The EFSA Journal (2005)201, 1-28

Opinion of the Scientific Panel on food additives, flavourings, processing aids and materials in contact with food (AFC) on a request from the Commission related to

a 7th list of substances for food contact materials

(Question N° EFSA-Q-2003-076, EFSA-Q-2004-144, EFSA-Q-2004-166, EFSA-Q-2004-082, EFSA-Q-2003-204, EFSA-Q-2003-205, EFSA-Q-2003-206)

adopted on 29 March 2005 by written procedure

SUMMARY

Within the general task of evaluating substances intended for use in materials in contact with food according to Council Directive 89/109/EEC of 21 December 1988 relating to materials and articles intended to come into contact with foodstuffs, the AFC Panel evaluated the following substances.

Ref. No.:	12786
Name of the substance:	3-aminopropyltriethoxysilane
CAS number:	000919-30-2
Classified in list:	3
Restriction:	Residual extractable content of 3-aminopropyltriethoxysilane to be less than 3 mg/kg filler.

Ref. No.:	66350
Name of the substance:	2,2'-Methylenebis(4,6-di-tert-butylphenyl) lithium phosphate
CAS number:	85209-93-4
Classified in list:	3
Restriction:	5 mg/kg food

Ref. No.:	66905
Name of the substance:	N-methyl-2-pyrrolidone
CAS number:	872-50-4
Classified in list:	2
Restriction:	None

Ref. No.:	76845
Name of the substance:	Polyester of 1,4-butanediol with caprolactone
CAS number:	31831-53-5
Classified in list:	3

Restriction:	None
Ref. No.:	86437
Name of the substance:	Silver Zeolite A (Silver zinc sodium ammonium alumino silicate), silver content 2 – 5 %
CAS number:	-
Classified in list:	3
Restriction:	Group restriction: 0.05 mg Ag/kg food, based on the human NOEL of about 10 g of silver for a total lifetime oral intake allocated by WHO (WHO, 2004) for drinking water. Maximum content in polymer: 10% (w/w) of silver zeolite A containing ≤ 5% silver. Only for repeated use articles made from polyolefins (up to 40°C for contact times below 1 day) and for poly(alkylene terephthalate) based polymers (up to 99°C for contact times below 2 hours)
Ref. No.:	86437/50
Name of the substance:	Silver-zinc- aluminium – boron – phosphate glass, mixed with 5-20% barium sulphate, silver content 0.35 – 0.6 %
CAS number:	-
Classified in list:	3
Restriction:	Group restriction: 0.05 mg Ag/kg food, based on the human NOAEL of about 10 g of silver for a total lifetime oral intake allocated by WHO (WHO, 2004) for drinking water. Group restriction: 1 mg Ba/kg food Group restriction: 6 mg B/kg food Maximum content in plastic: 1% (w/w)
Ref. No.:	86438 and 86438/50
Name of the substance:	REF No. 86438: Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 % REF No. 86438/50:Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %
CAS number:	-
Classified in list:	3
Restriction:	Group restriction: 0.05 mg Ag/kg of food, based on the human NOAEL of about 10 g of silver for a total lifetime oral intake allocated by WHO (WHO, 2004) for drinking water.

KEY WORDS

Food Contact Materials, Plastics, Monomers, Additives, 3-aminopropyltriethoxysilane, REF. No 12786, CAS No 000919-30-2, 2,2'-Methylenebis(4,6-di-tert-butylphenyl)

lithium phosphate, REF. No 66350, CAS No 85209-93-4, N-methyl-2-pyrrolidone, REF. No 66905, CAS No 872-50-4, Polyester of 1,4-butanediol with caprolactone, REF. No 76845, CAS No 31831-53-5, Silver Zeolite A (Silver zinc sodium ammonium alumino silicate), silver content 2 – 5 %, REF No 86437, Silver-zinc- aluminium – boron – phosphate glass, mixed with 5-20% barium sulphate, silver content 0.35 – 0.6 %, REF No 86437/50, Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 % and Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %, REF No 86438 and 86438/50.

BACKGROUND

According to Article 7 of the Council Directive 89/109/EEC of 21 December 1988 it is necessary to consult the Scientific Committee on Food (SCF) on the risks connected with the migration of substances into food from food contact materials in which they are used. This competence was transferred to the European Food Safety Authority (EFSA) by virtue of the Regulation (EC) 178/2002. The opinion of the EFSA is required before a substance is authorized to be used in food contact materials and be included in a positive list when this is established in the relevant legislation.

TERMS OF REFERENCE

The Commission asks EFSA to carry out risk assessments on:

1.all new substances used in food contact materials before their authorization and inclusion in a positive list;

2.substances which are already authorized in the framework of Council Directive 89/109/EEC but need to be re-evaluated.

ASSESSMENT

Within this general task the Scientific Panel on food additives, flavourings, processing aids and materials in contact with food (AFC) evaluated the following substances used in food contact materials. The substances examined are listed in ascending order of their Reference Number (REF No.), with their chemical name, Chemical Abstract Number (CAS No.) and classification according to the "SCF list". (Previously the evaluation of substances used in food contact materials was undertaken by the Scientific Committee on Food (SCF)). The definitions of the various SCF lists and the abbreviations used are given in the appendix.

Ref. No.:	**12786**
Name of the substance:	**3-aminopropyltriethoxysilane**
CAS number:	000919-30-2
Document reference:	EFSA/AFC/FCM/408-Rev.IA/12786 of February 2005
General information:	According to the petitioner 3-aminopropyltriethoxysilane is used as a coupling agent on inorganic materials that are blended into

Ref. No.:	12786
Name of the substance:	3-aminopropyltriethoxysilane

polymers in order to render the inorganic materials more compatible with the polymers.

Previous evaluations (by SCF or AFC): None

Available data used for this evaluation:

Non-toxicity data:
- Identity, physical/chemical properties, use, authorization, migration
- Measurement of the residual content in treated glass fibres.
- Evidence for lack of significant residues of oligomers or breakdown products in/on the treated glass fibres.

