TOX/2023/63

Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)

EFSA consultation on a draft opinion on risks from polychlorinated naphthalenes in food and feed

Introduction

1. EFSA was asked by the European Commission to provide an opinion on the risks to animal and human health from polychlorinated naphthalenes (PCNs) in feed and food. EFSA's opinion attempted to address all 75 theoretically possible chlorinated naphthalenes. It did not consider naphthalene, brominated naphthalenes or chloro/bromo naphthalenes.

2. EFSA released its draft opinion for public consultation recently. The deadline for comments is 14 January 2024. A link to the consultation can be found at Annex A.

3. Members are asked to provide comments on the draft opinion to be submitted to EFSA, and also to advise whether they agree with EFSA's evaluation. Members are asked to provide any further comments after the meeting to the Secretariat by 10 January 2024.

Background

4. PCNs are a type of chlorinated polycyclic aromatic hydrocarbon, based on the naphthalene ring system with one or more hydrogen atoms replaced with chlorine. Technical PCN mixtures were used in the past in dielectrics, lubricants, electric cable insulation, preservatives of wood, paper and fabric, cutting and grinding fluids, and plasticisers. They were manufactured in various countries between around 1910 and 1980. They can also be formed as unintentional biproducts in the production of other industrial chemicals, and they are formed by combustion processes such as incineration, forest fires, burning of coal etc. They are lipophilic, bioaccumulative and occur widely in food and feed. They are considered persistent organic pollutants (POPs) under the Stockholm Convention.

5. PCNs are known to interact with the Ah receptor, resulting in concern that they could have dioxin-like effects and contribute to the cumulative toxicity of dioxin-like compounds.

6. EFSA has not previously evaluated PCNs. However, the COT considered the PCNs in 2009 (COT, 2009). The COT found that some PCNs had shown clear evidence of dioxin-like toxicity. Due to data limitations the COT could not establish toxic equivalency factors (TEFs) for dioxin-like activity. However, the COT used relative potencies identified from in vitro studies to convert PCNs to relative amounts of TCDD. The COT considered that the PCNs were likely to be less persistent than the PCDDs and PCDFs and that this was therefore a highly conservative approach. The estimated dietary exposures of the PCNs were up to 49% of the COT's TDI of 2 pg WHO-TEQ/kg b.w for dioxins and dioxin-like compounds. Given the very conservative assumptions adopted, and although the data were insufficient for a robust risk assessment, the COT concluded that no specific toxicological concerns were identified.

Draft EFSA evaluation of PCNs

Toxicokinetics

7. No toxicokinetic studies were identified in humans. However, some indirect information was available from exposure incidents, from technical PCN formulations being applied to the skin of volunteers, and from reports of accumulation of PCNs in humans. In people intoxicated by PCN-contaminated rice oil, PCN-28/43, PCN-33/34/37, PCN-35, PCN-38/40, PCN-46, PCN-52/60 and PCN-66/67 were measured in adipose tissue. In contrast, PCN-24, some tetraCNs, pentaCNs and hexaCNs and both heptaCNs – PCN-73 and PCN-74 – were not detected in adipose tissue despite being present in the contaminated rice oil. Placental transfer of PCNs to fetuses was also shown. The panel concluded that the findings imply that monoCN to hexaCNs are well absorbed by humans from foodstuffs, while the larger heptaCNs and especially octaCN are possibly absorbed to a lesser extent.

8. Some toxicokinetic data were identified in rats, mice, pigs, rabbits and fish, though only for a small number of individual congeners or some mixtures. Mono- to hexaCNs were well absorbed following oral dosing, but the oral absorption of the two heptaCNs studied and the octaCN was lower. The absorbed PCNs were readily distributed in organs and tissues. Following intraperitoneal administration, hexa- and heptaCNs in plasma decreased with phase I and II half-lives of approximately 6 and 350 hours, respectively. Following single oral administrations by gavage, PCN-66 and PCN-67 persisted in the liver and adipose tissue for up to 120 days. In general, turnover of hexaCNs was slow in rats. Maternal transfer of PCNs has been shown in a number of studies.

