e.g. blood meal, bone meal, etc.);
- have demonstrated a certain capacity to reduce the BSE-infectivity (e.g. MBM, hydrolysed proteins).

These fertilisers are characterised by quite high nitrogen and phosphorus contents, high and fast availability, and by the fact that they cannot be washed away. The continuous and the slow release of the nitrogen in  $\text{NH}_4^+$  form reduces the phenomenon of potential pollution of the underground layers due to nitrate leaching. Furthermore, organic fertilisers contain compounds with growth-promoting or growth-promoting-like characteristics (free amino acids, peptides and polypeptides that are useful for qualitative crop production or are rich in specific trace minerals like Fe in blood meals).

Organic fertilisers in the form of compost improve the chemical and physical characteristics of the soil. UNEFA has estimated that no less than 350,000 tons of meals for use in fertilisers could be produced within the EU.

According to the current EU-legislation, organic fertilisers may be obtained from any slaughter residues, including the SRM (specified risk materials), as defined in the opinion of the SSC of 9/12/97, and carcasses of dead animals (fallen stock).

Since 1996, SEAC (the UK Spongiform Encephalopathy Advisory Committee) has suggested to ban the use of meat meals as fertilisers in those cases where the conditions exist for ruminants to accidentally ingest this type of material.

The recent UK Regulation - The fertilisers (Mammalian Meat and Bone Meal) 1998/954 - introduces the prohibition of mammalian meat and bone meal as or in fertiliser on agricultural land ([In these UK Regulations, the following definitions are used: agricultural land means land used or capable of use the purpose of a trade or business in connection with agriculture; agriculture includes fruit growing, seed growing, dairy farming and livestock breeding and keeping, the use of land as grazing land, meadow land, osier land, the use of land for woodlands, and horticulture \(except the propagation of plants and the growing of plants within greenhouses and glass or plastic structures\); mammalian meat and bone meal means mammalian protein derived from the whole or part of any dead mammal by the process of rendering](#))

The UK Regulation 1998 - The fertilisers (Mammalian Meat and Bone Meal) 1998/955 - further introduce the prohibition in respect of the manufacture of mammalian meat and bone meal for use as or fertilisers (In these UK Regulations, the following definitions are used: *agricultural land* means land used or capable of use the purpose of a trade or business in connection with agriculture; *agriculture* includes fruit growing, seed growing, dairy farming and livestock breeding and keeping, the use of land as grazing land, meadow land, osier land, the use of land for woodlands, and horticulture (except the propagation of plants and the growing of plants within greenhouses and glass or plastic structures); *mammalian meat and bone meal* means mammalian protein derived from the whole or part of any dead mammal by the process of rendering)

"No person shall manufacture mammalian meat and bone meal for use as or in any fertiliser except by a rendering process in which-

- (a) the particle size of the raw material prior to processing is reduced so that the maximum dimension of no particle exceeds 50 mm; and
- (b) the material is heated to core temperature of more than 133°C for at least 20 minutes at a pressure of at least 3 bar."

#### **4. Identification of possible hazards and elements of risk assessment**

*Preliminary remark:*

a complete section on hazards and risks related to meat-and-bone meal figures in the *Updated Report and Scientific Opinion on the Safety of Meat-and-Bone Meal Derived from Mammalian Animals fed to Non-ruminant Food Producing Farm Animals* which was prepared for the Scientific Steering Committee and presented at its meeting of 24-25 September 1998.

The first possible hazard is that the organic fertiliser would carry a residual BSE-infectivity.

If this would be the case the following additional hazards exists:

- ingestion by humans or animals of residues of the fertiliser, if this was applied to pasture, lawn or food crops (in particular leaf-vegetables);
- contact of humans or animals with the fertiliser during its application;
- potential involuntary persistence in the environment of and contamination of soil and water with the BSE-agent, including a potential accumulation of infectivity over years.

**Elements of the risk assessment:**

*1. The risk that organic fertiliser would carry a residual BSE-infectivity*

- Organic fertilisers which are produced without being exposed to any process known to reduce BSE infectivity (e.g. dried blood, bone meal) would carry the same BSE risk as the raw material from which they are derived.
- The risk of organic fertilisers, which are produced with being exposed to processes known to reduce BSE-infectivity (e.g. the 133/20/3 MBM-process or the hydrolisation process, see opinions of the SSC on these) will carry a considerably lower risk than the raw material from which they are produced.
- Exposing organic fertilisers, produced via MBM, to harsher conditions than the 133/20/3 would enhance the safety further.

*2. The risk of ingestion of residues of the fertiliser by humans or animals*

- The amounts ingested by this way are probably rather small. Human consumption will normally follow washing the material which would reduce the fertiliser residues on the surface. Animal consumption could be more substantial.
- No information is available as to the inactivation of an eventual residual infectivity of organic fertiliser by external conditions such as atmospheric conditions, microbiological activity, ploughing, washing of by rain or irrigation, etc. It is therefore not possible to assess if, and after which period, consumption of crops treated with organic fertiliser could be safe, if it could not be excluded that these carry the BSE-agent.