Toxicity data:
- Gene mutation assays in bacteria
- *In vitro* mammalian cell gene mutation test
- *In vitro* mammalian chromosome aberration test
- *In vivo* mouse micronucleus test

Evaluation:

The substance 3-aminopropyl-triethoxysilane is used to pre-treat the surface of inorganic materials used as fillers for a wide range of thermoset, thermoplastic and elastomeric polymers. The substance is intended to bond to the surface of the substrate and promote adhesion and mutual compatibility between the inorganic filler and the organic polymer. The residual content of 3-aminopropyl-triethoxysilane has been determined by solvent extraction of a mat of glass fibres without any protective polymer binder used and was not detectable using a method with a detection limit of 0.77 μg of test substance per gram of glass fibre. Using this figure of 0.77 μg of test substance per gram of glass fibre and assuming a 90 % w/w use of treated filler in a plastic, that the density of the plastic is 1, migration is restricted to a layer of 0.25 mm, and the conventional ratio of 6 dm^2 plastic / kg food applies, the petitioner has calculated the worst case migration to be 10.4 μg/kg food. By calculation and using this worst-case example, in order to keep the migration potential below 50 μg/kg food or food simulant the residual content of the substance in the inorganic filler could be up to 3.7 μg/g The petitioner has also conducted tests to demonstrate that there are no significant extractable oligomers or other identifiable reaction products.

Ref. No.:	**12786**
Name of the substance:	**3-aminopropyltriethoxysilane**

The substance (3-aminopropyl-triethoxysilane) was tested under *in vitro* conditions in an Ames test, a gene mutation assay with CHO cells, and in V79 cells chromosome aberration assay. All three tests were clearly negative and indicate that the substance has no genotoxic potential.
An *in vivo* mouse micronucleus test has been performed. Although a statistically significant increase in micronucleated PCE's sampled after 48 hours was observed in female mice at all dose levels, this did not show a dose:response relationship, was not seen in males and was not considered to be treatment-related. A dose-related response was absent, the response was similar in all dose groups. No response was present at the other sampling times of 30 and 72 hours. It is concluded that the substance does not induce micronuclei in the polychromatic erythrocytes of treated mice under the reported experimental conditions.

Conclusion: Based on the above-mentioned data the substance is classified*:*

SCF_List: **3**

Restriction: **Residual extractable content of 3-aminopropyltriethoxysilane to be less than 3 mg/kg filler.**

Remark for Commission: Used only for the reactive surface treatment of inorganic fillers.

Needed data or information: None

References: Unpublished data submitted by the petitioner on April 2003 and January 2004

Ref. No.:	**66350**
Name of the substance:	**2,2'-Methylenebis(4,6-di-tert-butylphenyl) lithium phosphate**

CAS number: **85209-93-4**

Document reference: *EFSA/AFC/FCM/403-Rev.0A/66350 of February 2005*

General information: According to the petitioner 2,2'-methylenebis(4,6-di-tert-butylphenyl) lithium phosphate is used as a clarifying agent in polypropylene homo and copolymers at maximum level of 0.3%. The products containing the additive are for single and repeated use, for all types of foods, for short contact at elevated temperatures (up to 2 hours at 100°C) and prolonged contact at or below room temperature.

Previous evaluations (by None

Ref. No.:	**66350**
Name of the substance:	**2,2'-Methylenebis(4,6-di-tert-butylphenyl) lithium phosphate**

SCF or AFC):

Available data used for this evaluation:

Non-toxicity data:

- Identity of the substance
- Chemical and physical properties
- Intended use
- Authorisation of the substance
- Specific migration tests from Ethylene polypropylene copolymer to 3% acetic acid, 15% ethanol, Miglyol (synthetic triglycerides mixture)
- Determination of the actual content in the polymer sample

Toxicity data:

- gene mutation assay in bacteria
- *in vitro* mammalian cell gene mutation test
- *in vitro* mammalian chromosome aberration test
- *in vitro/in vivo* UDS in rat liver
- mouse bone marrow micronucleus test
- 90-day rat oral toxicity studies with aluminium hydroxide salt and sodium salt of 2,2'-methylenebis(4,6-di-tert-butylphenyl) phosphate

Evaluation:

Specific migration tests were performed on Ethylene polypropylene copolymer plaques containing 0.3% of the additive. The content of 2,2'-methylenebis(4,6-di-tert-butylphenyl) lithium phosphate in the polymer sample was confirmed via the determination of the amount of lithium, by inductively coupled plasma – atomic emission spectroscopy (ICP-AES) Migration tests were performed by total immersion in 15% ethanol, 3% acetic acid, and Miglyol (synthetic triglycerides mixture), for 2 hours at 100°C followed by 10 days at 40°C. The Liquid Chromatography-Mass Spectrometry (LC-MS) method used was well described and the results were properly validated. Migration of 2,2'-Methylenebis(4,6-di-tert-butylphenyl) lithium phosphate in 15% ethanol was 288 µg/kg simulant, in 3% acetic acid it was 3.42 µg/kg simulant, in Miglyol it was 60.9 µg/kg simulant

2,2'-methylenebis(4,6-di-tert-butylphenyl) lithium phosphate was inactive in 2 bacterial reversion assays and in a chromosomal aberration test *in vitro*, with and without metabolic activation. An increased frequency of mutants at the *tk* locus was observed in mouse lymphoma cells after treatments with the test substance at toxic doses, only in the absence of metabolic activation. *In vivo*, 2,2'-methylenebis(4,6-di-tert-butylphenyl) lithium phosphate was

Ref. No.:	66350
Name of the substance:	**2,2'-Methylenebis(4,6-di-tert-butylphenyl) lithium phosphate**

negative in the micronucleus test in mouse bone marrow and in the UDS assay in rat liver. On the weight of the available experimental evidence, it is concluded that 2,2'-methylenebis(4,6-di-tert-butylphenyl) lithium phosphate is not genotoxic *in vivo*.

Oral subchronic (90-day) toxicity studies in the rat with the aluminium hydroxide and sodium salts of 2,2'-methylenebis(4,6-di-tert-butylphenyl) phosphate indicate low toxicity, provided NOAELs of 50 and 500 mg/kg bw respectively, based on slight reductions of body weight in the absence of other signs of dose-related systemic toxicity. These studies can be regarded as adequate to evaluate the toxicity of the organic anion of the test agent. The inorganic cation, lithium, has already been evaluated by SCF and it is included in the Directive 2002/72/EC with a group restriction of 0.6 mg/kg food.

Based on the logPo/w value of 2.5 for the substance, the potential for accumulation in humans is concluded to be low.

Conclusion: Based on the above-mentioned data the substance is classified:

SCF_List: **3**

Restriction: **5 mg/kg food**

Remark for Commission: Lithium: Group restriction of 0.6 mg/kg food

Needed data or information: None

References:

- Unpublished data provided by the Petitioner, October 2004
- Commission Directive 2002/72/EC, relating to plastic materials and articles intended to come into contact with foodstuffs

http://europa.eu.int/comm/food/food/chemicalsafety/foodcontact/2002-72_en.pdf

Ref. No.:	66905
Name of the substance:	**N-methyl-2-pyrrolidone**

CAS number: 872-50-4

Document reference: *EFSA/AFC/FCM/405-Rev.0A/66905 of February 2005*

General information: According to the petitioner, N-methyl-pyrrolidone (NMP) is used as an additive (as a solvent) during the production of polysulfone (PSU) or polyethersulfone (PES). These polymers are used for production of articles intended for heating in a microwave oven.