9. PCNs are likely metabolised similarly to other similar halogenated compounds, with increasing resistance to enzymatic oxidation due to steric hindrance and increase in the number of substituted chlorines. Mono- to tetraCNs were readily metabolised and excreted in urine as hydroxylated PCNs (chloronaphthols) and phase II metabolites. Urinary metabolites of pentaCNs, heptaCNs and octaCN could not be observed in a study in rabbits. In a study in rats,

single oral doses of tetra-, penta- and hexaCNs were 99% excreted in five days, with 94% being via the faeces. Faeces were the main route of excretion of both unabsorbed and metabolised (phase II) hydrophobic higher chlorinated naphthalene derivatives.

Toxicity in laboratory animals

10. Toxicity studies were performed in rats mainly using hexaCNs. Most studies used a specific hexaCN mixture containing all ten hexaCNs and heptaCN (PCN-73). The composition was 94.1% hexaCNs (81.2% PCN-66/67, 5.4% PCN-64/68, 2.2% PCN-69, <0.1% PCN-71/72, 3.2% PCN-63. 0.6% PCN-65 and 1.4% PCN-70) and 5.9% of the heptaCN PCN-73.

Acute toxicity

11. Effects on the liver were reported in the two acute toxicity studies available, one using hexaCN mixture (composition as above) and the other a technical PCN mixture.

Subacute toxicity

12. Effects on the liver were reported in three sub-acute toxicity studies performed with hexaCNs in rats and in one study performed with a technical PCN mixture in rats. A study investigating the effects of hexaCN mixture (composition as above) on blood coagulation and fibrinolysis indicated disturbed both coagulation and fibrinolysis processes, as well as decreased the platelet count. A single study in rats with PCN-43 reported no adverse effects.

Subchronic toxicity

13. A single 90-day study was available, testing hexaCN mixture (as described above) in female Wistar rats and focusing on selected liver and haematological parameters. Dosing was by oral gavage at levels of 0, 0.03, 0.1 and 0.3 mg/kg bw/day. Absolute and relative liver and adrenal weights were increased and relative thymus weights decreased at the highest dose. Histopathological examination showed fatty degeneration in the liver at the highest dose. Malondialdehyde (MDA)

concentration in the liver was increased at the mid and high dose levels and the serum total antioxidant status (TAS) was decreased at the high dose. The total liver concentration of cytochrome P450 was decreased at the highest dose but increased at the low and mid dose levels without a clear dose-response relationship. CYP1A activity in the liver and kidney was increased strongly at all dose levels and CYP2B activity in liver and kidney was also induced at all dose levels.

14. At the top dose level, haematological changes included decreased red blood cell count, haemoglobin, haematocrit, mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH). There was an increased red cell distribution width (RDW) at the mid and high dose levels, a decrease in the platelet count at the mid and high dose levels and an increased mean platelet volume (MPV) at the high dose only. Investigation of parameters related to the haem biosynthesis showed aminolaevulinic acid dehydratase (ALA-D) and uroporphyrinogen decarboxylase (URO-D) activities in the liver at the high dose and effects on the concentration of porphyrins in liver and urine. Increased concentrations of aminolaevulinic acid (ALA) were observed at the mid and high dose levels.

Chronic toxicity and carcinogenicity

15. No studies were identified.

Reproductive and developmental toxicity

16. No reproductive toxicity studies were identified. Four developmental toxicity studies in rats were identified, one studying PCN-43, one PCN-66, one hexaCN mixture as described above, and one a technical PCN mixture.

17. PCN-43 was administered by oral gavage to pregnant Wistar rats on gestation days (GD) 6-15 at dose levels of 0, 0.3, 1 or 3 mg/kg bw/day. The only effect observed was delayed ossification in the mid- and high-dose groups (there was no maternal toxicity).

18. PCN-66 was administered by oral gavage to pregnant Wistar rats on GD 14-16 at dose levels of 0 or 0.001 mg/kg bw/day in a study designed to investigate effects on male reproductive development. No maternal, embryotoxic or fetotoxic

effects were observed. Increased testicular spermatid count was observed on postnatal day (PND) 48 and increased percentage of post-meiotic tubules was observed on PND 31. The EFSA panel considered this to be an acceleration of the first round of spermatogenesis that was without adverse consequences when the offspring reached reproductive age. An increased sperm count in cauda epididymitis was also observed on PND 62, and increased serum luteinising hormone (LH) and follicle-stimulating hormone (FSH) levels were observed from PND 31 to PND 48.