*3. Contact of humans or animals with the fertiliser during its application*

- Solid organic fertilisers could enter the human (or animal) body via the skin or through inhalation. No information is available as to the transferability of the BSE-agent by these routes. Accordingly no maximum exposure value can be defined

*4. Contamination of soil and water with the BSE-agent, including a potential accumulation of infectivity over years.*

- No information is available as to the behaviour (including accumulation) of the BSE-agent in the soil, the ground water or the surface water. There is, however, concern that a remote risk could exist that it would enter BSE-resistant species (e.g. mites) and by that create a potential source for future outbreaks.

## Conclusion:

It is currently not possible to assess the potential risk that could be posed by BSE-contaminated organic fertilisers for human, animals or the environment.

The following considerations are therefore essential for ensuring that organic fertilisers are safe in use with respect to BSE:

- Organic fertilisers which are produced without being exposed to any process known to reduce BSE infectivity can only be regarded as BSE-"free" if the raw material can be regarded to be BSE-free. This would require that it originated from countries or regions classified as BSE-free (or having a negligible risk of BSE) and/or that it was only prepared from those tissues or body fluids which are not likely to carry the BSE-agent (With regard to blood an opinion is pending as to its capacity to transfer BSE).
- Organic fertilisers which are produced with being exposed to processes known to reduce BSE-infectivity may be regarded as BSE free (or carry a negligible BSE-risk) if the conditions for the safe production of MBM or hydrolysed proteins (see SSC opinions on these subjects) are respected.
- Organic fertilisers regarded as BSE-free or as carrying a negligible BSE-risk might be used for any application as fertiliser. Except for the case where the raw material is coming from a BSE-free source, ingestion by man or animals (in particular ruminants) must be prevented.

## 5. Not exhaustive list of scientific and technical documents used by the working group.

Alexandersen, S., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

Böhm, R., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

Bradley R., 1998. Various letters, with scientific comments on a draft report of the Working Group.

Dormont, D., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

MAFF (UK Ministry of Agriculture, Fisheries and Food), 1998a. Bulletin N° 18

MAFF(UK Ministry of Agriculture, Fisheries and Food), 1998b. Bulletin N° 20.

MAFF-AGRICULTURE - *Regulations 1998 - The fertilisers Mammalian Meat and Bone Meal 1998/954*

MAFF-AGRICULTURE - *Regulations 1998 - The fertilisers Mammalian Meat and Bone Meal 1998/955*

Piva, G., Sequi, P., 1998. Safety of organic fertilisers from residues of slaughtered mammalian animals. Technical report submitted to the TSE/BSE *ad hoc* group of the Scientific Steering Committee. 7pp

Piva, G., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

Prusiner, S.B., 1997. Prion Diseases and the BSE Crisis. *Science*, Vol. 278 (10 October 1997): pp 245-251.

Riedinger, O., 1998a. Stellungnahme zum vorläufigen Arbeitspapier der "BSE/TSE-working group", das unter Federführung van Prof.Piva am 12.02.98 in Brüssel beraten soll. Discussion paper. 10pp (available in German and in English).

Riedinger, O., 1998b. Additional remarks concerning TSE agents and safe rendering procedure. Letter of 19 March 1998 to the SSC secretariat.

Schreuder, B.E.C., Geertsma, R.E., van Keulen, L.J.M., van Asten, J.A.A.M., Enthoven, P., Oberthür, R.C., de Koeijer, A.A., Osterhaus, A.D.M.E., 1998. Studies on the efficacy of hyperbaric rendering procedures in inactivating bovine spongiform encephalopathy (BSE) and scrapie agents. *The Veterinary Record*, Vol. 142: pp. 474-480.

Sequi, P., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

Taylor, D., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

Taylor, D.M., Woodgate, S.L., Fleetwood, A.J., Cawthorne, R.J.G., 1997. The effect of rendering procedures on scrapie agent. *Veterinary Record*. Vol.141, pp. 643-649.

Taylor, D.M., Fernie, K., McConnell, I., Ferguson, C.E., Steele, 1998. Solvent extraction as an adjustment to rendering; the effect on BSE and scrapie of the solvent followed by dry heat and steam.-*Veterinary Record*. Vol.143, pp. 6-9.

Vanbelle, M., 1998. Various letters to the secretariat of the Scientific Steering Committee with comments on and contributions to the various versions of the draft reports of the Working Group.

## **6. Acknowledgements**

The present opinion of the SSC is substantially based on the work of a working group, chaired by Prof.Dr.M.Vanbelle. Other members of the working group were: Dr R. Prof.Dr. R.Böhm, Dr.R.Bradley, Prof.Dr. J. W.Bridges, Prof.Dr.D.Dormont, Prof.DVM. Esko Nurmi, Prof. Dr. A.-L. Parodi, Prof.Dr.G.Piva, Dr. M.Riedinger, Dr. B.Schreuder, Prof.Dr. P.Sequi, Prof.Soren Alexandersen, Dr.D.Taylor, Dr. H.A.P. Urlings, Prof.Dr. M.Wierup, Prof.Dr. P.Willeberg.