Ref. No.:	66905
Name of the substance:	N-methyl-2-pyrrolidone

Maximum residual content of NMP in the polymer is <100 mg/kg.

Previous evaluations (by SCF or AFC): None

Available data used for this evaluation:

Non-toxicity data:

- Identity of the substance
- Chemical and physical properties
- Intended use
- Authorization of the substance
- Specific migration tests in to simulants and food
- Determination of the residual content of NMP in the polymer.

Toxicity data:

- Gene mutation tests in bacteria
- Gene mutation test in cultured mammalian cells
- Chromosomal aberration test *in vivo*
- Micronucleus test *in vivo*
- Subchronic toxicity studies in rats and mice
- Chronic toxicity/carcinogenicity studies in rats and mice
- Developmental toxicity study in rat
- Two generation reproduction study in rat
- Information on ADME

Evaluation:

Specific migration of N-methyl-pyrrolidone into 3% acetic acid, 10% ethanol and 95% ethanol after 10 d at 40°C has been determined. No detectable migration of NMP from PSU and PES has been found under the test conditions applied (detection limit varying from <0.003 mg/kg - <0.015 mg/kg). Determining the migration of NMP into olive oil (2 hr 175°C) was experimentally not possible due to low recovery rate at low determination limit. Migration of NMP into olive oil after 2 hr 175°C was calculated by modelling to be 0.7 mg/kg for a worst case residual content of 100 mg NMP/kg polymer.
The residual content of NMP in a PES sample, intended to contain 30 mgNMP/kg polymer, was determined analytically to be 19.5 mg NMP/kg polymer; the residual content of NMP in PSU, intended to contain 20 mg NMP/kg polymer, was determined analytically to be 14 mg/kg.

N-methylpyrrolidone (NMP) was tested with negative results in gene mutation assays in bacteria and in cultured mammalian cells,

Ref. No.:	66905
Name of the substance:	N-methyl-2-pyrrolidone

and in a DNA damage/repair test in primary hepatocytes. *In vivo*, NMP did not increase the incidence of chromosomal aberrations or micronuclei in bone marrow of Chinese hamsters and mice, respectively, administered at dose levels of NMP producing signs of systemic toxicity. From these data it is concluded that NMP is not genotoxic.

Subchronic (90-days) oral toxicity studies in rats and mice only showed signs of general toxicity, such as reduction in body weights, increased liver weights and centrilobular hypertrophy in both species, possibly indicative of an adaptative response to the high doses administered. Testicular degeneration and atrophy was also a consistent finding in rats. The NOAELs from subchronic toxicity studies were approximately 170 mg/kg bw in rats and 230 mg/kg bw in mice. At the next higher dose levels, in both species only slight body and / or liver weight changes were seen, without relevant histopathological or clinical biochemical effects, making these weight changes of limited toxicological importance.

In a chronic toxicity/carcinogenicity study in rat, NMP showed no carcinogenic potential; adverse effects at high doses were observed on survival, weight gain and increased incidence of severe progressive nephropathy and testicular degeneration, with a NOAEL of approximately 200 mg/kg bw. In mice, liver was the main target of chronic dietary exposure to NMP, showing increased absolute and relative weight, altered foci and adenomas at high doses. In male mice also liver carcinomas were significantly increased. These tumours are of common occurrence in B6C3F1 mice and, considering of the lack of genotoxicity of NMP, can be regarded as of limited relevance. The NOAEL for chronic toxicity in mice was about 90 mg/kg bw in males (based on a modest increase in relative liver weight), and about 220 mg/kg in females.

In two-generation reproduction toxicity and prenatal oral toxicity studies in the rat, the NOAEL for reproductive performance/fertility was 350 mg/kg. Adverse effects on development were observed, but only at doses which were also toxic to dams, with a NOAEL of about 125 mg/kg.

Based on the toxicological data available, a TDI of 1.0 mg/kg bw can be established for N-methylpyrrolidone by applying an uncertainty factor of 100 to the overall NOAEL derived from chronic toxicity and reproduction studies.

Conclusion: Based on the above-mentioned data the substance is classified:

SCF_List: **2**

Restriction: **None**

Remark for Commission: Used as solvent

Ref. No.:	66905
Name of the substance:	**N-methyl-2-pyrrolidone**
Needed data or information:	None

References:

- Unpublished data provided by petitioner on 04/12/2004
- Following published studies:

-Wells DA, Thomas HF, Digenis GA. (1988) Mutagenicity and cytotoxicity of N-methyl-2-pyrrolidinone and 4-(methylamino)butanoic acid in the Salmonella/microsome assay. 1: J Appl Toxicol. 8(2):135-9.

-Engelhardt G., Fleig H. (1993) 1-Methyl-2-pyrrolidone (NMP) does not induce structural and numerical chromosomal aberrations *in vivo*, Mut. Res., 298, 149-155

-Malley LA, Kennedy GL, Elliott GS, Slone TW, Mellert W, Deckardt K, Gembardt C, Hildebrand B, Parod RJ, McCarthy TJ, Griffiths JC (1999) 90-day subchronic toxicity studies in rats and mice fed N-Methylpyrrolidone (NMP) including neurotoxicity evaluation in rats. Drug Chem Toxicol 22:455—480

-Malley LA, Kennedy GL, Elliott GS, Slone TW, Mellert W, Deckardt K, Kuttler K, Hildebrand B, Banton MI, Parod RJ, Griffiths JC (2001) Chronic Toxicity and oncogenicity of N-Methylpyrrolidone (NMP) in rats and mice by dietary administration. Drug Chem Toxicol 24:315—338

-Saillenfait AM, Gallissot F, Langonne I, Sabate JP (2002) Developmental toxicity of N-Methyl-2-Pyrrolidone administered orally to rats. Fd Chem Toxicol 40:1705—1712

Ref. No.:	76845
Name of the substance:	**Polyester of 1,4-butanediol with caprolactone**
CAS number:	31831-53-5
Document reference:	*EFSA/AFC/FCM/76845-Rev.0A/76845 of February 2005*

General information: According to the petitioner, Polyester of 1,4-butanediol with caprolactone (PCL) is intended for use as a polymeric additive in food-contact polyolefins at a maximum level of 0.1%. Polyolefins made with Polyester of 1,4-butanediol with caprolactone are intended for contact with all food types in conditions depending on the polymer type.