19. HexaCN mixture as described above was administered by oral gavage to pregnant Wistar rats on GD 6-15 at dose levels of 0, 0.1, 0.3 or 1 mg/kg bw/day. Maternal effects at the high dose included decreased body weight from GD15; increased relative liver, kidney, adrenal gland, spleen and brain weights; and fatty changes in the liver as shown by microscopic evaluation. The MDA concentration in liver was increased at the mid and high dose groups. Intrauterine mortality of embryos and foetuses was increased at all dose levels, fetal body weight was decreased in the mid- and high-dose groups, fetal length was decreased at all dose levels and delayed ossification was observed at the high dose. Induction of CYP1A activity was observed in maternal liver and in the placenta and the fetal liver.

20. A technical PCN mixture was administered by oral gavage to pregnant Wistar rats at dose levels of 0, 0.3, 1, 3 or 9 mg/kg bw/day during GD 6-15. Maternal body weight was decreased from GD 10 at the two highest doses, and haematocrit was decreased at the highest dose. Absolute weights of maternal liver, ovaries and spleen were decreased at the top dose, relative weights of the liver, kidneys, adrenal glands, ovaries and brain were increased at 1 mg/kg bw/day and above and relative spleen weight was increased at 3 mg/kg bw/day and above. Developmental effects were an increase in intrauterine mortality, decreased fetal body weight and length, delayed ossification and retarded development of brain and kidneys at all dose levels. In addition, hydronephrosis was observed in one female fetus in the low dose, 0.3 mg/kg bw/day, group and in two male fetuses at 1 mg/kg bw/day.

Neurotoxicity

21. One subacute neurotoxicity study was conducted with the hexaCN mixture (composition as above). Six-week-old male Wistar rats were dosed by oral gavage at

0, 0.3 or 1 mg/kg bw/day for 28 days. Assessments were of motor behaviour on day 21 after the end of dosing, long-term memory on day 28 after the end of dosing, pain sensitivity and magnitude of stress-induced analgesia on day 35 after the end of dosing, and auditory function and sensorimotor gating on day 42 after the end of dosing. Body weight was decreased at the top dose. There were decreases in spontaneous locomotor and exploratory activities at the high dose. Impairment of long-term memory, enhanced pain sensibility and a decrease in the level of stress-dependent analgesia were observed at both dose levels.

Genotoxicity

22. Ames tests were conducted on PCN-1, PCN-2, PCN-27 and PCN-75 using *Salmonella typhimurium* strains TA100, TA1535, TA98 and TA97 (except for PCN-27 for which TA1537 was used instead of TA97) in the presence and absence of metabolic activation. The results were negative for PNC-2, PCN-27 and PCN-75. However, PCN-1 was weakly positive in strains TA100 and TA97 using S9 from Syrian hamster liver. From EFSA's summary it appears the results were negative when S9 from Sprague-Dawley rats was used.

23. HexaCN mixture (composition as above) was tested in an *in vivo* bone marrow micronucleus study following daily oral gavage dosing at 0, 0.03, 0.1 or 0.3 mg/kg bw/day for 90 days. This was apparently part of the subchronic toxicity study described above. No increase in micronuclei was observed. There was also no change to the ratio of polychromatic to normochromatic erythrocytes (PCEs/NCEs), indicating no toxicity to the bone marrow. However, the observation of haematological changes and hepatotoxicity in the sub-acute studies and in this subchronic toxicity study were considered by EFSA to provide indirect evidence of systemic exposure.

24. Overall, EFSA concluded that the extremely limited information available on the genotoxicity of PCNs does not allow a conclusion to be drawn on their genotoxic potential.

Epidemiological data

25. No relevant epidemiological studies were identified.

Effects in food producing animals and companion dogs

26. Most identified studies were on technical PCN mixtures. The data identified were useful for hazard identification but less so for hazard characterisation.

