

## **COMMITTEE ON TOXICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT**

### **STATEMENT ON A MULTI-ELEMENT SURVEY OF FUNGI AND BLACKBERRIES**

#### **Introduction**

1. We have considered a draft Food Surveillance Information Sheet <sup>1</sup> describing the results of a survey carried out for the MAFF/DH Joint Food Safety and Standards Group on the concentrations of 12 elements (arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, platinum, tin, titanium and zinc) in free food, namely wild edible fungi and blackberries.

2. Wild edible fungi were collected from 34 locations and wild blackberries from 48 locations within Great Britain. Samples were collected from urban and rural areas, and for blackberries also close to and away from roads. These free foods were then analysed for total concentrations of these elements, though no attempt was made to distinguish between different chemical species of each element. For example, the reported arsenic concentration is the sum of organic and inorganic arsenic.

#### **Results of the survey**

3. There were wide variations in the concentrations of the elements found in the different samples of free foods that were analysed. For a number of the elements there were differences when concentrations in samples from the different locations were compared. We *note* that the results for elements that may partially originate from vehicle exhausts, *i.e.* lead (from leaded petrol) and platinum (from catalytic converters), are indicative of higher concentrations in samples from localities with a greater density of motor traffic. We also *note* that chromium and tin concentrations appeared to be higher in fungi from urban areas whereas cadmium and zinc concentrations were higher in fungi from rural areas. For blackberries, the arsenic, chromium and tin concentrations were higher in urban samples, while manganese concentrations were higher in rural samples.

4. We *note* that there are no legal limits for metals and other elements in free foods that are collected for personal consumption. We also *note* that the concentrations of arsenic in the samples of fungi and blackberries were all less than 1 milligram/kilogram (mg/kg), the statutory limit for commercial foods. Similarly, the concentrations of tin in the samples were all much less than the legal limit of 200 mg/kg that applies to commercial products.

5. Five of the thirty-four samples of fungi had lead concentrations higher than the legal limit of 1 mg/kg that would apply to commercial samples of

fungi. However, we *note* that total lead intake of individuals who are high level (97.5<sup>th</sup> percentile) consumers of both wild edible fungi and blackberries suggest that such individuals would not exceed the Provisional Tolerable Weekly Intake (PTWI) for lead that has been determined by the Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives (JECFA).<sup>2</sup>

6. JECFA have also determined PTWIs for cadmium, mercury, and tin.<sup>3,4</sup> Provisional Maximum Tolerable Daily Intakes (PMTDI) have been established by JECFA for copper and zinc.<sup>3</sup> In addition, a Tolerable Daily Intake (TDI) for nickel has been established by the World Health Organization (WHO).<sup>5</sup> Estimates of intake of these elements show that the 97.5<sup>th</sup> percentile consumer would not exceed the appropriate tolerable intake.

7. Estimates of total dietary intake of arsenic suggest that a high level consumer of wild edible fungi and blackberries might exceed the JECFA PTWI.<sup>4</sup> However, the JECFA PTWI would be exceeded by only 8%. Furthermore, it is estimated that the intake of arsenic via the consumption of wild edible fungi and blackberries only contributes 5% to the total estimated dietary intake. As was indicated in paragraph 2, estimated intakes of arsenic from the consumption of free foods as well as from the rest of the diet are for total (*i.e.* organic and inorganic) arsenic. Inorganic arsenic is more toxic than organic arsenic and this is reflected in the JECFA PTWI, which applies to inorganic arsenic only. However, most of the arsenic in the diet is present as the less toxic organic arsenic compounds, with fish and shellfish being the major sources.

8. Neither JECFA nor the WHO have determined tolerable intakes of chromium, manganese, platinum or titanium. We *note* that titanium was included as an indicator of surface contamination of the samples with soil and that there are no estimated total dietary intakes for titanium with which to compare intakes from the consumption of free foods. We have been informed that the concentrations of chromium, manganese and platinum in the wild edible mushrooms and blackberries would not contribute appreciably to the total intake of those elements from dietary sources as estimated from the Total Diet Studies of 1994 and 1997.<sup>6-8</sup>

## **Conclusion**

9. Estimated total dietary intakes of the elements cadmium, copper, lead, mercury, nickel, tin, and zinc for high level consumers of wild edible fungi and blackberries do not exceed the appropriate tolerable intake and are therefore not a health concern. Although estimated total dietary intakes of arsenic may exceed the tolerable intake, this value applies to inorganic arsenic only whereas most of the arsenic in the diet is in the less toxic organic forms. Therefore, we do not consider the concentrations of arsenic in free foods to be a cause for concern. There are no relevant tolerable intakes for the metals chromium, manganese, platinum and titanium against which to compare estimated dietary intakes. However, where the results of previous surveys are available, the concentrations of each element in wild edible fungi and

blackberries would not contribute appreciably to the total dietary intake of that element.

10. Therefore, we *conclude* that the concentrations of the elements arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, platinum, tin, titanium and zinc in fungi and blackberries collected in the wild do not provide any cause for concern for individuals eating these foods.

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## References

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