Previous evaluations (by SCF or AFC): None

Ref. No.:	**76845**
Name of the substance:	**Polyester of 1,4-butanediol with caprolactone**

Available data used for this evaluation:

Non-toxicity data:
- Identity
- Physical and chemical properties, molecular weight distribution
- Intended use
- Authorization of the substance
- Residual monomers amount
- Specific migration of the substance in food simulants
- Analytical method for specific migration and validation test

Toxicity data:
- None

Evaluation:

The average molecular weight is >1000 D, the fraction with molecular weight below 1000 D is less than 0.5%.
Specific migration of the polymeric additive (0.1% in Low Density Polyethylene, LDPE) was tested by a method based on High Performance Liquid Chromatography/Size Exclusion Chromatography- Evaporative Light Scattering Detector (HPLC/SEC-ELSD). Repeatability and recovery tests were performed. Migration of the polymeric additive in 3% acetic acid and 15% ethanol (2 hr-100˚C + 10 d at 40 °C) was ≤ 31 µg/kg and ≤29 µg/kg respectively. In 95% ethanol (3.5 hr - 60˚C + 10 d at 40˚C) migration was <34 µg/kg after correction for recovery.

The monomers, caprolactone (REF No 14260) and 1,4-butanediol (REF No 13720) , have already been evaluated by EFSA in 2004 (AFC, 2004) and have both been classified in List 3. Caprolactone has a restriction of 0.050 mg/kg food expressed as the sum of caprolactone and 6-hydroxyhexanoic acid, while 1,4-butanediol has a restriction of 5 mg/kg food.
Given the molecular weight distribution of the substance and the previous evaluation of the monomers caprolactone and 1,4-butanediol, no further toxicological data are required.

Conclusion: Based on the above-mentioned data the substance is classified:

SCF_List: **3**

Restriction: **None**

Remark for Commission: The restriction for caprolactone (REF No 14260) and 1,4-butanediol (REF No 13720) shall be respected

Needed data or information: -

References:
- Unpublished data submitted by the petitioner, June 2004.

Ref. No.:	**76845**
Name of the substance:	**Polyester of 1,4-butanediol with caprolactone**

- Opinion of the Scientific Panel on food additives, flavourings, processing aids and materials in contact with food (AFC) on a request from the Commission related to a 5th list of substances for food contact materials http://www.efsa.eu.int/science/afc/afc_opinions/675/afc_opinion20_ej109_list5_en1.pdf

Ref. No.:	**86437**
Name of the substance:	Silver zeolite A (silver zinc sodium ammonium alumino silicate), silver content 2- 5 %

CAS number:

Document reference: *EFSA/AFCFCM/206-Rev.IIA/86437 of November 2004*

General information:

According to the petitioner, the compound Silver zeolite A is a defined mixture $M_{12}(2AlO_2\ 2SiO_2)_6\ 27H_2O$ (with M^+=Na^+, Ag^+, Zn^{++}, $NH4^+$)

The detailed composition corresponds to the raw formulas ranging from

$Na_{1.3}$, Ag, $Zn_{9.7}$, $(NH_4)_{5.8}$]*$(AlO_2*SiO_2)_{23}$* 36 H_2O

to

$Na_{1.5}$, Ag, $Zn_{9.4}$, [$(NH_4)_{6.8}$] $(AlO_2*SiO_2)_{27.4}$ 2.2 H_2O

depending on the grade

Grades used in food contact applications may contain up to 5% (w/w) silver.

The function of the substance is to control microorganism growth on the article and to thereby preserve the article. According to the petitioner, Silver Zeolite A is not intended to have a technical effect on food.

Previous evaluations (by SCF or AFC): None

Available data used for this evaluation:

Non-toxicity data:

- Data on structure and identity, correspondence between specifications of all grades used and names mentioned in the petitioner SDS
- Physical and chemical properties, intended use and authorization of the substance
- Global migration data
- Specific migration data from LDPE, OPP and PBT into 3% acetic acid, and sodium containing test media
- Analytical data showing high migration from PS and PVC

Ref. No.:	**86437**
Name of the substance:	Silver zeolite A (silver zinc sodium ammonium alumino silicate), silver content 2- 5 %

Microbiological data:
- Intended microbiological function and applications
- Spectrum of microbial activity
- Level of activity (minimum inhibitory concentrations),
- Efficacy
- Efficacy following repeated use,
- Lack of antimicrobial activity against microbes in the food.

Toxicity data:
- Gene mutation tests in bacteria, one with silver zeolite A, one without a clear indication of the substance tested
- *In vitro* gene mutation assay in mammalian cells (mouse lymphoma L5178Y cells)
- *In-vitro* chromosomal aberration test with silver copper zeolite
- *In-vivo* chromosomal aberration assay in rats
- 90-day dietary toxicity study in rats.
- 90-day dietary toxicity study in dogs
- Dietary two-generation reproduction and fertility study in rats

Evaluation:

The petitioner requests authorization of Silver zeolite A (silver zinc sodium ammonium alumino silicate), containing up to 5 % silver, and used up to 10% in plastic articles.

The petitioner has narrowed down the application to situations where migration of silver is below 50 µg/kg food: in polyolefins, polyesters (polybutylene terephthalate), polystyrene based polymers and PVC, only for repeated use.

The Panel noted that due to the nature of the substance the only ion that might migrate in toxicologically relevant quantities is silver.

Migration into a sodium-containing food simulant has been requested, in order to evaluate the possible migration of silver by an ion exchange mechanism. Such an experiment has been reported for silver zeolite A in LDPE. There is a marked effect during a first contact period, and the migration slows then down, reaching values below 50 µg Ag^+/kg food simulant.

A kinetic display of the provided data suggests that a rapid migration occurs during the initial contact time, probably through migration of silver leaching from the zeolite particles which are close to the food surface. In subsequent contact periods, migration is much lower. This suggests that silver zeolite A (containing up to 5% silver):

a) can only be used up to 10% in food contact plastics,

b) only in repeated use conditions.
c) migration is less than 50 µg Ag^+/kg in the following conditions:
- in polyolefins (up to 40°C) for contact times below 1 day
- in poly(alkylene terephthalate) based polymers (up to 99°C) for contact times below 2 hours

In PVC and polystyrene based polymers, the migration far exceeds 50 µg Ag^+/kg and for these materials use of this silver zeolite should not be authorized.

Global migration into 3 % acetic acid has been tested for silver zeolite A in LDPE, and is below the legal limit.