27. Hyperkeratosis was observed in cattle and possibly linked to a substantial decrease in serum vitamin A following PCN exposure. However, PCN exposure presented differently in sheep. In pigs, exposure to lethal doses of PCN resulted in decreased plasma vitamin A concentrations but these recovered even in animals which subsequently died. Typical signs of PCN toxicity in cattle, such as hyperkeratosis, were also absent in pigs. Studies in poultry also showed decreased serum vitamin A concentration but this did not appear to be linked to adversity. Dose-dependent effects were observed on survival and performance parameters. Studies in fish showed upregulation of genes and proteins involved in xenobiotic metabolism, in particular CYP1A but no adverse effects. A study in rainbow trout which found no adverse effects was used to identify a NOAEL for fish of 32.8 mg PCN-52/kg feed (dry weight). No NOAELs of other point of departure could be identified for cattle, sheep, pigs or poultry.

28. No relevant studies in dogs were identified.

Modes of action

29. PCNs have been shown to weakly activate the Ah receptor, with PCN-70 and PCN-60 being the most potent. As shown by reporter gene assays, relative potency compared to TCDD ranged approximately 10^{-7} - 10^{-3}. However, EFSA noted that some of these potencies are greater than some dioxin-like PCBs.

30. In addition to activating AhR, PCNs may also activate the constitutive androstane receptor (CAR) and pregnane X receptor (PXR), as shown by induced CYP2B expression in the liver in one study.

31. Regarding the haematological effects observed, effects on red blood cells are likely due to haemolysis since increased red blood cell lysis was reported in the sub-acute toxicity study. Decreased platelet count could be due to increased platelet turnover, as indicated by the increased mean platelet volume observed. The effects on the blood-clotting time/potential may be due to a decrease in kinetic parameters of clot formation and fibrinolysis.

32. No data were identified regarding the MOA for the effects on fetal development observed in the developmental toxicity studies. No data were identified regarding the MOA for the effects observed in the neurotoxicity study.

Hazard characterisation

33. Since there were no suitable epidemiological data available, the hazard characterisation was based on the studies in laboratory animals. All of the adverse effects observed were assumed to be relevant to humans. After listing all the LOAELs and NOAELs for the liver, thymus, haematological, developmental and neurotoxic effects observed in the various studies (see Table 4 of the draft opinion, Annex A) the EFSA panel considered the critical effect to be decreased platelet count in the subchronic toxicity study with hexaCN mixture. The NOAEL was 0.03 mg/kg bw/day.

34. The panel performed benchmark dose modelling in accordance with the 2022 EFSA guidance. The panel decided to use a benchmark response of 20% based on guidance from the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) that a change in platelet count within 20% might be non-adverse. The BMD model averaging resulted in a $BMDL_{20}$ of 0.05 mg/kg bw/day.

35. Due to limitations and uncertainties in the available data, the EFSA panel considered that it would not be appropriate to establish a health-based guidance

value (HBGV) and that the margin of exposure (MOE) approach should be used instead. The panel considered that MOEs ≥2000 would not be a concern. This took into account factors of 10 each for interspecies and intraspecies variation, a factor of 2 for the use of a subchronic rather than chronic study and a factor of 10 due to database limitations. The data limitations were considered to be lack of studies on reproductive toxicity, carcinogenicity, developmental neurotoxicity and immunotoxicity, the very limited information on genotoxicity, limitations in the key study used and insufficient data on bioaccumulation. The limitations in the key study were that only females were studied and a number of standard parameters were not assessed.

36. Regarding the hazard characterisation for animals, as described above a NOAEL of 32.8 mg PCN-52/kg feed (dry weight) was identified for fish, but points of departure were not identified for the other species under consideration.

Occurrence and exposure assessment

Occurrence in food

37. A total of 9,111 analytical results from 371 samples generated mainly by gas chromatography (GC)-based methods, particularly GC-HRMS, fulfilled the quality criteria applied. The results addressed 71 PCNs. The EFSA panel decided to focus on the results for hexaCNs since the toxicology data to be used in the risk characterisation were for a hexaCN mixture. Thus, 2,317 hexaCNs analytical results analysed in 371 samples on food were used for the exposure assessment. Left-censored data accounted for 47% of the occurrence values.

38. The highest percentages of quantified data were found in food categories ‘eggs and egg products’, ‘fish, seafood, amphibians, reptiles and invertebrates’, ‘milk and dairy products’ and ‘meat and meat products.’ The highest mean concentrations were reported for ‘whole eggs,’ followed by ‘diadromous fish.’

39. The EFSA panel noted that one particularly high result for PCN-69 in hens’ eggs of 313 ng/kg had a considerable impact on the mean concentration level of PCN-69 for the food category ‘Eggs and egg products.’

40. For infant formula, only one sample of follow-on formulae (powder) was reported, and only PCN-64/68 and PCN-66/67 were measured.

41. For human breast milk, data on 26 individual or pairs of hexaCN congeners in European human milk were taken from pooled samples that were collected and analysed as part of WHO/UNEP field studies in 2016-2019.

Occurrence in feed

42. A total of 1,467 PCNs analytical results from 31 samples of feed, analysed for 70 PCNs, fulfilled the quality criteria applied and were considered in the assessment. Out of these, 217 hexaCNs analytical results analysed in 31 samples of feed were available in the final cleaned dataset and the EFSA panel again focused on the results for the hexaCNs. The hexaCN occurrence data were very limited for single congeners or pairs of congeners and therefore the panel used results for the results from the hexaCN homologue group to assess exposure. The panel were only able to consider three feed categories: 'oil seeds, oil fruits, and products derived thereof (feed)', 'forages and roughage, and products derived thereof (feed)' and 'compound feed (feed)'. The highest percentage of quantified data was observed for 'compound feed.' The highest mean hexaCN concentration was measured in dog food.

Dietary exposure assessment

43. The EFSA panel assessed chronic dietary exposures for the individual hexaCNs PCN-63, PCN-64/68, PCN-65, PCN-66/67, PCN-69, PCN-70 and PCN-71/72 at the mean and 95th percentile. For PCN-69, two exposure assessments were conducted, one including the high concentration of 313 ng/kg measured in an egg sample (scenario A) and one excluding it (scenario B).

44. Since the critical toxicology data were from a study which tested a mixture of hexaCNs plus the heptaCN PCN-73, exposure assessments were also conducted based on the summed exposure of all the hexaCNs plus PCN-73 (mixture scenario). This was done both including the high concentration of PCN-69 measured in a sample of eggs (mixture scenario A) and excluding it (mixture scenario B).

45. In addition, exposures were estimated for two particular scenarios: exposure by fish consumers for consumers of fish only (since due to the relatively high concentrations of PCNs in fish, fish consumers may have higher dietary intakes than non-consumers of fish), and exposures of breastfed infants, based on a body weight of 6.1 kg for an infant aged 3 months and consumption of 800 mL/day on average or 1200 mL/day for high consumers.

46. EFSA's dietary exposure assessments did not include UK consumption data since the UK is no longer an EU Member State.

47. For the individual (or pairs of) hexaCN exposure scenarios, the highest exposures across the European dietary surveys were estimated for PCN-69 scenario A (including the high egg result), and the highest exposures were estimated in "toddlers." The food categories contributing mostly to exposure of PCN-66/67 were 'fish, seafood, amphibians, reptiles and invertebrates' and 'meat and meat products' in adult groups and 'milk and dairy products' in infants. However, for the other hexaCNs, the food categories 'eggs and egg products' and 'fish, seafood, amphibians, reptiles and invertebrates' contributed the most.

48. For the mixture scenarios, the lowest exposures were estimated for "elderly" consumers and the highest for "toddlers" and the exposure estimated were higher for scenario A (including the high egg result for PCN-69) than for scenario B. The food categories 'fish, seafood, amphibians, reptiles and invertebrates' and 'eggs and egg products' contributed the most to exposures in adult groups, while 'milk and dairy products' contributed the most to exposures in infants.