The biocide silver zeolite A is intended to be incorporated into a number of food contact polymer materials in order to reduce the level of microbiological contamination on the surface of the FCM. It is intended that use will include industrial, commercial and domestic applications. The data supplied showed that the biocide had antimicrobial activity against moulds, yeasts, and both Gram positive and negative bacteria. All microorganisms likely to be encountered in food and food manufacturing plants could reasonably be expected to be sensitive to silver ions. Thus it would not be expected that overgrowth of surfaces by species resistant to silver ions would occur. With regard to the selection of mutants resistant to silver in sensitive microbial populations, no evidence exists that such mutants have arisen during the use of silver compounds for decades in water treatment or for medical purposes even though silver-resistant strains of bacteria have been isolated from environments such as silver mines and photographic film waste water. However this does not appear to be a problem in those food environments where silver zinc glass would be used. Minimum inhibitory concentrations of the biocide have been determined for a wide range of microorganisms and combined with data on maximum migration of silver ions have demonstrated that the maximum silver ion concentration in food is well below the MICs for all the bacteria tested. The efficacy of the biocide in a wide range of polymers was demonstrated against a wide range of microorganisms exposed in aqueous solutions to the FCM surface. In all cases there was a three to four log reduction in viability of the test organism after 24 hours exposure. This antimicrobial activity was retained in various test systems after more than 50 wash cycles, 30 autoclave treatments or 30 cleaning treatments with proprietary dishwashing detergents. No evidence was presented that demonstrated the efficacy of the biocide under in-use conditions i.e.

that the use of the biocide makes a contribution to food safety and hygiene over and above that resulting from normal cleaning procedures employed in food preparation areas.

In the first gene mutation test in bacteria (Ames test) results were negative, however the precise nature of the test compound could not be defined. A second test has been performed with Zeomic Type AKsilver zeolite A, which was negative. In an *in-vitro* test for gene mutations in mammalian cells (L5178Y Mouse Lymphoma cells) Zeomic Type AK silver zeolite A induced significant increases in mutant frequency at some concentrations that were associated with high cytotoxicity (RTG 20%) and without relation to dose. The Panel concluded that the study was negative. An in-vitro chromosomal aberration test using CHO cells gave positive results with S9 and with the lower expression time of 8 hourts; but this test was performed on silver copper zeolite instead of silver zinc zeolite and the Panel concluded that the results are not relevant for the assessment of the latter. An *in-vivo* study for chromosomal aberration in rat bone marrow cells, carried out with silver zinc copper, gave negative results.Overall it can be concluded that the substance has no genotoxic potential expressed in-vivo.
A 90-day study in rats with dietary administration has been performed with silver zinc copper zeolite. Based on haematology and histopathology results, showing an effect on the pancreas, the NOAEL of the substance was determined at 1000 mg/kg of diet for both sexes (equivalent to about 60 mg/kg body weight).
A 90-day study in dogs with oral administration by capsule has been performed with silver zinc copper zeolite. The No-Observed-Effect-Level (NOEL) for both sexes was 50 mg/kg b.w./day, based on kidney, pancreas and clinical chemistry changes at the high dose level of 250 mg/kg b.w./day.
In a dietary two-generation reproduction and fertility study in rats, the test substance was administered in the diets to groups (30 animals) of Crl/CD(SD)IGS BR rats at dose levels of 0, 1000, 6500 and 12500 mg/kg of diet. The NOAEL for reproductive and parental toxicity was 1000 mg/kg of diet (75 mg/kg b.w./day in male and 90 mg/kg b.w./day in female) based upon effects on parental and pup growth and survival, haematology and clinical chemistry at dietary concentrations of 6250 mg/kg of diet (480 mg/kg b.w./day in male and 550 mg/kg b.w./day in female).

The Panel also took note of the WHO "Guidelines for drinking-water quality". According to these Guidelines a total lifetime oral

Ref. No.:	86437
Name of the substance:	Silver zeolite A (silver zinc sodium ammonium alumino silicate), silver content 2- 5 %

intake of about 10 g of silver (equal to 0.39 mg/day/person) can be considered on the basis of epidemiological and pharmacokinetic knowledge as the human NOAEL.
Based on the data above, a restriction of 0.05 mg/kg of food (as silver) for the substance would limit intake to less than 13 % of the human NOAEL, under the assumption that each day a kg of food is consumed containing silver at the restriction limit.

Conclusion: Based on the above-mentioned data the substance is classified*:*

SCF_List: **3**

Restriction: **Group restriction: 0.05 mg Ag/kg food,** based on the human NOAEL of about 10 g of silver for a total lifetime oral intake allocated by WHO (WHO, 2004) for drinking water.
Maximum content in polymer: 10% (w/w) of silver zeolite A containing ≤ 5% silver.
Only for repeated use articles made from polyolefins (up to 40°C for contact times below 1 day) and for poly(alkylene terephthalate) based polymers (up to 99°C for contact times below 2 hours)

Remark for Commission: It is a biocide

Needed data or information: –

References:

- Unpublished data submitted by the petitioner (May 2002 and December 2003 and September 2004).
- World Health Organization (2004). Guidelines for drinking-water quality. Third edition. http://www.who.int/water_sanitation_health/dwq/gdwq3/en/

Ref. No.:	86437/50
Name of the substance:	**Silver-zinc- aluminium – boron – phosphate glass, mixed with 5-20% barium sulphate, silver content 0.35-0.6%**

CAS number: None
Document reference: EFSA/AFC/FCM/337-Rev IA/86437/50 of November 2004

General information: According to the petitioner, the compound is a silver zinc glass containing 5-20 % barium sulphate.
Silver zinc glass has the following composition: xAg2O – yZnO – sAl2O3 – tB2O3 – uP2O5 - wH2O
The maximum amount of silver in the additive is 0.6 % and the maximum percentage of the additive in food contact materials is

Ref. No.:	86437/50
Name of the substance:	Silver-zinc- aluminium – boron – phosphate glass, mixed with 5-20% barium sulphate, silver content 0.35-0.6%

1%.