49. The exposure scenario for high consumers of fish was only conducted for PCN-66/67 as this was considered the most relevant due to the high contribution of fish consumption to exposures assessed for the total population. The estimated exposures were approximately twice as high as exposures estimated for the total population.

50. Exposure estimated from breastfeeding were conducted for exposure to PCN-66/67 and exposure to the sum of all the hexaCNs plus PCN-73. Exposures to the

mixture were only about 20% higher than for PCN-66/67, indicating the major contribution of PCN-66/67 to total exposure. The EFSA panel considered that no exposure estimate could be made for infant formula since only a single sample of follow-on formula had been analysed.

51. In addition to dietary exposure, the EFSA panel noted that dust may contribute significantly to total exposure, particularly for infants and toddlers due to hand to mouth contact. However, since only two studies reporting on concentrations in dust were identified, neither of which were conducted in Europe, the panel considered that no robust exposure estimate from dust could be made.

Exposure of animals from feed

52. Exposures from feed were estimated considering feed materials and model diets. Forages were also included for ruminants and horses. It was not possible to use compound feeds (complete and/or complementary) to assess dietary exposure due to the lack of data. Exposures were estimated for pigs (piglets (weaned), pigs for fattening, lactating sows), poultry (chickens for fattening, laying hens, turkeys for fattening, ducks for fattening), fish (salmonids), rabbits (for fattening), cattle (dairy cows, cattle for fattening), small ruminants (dairy sheep, dairy goats, lambs for fattening, kids for fattening), dogs (meat-containing diet, vegetarian diet) and cats. Exposures could not be estimated for veal calves or horses due to a lack of occurrence data. The highest modelled concentrations of hexaCNs in complete feed were for rabbits for fattening, followed by turkeys and ducks for fattening.

Risk characterisation

Human health

53. The EFSA panel only calculated MOEs for exposure to the hexaCN mixture (sum of all hexaCNs plus the heptaCN PCN-73) since the critical study tested a mixture of hexaCNs plus PCN-73. MOEs, using the $BMDL_{20}$ of 0.05 mg/kg bw/day for decreased platelet count in the subchronic toxicity study, were calculated for the various age groups for high exposures (95^{th} percentile) of the hexaCNs based on mixture scenario A (i.e. including the high result for PCN-69 in eggs) and are presented in Table 23 in the draft opinion. The MOEs ranged from 1,700,000 in

"toddlers" to 55,000,000 in "elderly" and were all well above the MOE of 2,000 considered not to be a health concern.

54. For breast-fed infants, the estimated MOEs for high consumers ranged from 89,000 to 230,000 and were also considered not to be of concern. It was noted that since the samples were pooled, the estimates do not take into account the variation between individuals.

55. No risk characterisation could be performed for PCNs other than hexaCNs. However, considering the very large MOEs for the hexaCN mixture and that available data indicate that PCN-66/67 and PCN-70 are the most potent congeners, the panel considered that further data would not change the risk characterisation.

Animal health

56. The only point of departure identified was a NOAEL for PCN-52 in fish. However, a risk characterisation for PCN-52 in fish was not possible due to a lack of exposure data for PCN-52. Therefore, risk characterisations could not be conducted for PCNs in any of the animal species considered.

Uncertainty analysis

57. The EFSA panel conducted an uncertainty analysis. Due to what was considered extremely limited information on uncertainty, the panel considered that they could not conclude on the genotoxic potential of the PCNs and they could not quantify the uncertainty.

58. A number of "non-standard" uncertainties were considered to affect the exposure and hazard assessments. For exposure, these included limited or lack of occurrence data for many important food categories (e.g. various fish species, types of meat), occurrence data were available only from a few Member States, the impact of the contribution of one egg sample with high PCN-69 result, and use of default values for breastmilk consumption rather than data. For the hazard assessment the non-standard uncertainties included the lack of studies on chronic toxicity,

reproductive toxicity, carcinogenicity, developmental neurotoxicity and immunotoxicity; that the critical toxicology study used was conducted only with female animals and did not include a number of standard parameters; and the lack of sufficient data on bioaccumulation to allow a body burden approach to be taken. These uncertainties were quantified by expert judgement using a semi-formal structured method of expert knowledge elicitation and combined by probability bounds analysis. Additional uncertainties affecting the risk characterisation were also taken into account when assessing the overall uncertainty, the most important of which was considered to be the difference between the mixture tested in the critical study and the proportions of those congeners in the human exposures.