According to the petitioner, the additive is intended to release silver onto the surface of food contact materials to improve hygiene on their surface. The additive is intended for all plastics, and all types of food at or below room temperature, possibly with a short time at 100 °C, followed by storage at or below room temperature. Mainly repeated use articles are intended, however some single use applications (disposable aprons, disposable gloves) are foreseen

Previous evaluations (by SCF or AFC): None

Available data used for this evaluation

Non-toxicity data:

- Specifications
- Data on purity and impurities
- Physical and chemical properties, intended use and authorization of the substance
- Determination of specific migration of silver
- Description of the analytical method and of the procedure
- Determination of residual amount in food contact materials

Microbiological data

- intended microbiological function
- spectrum of microbiological activity
- minimum inhibitory concentration
- consequences of use (antimicrobial resistance and overgrowth of surface)
- interaction with food constituents
- efficacy
- efficacy after repeated cleaning procedures
- lack of antimicrobial activity against microbes in food

Toxicity data: On silver zeolite A: (silver zinc sodium ammonium alumino silicate):

- Gene mutation assay in bacteria (Ames test)
- Cell mutation assay in mouse lymphoma L5178Y cells
- *In-vitro* chromosomal aberration test
- *In-vivo* chromosomal aberration assay in rats

Evaluation: The antimicrobial agent, silver ions, is embedded in an inert material, a “glass” matrix. The glass matrix is chemically a silver zinc aluminium boron phosphate glass, structurally and compositionally of the same characteristics of ordered structure as zeolite so the data presented to support the silver zinc zeolite

(silver zeolite A) are pertinent to this application.
The substance is intended to be used in plastics employed in articles of repeated use such as conveyor belts, food processing machinery, containers as well as disposable items such as aprons and gloves. The technological function is to reduce the number of microorganisms on the surface of the plastic and thus to reduce the possibility of cross-contamination.
The specific migration of silver from the test substance in Low Density Polyethylene (LDPE) was studied into acetic acid, sodium acetate (pH 5) and sodium phosphate (pH 7), which are considered as worst case test media.
Migration (10 d at 40 °C) was in all cases below 5 µg/kg (not detectable) for LDPE containing 1% of the test substance containing 0.39% silver. A worst case migration of 8 µg/kg can be calculated for the substance containing the maximum percentage of silver (0.6 %)
Recovery experiments and the description of the analytical method and of the procedure, were satisfactory.
For boron which is a constituent of the "glass" matrix and may also migrate into food, a group restriction of 6 mg B/kg food has already been allocated (Directive 2002/72/EC).
The substance contains barium sulphate which may give rise to migration of barium for which a group restriction of 1 mg Ba/kg food has already been allocated (Directive 2002/72/EC).

The petitioner has demonstrated that silver ions generated from a silver zinc glass have antimicrobial activity against a range of microorganisms including Gram positive and negative bacteria. The Minimum Inhibitory Concentrations of silver ions generated from silver nitrate solutions was 6.8 µg/l. The Film Test Method (JIS Z 2801) was used to demonstrate the antimicrobial activity of silver zinc glass incorporated into a variety of food contact materials (FCMs) when bacterial suspensions were presented to the FCMs in a thin aqueous film for 24 hours at 37^0C. Evidence was also provided that the biocide had no antimicrobial activity in real foods e.g. curry, when the food was presented as a 1 mm layer held between two sheets of FCM over a period of seven days at 7-10^0C. The efficacy of the biocide was retained following exposure to a similar layer of beef lard, corn oil or minced pork for 24 hours and then washed off.
With regard to the selection of mutants resistant to silver in sensitive microbial populations, no evidence exists that such mutants have arisen during the use of silver compounds for

decades in water treatment or for medical purposes even though silver-resistant strains of bacteria have been isolated from environments such as silver mines and photographic film waste water. However this does not appear to be a problem in those food environments where silver zinc glass would be used. The overgrowth by silver-resistant microbes of the surfaces of the silver zinc glass FCMs is not expected to be a problem because the non-specific nature of microbial inactivation by silver and the multiplicity of targets in the microorganisms provides a general sensitivity of microorganisms to silver ions. The antimicrobial activity of silver zinc glass in FCMs was still significant after 5000 treatments with cleaning fluid and wiping. These conditions were intended to mimic those to which such materials might be exposed in food preparation areas.

No evidence was provided of efficacy under "in use" conditions to demonstrate that the use of silver zinc glass in FCMs improved the hygienic state of manufacturing plant and food preparation areas over and above that of general cleaning procedures although the laboratory experiments reported suggest that might be the case.

The related substance, silver zinc zeolite (silver zeolite A), was tested under *in-vitro* conditions in a gene mutation assay in bacteria (Ames test), a mouse lymphoma assay and in chromosomal aberration assays. The two first tests were clearly negative and indicate that the substance has no mutagenic potency. In an *in vitro* chromosomal aberration assay using V79 cells, the incidence of cells with chromosomal aberrations increased significantly after a 4 hour treatment with a concentration of 7.5 µg/ml (suspension in DMSO, and cell culture medium as second solvent) and without S9 mix.
An *in-vivo* chromosomal aberration assay has been performed in rats with silver zinc zeolite (silver zeolite A). For the three doses used, 500, 1500 and 5000 mg/kg bw (in 0.5% CMC), no toxicity was recorded. A very low mitotic index was frequently observed with cells from male animals (treated or non-treated). In these conditions, no significant increase of cells with chromosomal aberrations was observed. From this study, it could be concluded that the chromosomal aberration potency observed *in-vitro* is not expressed *in –vivo* in female animals. For males, the study is inconclusive due to the very low observed mitotic index. Overall it is concluded that the substance would not be genotoxic.

Ref. No.:	86437/50
Name of the substance:	Silver-zinc- aluminium – boron – phosphate glass, mixed with 5-20% barium sulphate, silver content 0.35-0.6%

Conclusion:

The Panel also took note of the WHO "Guidelines for drinking-water quality". According to these Guidelines a total lifetime oral intake of about 10 g of silver (equal to 0.39 mg/day/person) can be considered on the basis of epidemiological and pharmacokinetic knowledge as the human NOAEL.

Based on the data above, a restriction of 0.05 mg/kg of food (as silver) for the substance would limit intake to less than 13 % of the human NOAEL.

SCF_List: **3**

Restriction: **Group restriction: 0.05 mg Ag/kg food,** based on the human NOAEL of about 10 g of silver for a total lifetime oral intake allocated by WHO (WHO, 2004) for drinking water.
Group restriction: 1 mg Ba/kg food
Group restriction: 6 mg B/kg food
Maximum content in plastic: 1% (w/w)

Remark for Commission: It is a biocide

Needed data or information: None

References:

- Unpublished data submitted by the petitioner (2003 and 2004)
- World Health Organization (2004). Guidelines for drinking-water quality. Third edition.
http://www.who.int/water_sanitation_health/dwq/gdwq3/en/
- Commission Directive 2002/72/EC of August 2002, relating to plastic materials and articles intende to come into contact with foodstuffs, L39/2, 13.2.2003
http://europa.eu.int/comm/food/food/chemicalsafety/foodcontact/2002-72_en.pdf

Ref. No.:	86438 and 86438/50
Name of the substance:	**REF No. 86438: Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 %** **REF No. 86438/50:Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %**

CAS number: -
Document reference: EFSA/AFC/FCM/362-Rev.IIA/86438 of February 2005

General information: According to the petitioner, the **Silver zinc zeolite A are physical mixtures of metallic oxides**. Given the different compositions two references are distinguished:
REF No. 86438: higher silver content, no magnesium oxide
REF No. 86438/50: lower silver content, containing magnesium oxide
Each silver zeolite A is a defined mixture which may contain substances other than the two possible silver zinc zeolites:
ZnO , SiO_2, polydimethylsiloxane, H_2O and / or $MgAl_2(OH)CO_3$

REF No. 86438

- Silver zinc zeoliteA (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 %
- 60% AgZn zeolite A ($x_1Na_2O \bullet x_2Ag_2O \bullet x_3ZnO) \bullet Al_2O_3 \bullet ySiO_2 \bullet mH_2O \bullet Ca(PO_3)_2$
- 30% ZnO
- 10% SZ100S, dispersion agent consisting of 6.8% ZnO, 2.5% SiO_2 0.3% polydimethylsiloxane, 0.4% H_2O
- total silver content: 1 – 1.6 %

REF No. 86438/50
Silver zinc **zeolite A** (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %

- 20% AgZn Zeolite A ($x1Na2O \bullet x_2Ag_2O \bullet x_3MgO \bullet x_4ZnO) \bullet Al_2O_3 \bullet ySiO_2 \bullet mH_2O \bullet Ca(PO_3)_2$
- 70% ZnO
- 10% DHT-4A-2 (dispersion agent: $MgAl_2(OH)CO_3$)
- total silver content: 0.34 – 0.54%

Previous evaluations (by SCF or AFC): None

Available data used for this evaluation:

Non-toxicity data: - Complete specifications of the commercial additives, and of the

Ref. No.:	86438 and 86438/50
Name of the substance:	**REF No. 86438: Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 %** **REF No. 86438/50:Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %**

active antimicrobial substance
- Physical and chemical properties, intended use and authorization of the substance
- Specific migration
- Residual content of the substance in food contact material (FCM)

Microbiological data:
- Intended microbiological function
- Spectrum of microbiological activity
- Minimum inhibitory concentration
- Consequences of use (antimicrobial resistance and overgrowth on surfaces)
- interaction with food components
- Efficacy
- Efficacy after repeated cleaning procedures
- Lack of antimicrobial activity against microbes in food

Toxicity data:
- Gene mutation assay in bacteria (Ames test)
- Cell mutation assay in mouse lymphoma L5178Y cells
- *In-vitro* chromosomal aberration test in Chinese hamster V79 cells
- *In-vivo* chromosomal aberration assay in rats

Evaluation:

The full specifications have been provided.
Each REF No. reference corresponds to a different defined mixture, with different composition and specifications:
REF No. 86438: Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 %
REF No. 86438/50: Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %.
The petitioner requests the use of up to 1% of each additive in any plastic material, which gives the final maximum percentages of silver in the final plastic materials:
REF No. 86438: 0.016 %
REF No. 86438/50: 0.0054 %
The requested percentages of use of these additives correspond to the following percentages of use of the silver-zinc-zeolites:

Ref. No.:	86438 and 86438/50
Name of the substance:	**REF No. 86438: Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 %** **REF No. 86438/50:Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %**

- silver-zinc-zeolite in the composition of REF No. 86438 represents 60% of the whole, and 1 % of this additive represents 1.7 % of the silver-zinc-zeolite
- silver-zinc-zeolite in the composition of REF No. 86438/50 represents 20% of the whole, and 1 % of this additive represents 5 % of the silver-zinc-zeolite.

The Panel noted that due to the nature of the substance the only ion that might migrate in toxicologically relevant quantities is silver.

Migration has been tested for 10 days at 40°C in different test media representing worst case situations: 3% acetic acid, sodium acetate (pH 5) and sodium phosphate (pH 7). The migration was in all cases below 0.019 mg/kg for REF No. 86438 and below 0.005 mg/kg stimulant for REF NO 86438/50 (not detectable). This has been achieved with a well described method and satisfactory recovery experiments. The material used, LDPE, is usually considered as a worst case test material.

The concentration of silver in the tested plastic samples did not correspond to the max. intended use concentration:

REF No. 86438: 0.013 % instead of 0.016%.

REF No. 86438/50: 0.0047 % instead of 0.0054 %

However, the differences are small, and given the low migration, and assuming that the migration is proportional to the concentration of silver, the expected migration would be below 0.024 mg/kg food stimulant for REF No. 86438 and below 0.008 mg/kg food stimulant for REF No. 86438/50.

Silver migration may occur by several mechanisms, and can be enhanced by ion exchange between silver in the plastic and ions like sodium in the food. This was investigated by studying migration into test media containing 1 % sodium phosphate or 1 % sodium acetate buffer. In these media, the migration of silver was always below 8 µg/kg food simulant.

The petitioner applies for all types of food: solid, semi-solid and liquid (e.g. for the last category is dairy equipment).

The petitioner applies for all plastics used in repeated use articles, e.g. conveyer belts, “food handling” and food processing machinery, refillable food containers, etc. The petitioner further states that no single use applications are yet in place but according to customer requests, benefits for dedicated single use applications such as disposable aprons and disposable gloves for the food handling industry are foreseen.

Given the low migration values measured in conditions simulating single use, no problem is foreseen with single use applications below 40°C.
The residual concentration of silver has been determined and the method adequately described.

The petitioner has demonstrated that 0.2-0.4% silver zinc zeolite incorporated into a number of food contact polymers has antimicrobial properties against representative Gram negative and positive bacteria suspended in a thin aqueous layer against the polymer held at 37^0C for 24 hours. It was also demonstrated that 0.3% biocide did not exhibit any antimicrobial activity against bacteria in a 1 mm layer of curry held between two sheets of food contact material over a period of seven days at 7-10^0C. The efficacy of the biocide was retained following exposure to a similar layer of beef lard, corn oil or minced pork for 24 hours and then washed.
With regard to the selection of mutants resistant to silver in sensitive populations, no evidence exists that such mutants have arisen during the use of silver compounds for decades in water treatment or for medical purposes even though silver-resistant strains of bacteria have been isolated from environments such as silver mines and photographic film waste water. However this does not appear to be a problem in those food environments where the silver zinc zeolite would be used as a biocide.
The overgrowth by silver resistant microbes of the surfaces of the silver zinc zeolite is not expected to be a problem because the non-specific nature of microbial inactivation and the multiplicity of targets in the microorganisms provides a general sensitivity of microorganisms to silver ions.
The antimicrobial efficacy of the silver zinc zeolite in food contact materials is maintained after 13 weeks storage at 60^0C, 13 weeks storage in water at 40^0C and after 1000 water spray cycles over a period of 2000 hours. These conditions are intended to mimic conditions to which such materials might be exposed in food preparation areas.
No evidence is provided of efficacy under “in use” conditions i.e. to demonstrate that the use of silver zinc zeolite in food contact materials improves the hygienic state of manufacturing plant and food preparation areas over and above that of general cleaning

procedures although the laboratory experiments reported suggest that might be the case.