59. From the results of the uncertainty analysis the EFSA panel concluded with at least 99% certainty that the current dietary exposure to the hexaCNs would not raise a health concern for any of the population groups and dietary surveys considered in the assessment, including breast-fed infants.

Recommendations

60. Finally, the EFSA panel made a number of recommendations, which can be summarised as follows:

- To enable a more robust exposure assessment, more sensitive analytical methods are needed to reduce the amounts of left-censored data, and these should have improved selectivity to separate coeluting PCN congeners
- Further occurrence data should be generated in food and feed, in particular in different fish species and in infant formula.
- There should be monitoring of PCN occurrence in eggs and other edible products from food producing animals raised on PCN contaminated soil or in the proximity of other PCN sources.
- When PCN occurrence data in feed are submitted to EFSA, adequate information should be provided on the feed samples analysed, e.g. target species for complete/complementary compound feeds.

- Because the current dietary exposure does not raise a health concern for humans, additional experimental animal studies are not required.
- There is a need for non-animal studies to support the assessment of adverse effects of PCNs in food-producing and non-food-producing animals. (Secretariat note: Is this recommendation clear?)
- EFSA should develop harmonised guidance to allow extrapolation of data from experimental animals to food producing and non-food producing animals.
- The risks to animal and human health related to the presence of polyhalogenated PAHs other than PCNs in feed and food should also be assessed.

Questions on which the views of the Committee are sought:

Members are asked to consider the following questions:

i. Do Members have comments on the draft EFSA opinion that they wish to be submitted to EFSA? Please can Members specify the sections of the draft opinion they are referring to or the specific lines of text where possible.

ii. Do Members agree with the approach taken to the risk assessment of PCNs in the draft EFSA opinion?

iii. Do Members agree with the conclusion that, with at least 99% certainty, current dietary exposures to the hexaCNs do not raise a health concern?

iv. Do Members agree with the recommendations made?

v. Does the Committee have any further comments?

Secretariat

December 2023

Abbreviations

ALA	aminolaevulinic acid
ALA-D	aminolaevulinic acid dehydratase
BMD	benchmark dose
BMDL	benchmark dose lower confidence limit
CAR	constitutive androstane receptor
COT	Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment
FSH	follicle-stimulating hormone
GC	gas chromatography
GC-HRMS	gas chromatography – high resolution mass spectrometry
GD	gestation day
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
LH	luteinising hormone
LOAEL	lowest observed adverse effect level
MCH	mean corpuscular haemoglobin
MCV	mean corpuscular volume
MOA	mode of action
MOE	Margin of exposure
MPV	mean platelet volume
NCE	normochromatic erythrocyte
NOAEL	No observed adverse effect level
PCDD	polychlorinated dibenzodioxin
PCDF	polychlorinated dibenzofuran
PCE	polychromatic erythrocyte
PCN	polychlorinated naphthalene
PND	postnatal day
POP	persistent organic pollutant
PXR	pregnane X receptor
RDW	red cell distribution width

TAS	total antioxidant status
TCDD	2,3,7,8-tetrachlorodibenzo-*p*-dioxin
TDI	tolerable daily intake
TEF	toxic equivalency factor
UNEP	United Nations Environment Programme
URO-D	uroporphyrinogen decarboxylase
WHO	World Health Organisation
WHO-TEQ	WHO toxic equivalent

References

COT (2009). Statement on polychlorinated naphthalenes in food. COT Statement 2009/05. July 2009: [ARCHIVED CONTENT] UK Government Web Archive - The National Archives

Annex A to TOX/2023/63

Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)

EFSA consultation on a draft opinion on risks from polychlorinated naphthalenes in food and feed

EFSA's draft opinion for public consultation: Scientific opinion on the risks for animal and human health related to the presence of polychlorinated naphthalenes (PCNs) in feed and food: Public Consultation: (europa.eu)

Secretariat

December 2023