The substance (silver zinc zeolite) was tested under *in vitro* conditions in an Ames test, a mouse lymphoma assay and a chromosomal aberration assay in V79 cells. The two first tests were clearly negative and indicate that the substance has no mutagenic potency. In the chromosomal aberration assay, the incidence of cells with chromosomal aberrations increased significantly after a 4 hour treatment with a concentration of 7.5 µg/ml (suspension in DMSO, and cell culture medium as second solvent) and without S9 mix.

An *in vivo* chromosomal aberration assay has been performed in rats with the test substance. For the three used doses used of 500, 1500 and 5000 mg/kg bw (in 0.5% CMC), no toxicity was recorded. A very low mitotic index was frequently observed with cells issued from male animals (treated or non-treated). In the reported conditions, no significant increase of cells with chromosomal aberrations was observed in cells issued from female animals. On the basis of this study, it could be concluded that the chromosomal aberration potency observed *in-vitro* is not expressed *in –vivo.* in females animals. For male animals, the study is inconclusive due to the very low mitotic index mentioned above. Overall it is concluded that the substance would not be genotoxic.

The Panel also took note of the WHO "Guidelines for drinking-water quality". According to these Guidelines a total lifetime oral intake of about 10 g of silver (equal to 0.39 mg/day/person) can be considered on the basis of epidemiological and pharmacokinetic knowledge as the human NOAEL.

Based on the data above, a restriction of 0.05 mg/kg of food (as silver) for the substance would limit intake to less than 13 % of the human NOAEL.

Conclusion: Based on the above-mentioned data the substance is classified:

SCF_List: **SCF_list: 3**

Restriction: **Group restriction: 0.05 mg Ag/kg of food,** based on the human

Ref. No.:	86438 and 86438/50
Name of the substance:	**REF No. 86438: Silver zinc zeolite A (silver-zinc sodium alumino silicate calcium metaphosphate), silver content 1 -1.6 %** **REF No. 86438/50:Silver zinc zeolite A (silver-zinc sodium magnesium alumino silicate calcium phosphate), silver content 0.34 - 0.54 %**
Remark for Commission:	NOAEL of about 10 g of silver for a total lifetime oral intake allocated by WHO (WHO, 2004) for drinking water. It is a biocide The Commission is advised to specify: - the maximum amount of additive (1%) and - the max. amount of silver in the additive (1.6%) or in the final food contact material
Needed data or information:	None

References:

- Unpublished data submitted by the petitioner, January 2003, July 2004, January 2005
- World Health Organization (2004). Guidelines for drinking-water quality. Third edition. http://www.who.int/water_sanitation_health/dwq/gdwq3/en/

ACKNOWLEDGEMENTS

The Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food wishes to thank P.M.J. Bos, A. Feigenbaum, J, J.C. Lhuguenot, Bevan Moseley, M.A.H. Rijk, T.G. Siere, J. van Benthem, for their contribution to the draft opinion.

List of abbreviations:

FRF: Fat (Consumption) Reduction Factor, see Opinion of the SCF in 2002 http://europa.eu.int/comm/food/fs/sc/scf/out149_en.pdf
MIC: Minimum inhibitory concentration

APPENDIX

DEFINITION OF THE SCF LISTS

List 0 Substances, e.g. foods, which may be used in the production of plastic materials and articles, e.g. food ingredients and certain substances known from the intermediate metabolism in man and for which an ADI need not be established for this purpose.

List 1 Substances, e.g. food additives, for which an ADI (=Acceptable Daily Intake), a t-ADI (=temporary ADI), a MTDI (=Maximum Tolerable Daily Intake), a PMTDI (=Provisional Maximum Tolerable Daily Intake), a PTWI (=Provisional Tolerable Weekly Intake) or the classification "acceptable" has been established by this Committee or by JECFA.

List 2 Substances for which this Committee has established a TDI or a t-TDI.

List 3 Substances for which an ADI or a TDI could not be established, but where the present use could be accepted.
Some of these substances are self-limiting because of their organoleptic properties or are volatile and therefore unlikely to be present in the finished product. For other substances with very low migration, a TDI has not been set but the maximum level to be used in any packaging material or a specific limit of migration is stated. This is because the available toxicological data would give a TDI, which allows that a specific limit of migration or a composition limit could be fixed at levels very much higher than the maximum likely intakes arising from present uses of the additive.
Depending on the available toxicological studies a restriction of migration into food of 0.05 mg/kg of food (3 mutagenicity studies only) or 5 mg/kg of food (3 mutagenicity studies plus 90-day oral toxicity study and data to demonstrate the absence of potential for bio-accumulation in man) may be allocated.

List 4 **(for monomers)**

4A Substances for which an ADI or TDI could not be established, but which could be used if the substance migrating into foods or in food simulants is not detectable by an agreed sensitive method.

4B Substances for which an ADI or TDI could not be established, but which could be used if the levels of monomer residues in materials and articles intended to come into contact with foodstuffs are reduced as much as possible.

List 4 **(for additives)**

Substances for which an ADI or TDI could not be established, but which could be used if the substance migrating into foods or in food simulants is not detectable by an agreed sensitive method.

List 5 Substances that should not be used.

List 6 Substances for which there exist suspicions about their toxicity and for which data are lacking or are insufficient.
The allocation of substances to this list is mainly based upon similarity of structure with that of chemical substances already evaluated or known to have functional groups that indicate carcinogenic or other severe toxic properties.

6A Substances suspected to have carcinogenic properties. These substances should not be detectable in foods or in food simulants by an appropriate sensitive method for each substance.

6B Substances suspected to have toxic properties (other than carcinogenic). Restrictions may be indicated.

List 7 Substances for which some toxicological data exist, but for which an ADI or a TDI could not be established. The required additional information should be furnished.

List 8 Substances for which no or only scanty and inadequate data were available.

List 9 Substances and groups of substances which could not be evaluated due to lack of specifications (substances) or to lack of adequate description (groups of substances).
Groups of substances should be replaced, where possible, by individual substances actually in use. Polymers for which the data on identity specified in "SCF Guidelines" are not available.

List W "Waiting list". Substances not yet included in the Community lists, as they should be considered "new" substances, i.e. substances never approved at national level. These substances cannot be included in the Community lists, lacking the data requested by the Committee.