

## **Risk in Brief: Aluminium in Food**

### **Introduction**

1. There have been media reports from time to time about high levels of aluminium being detected in various food products such as fried fritters, doughnuts, steamed bread, leavened snacks, seaweed, jellyfish, etc. The high levels of aluminium in these food items were likely due to the use of aluminium-containing food additives.
2. Aluminium exposure particularly from food with the use of aluminium-containing food additives, has attracted global attention in recent years. Many international and national authorities have been working towards a lowered dietary exposure of aluminium from food through restricting the use of aluminium-containing food additives or promulgating alternative additives and/or processing techniques in food production.

### **Nature, Uses and Sources**

1. Aluminium is a silvery-white metal with light weight and is the most abundant metallic element of the earth's crust.
2. Aluminium metal has a wide variety of uses including cooking utensils, food packaging such as beverage cans and foil, as well as other industrial uses. Aluminium compounds such as sulphate, phosphate, hydroxide and silicate, have a wide variety of applications including food processing (e.g. food additives), water treatment (e.g. coagulants), consumer products (e.g. antiperspirants) and medicinal products (e.g. antacids).
3. Aluminium can be present in food at higher levels owing to the use of aluminium-containing food additives, which has been regarded as the main dietary source. Aluminium is also present in food naturally and in drinking water due to its use in water treatment, normally at low levels, or due to the use of aluminium cooking utensils and foil, in which the magnitude of this increase is generally not of practical importance.

### **Public Health Significance**

1. Aluminium compounds have the potential to affect the development of experimental animals. The neurotoxicity potential for aluminium

has attracted particular attention due to a speculated association with Alzheimer's disease.

2. According to the scientific opinion published by the European Food Safety Authority (EFSA) in July 2008, it was considered that, based on the available scientific data, exposure to aluminium through food did not present a risk for developing Alzheimer's disease. Similarly, according to the evaluations conducted by the Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives (JECFA) in 2006 and 2011, it was considered that there was minimal information from the epidemiology literature about the association between intake of aluminium in food and neurological conditions, and that no crucial epidemiological studies were available for risk assessment at the time of the evaluation.
3. At the latest evaluation in 2011, JECFA allocated a Provisional Tolerable Weekly Intake (PTWI) of 2 mg/kg body weight (bw) to all aluminium compounds in food including food additives. PTWI is an estimate of the amount of a chemical that can be ingested over a lifetime without appreciable risk. An intake above the PTWI does not automatically mean that health is at risk. Transient excursion above the PTWI would have no health consequences provided that the average intake over long period is not exceeded as the emphasis of PTWI is a lifetime exposure.

### **Local Studies**

1. A risk assessment study published by the Centre for Food Safety (CFS) in May 2009 showed that aluminium-containing food additives were widely used in the production of steamed bread/bun/cake, some bakery products such as muffin, pancake/waffle, coconut tart and cake, and jellyfish. The average dietary exposure to aluminium of a 60-kg adult was estimated to be 0.60 mg/kg bw/week, which accounted for 60% of the old PTWI (1 mg/kg bw) established by JECFA in 2006. With reference to the latest PTWI (2 mg/kg bw) established by JECFA in 2011, the average dietary exposure to aluminium would account for 30% of the latest PTWI. The study results indicated that the average dietary exposure was unlikely to cause adverse health effect of aluminium for the general population.

2. According to the First Hong Kong Total Diet Study Report No. 5 on Metallic Contaminants published by the CFS in January 2013, dietary exposures to aluminium in average and high consumers of the population were 0.60 mg/kg bw/day and 1.5 mg/kg bw/day which accounted for 30% and 77% of the latest PTWI (2 mg/kg bw), respectively. On this basis, the general population was unlikely to experience major undesirable health effects of aluminium.

### **Regulatory Control**

1. Aluminium-containing food additives can be used in food processing as firming agent, raising agent, stabiliser, anticaking agent and colouring matter, etc. and some are permitted to be used in food in many countries such as the United States (US), the European Union (EU), Australia, New Zealand, Japan and Mainland China, etc.
2. In Hong Kong, according to the Colouring Matter in Food Regulations, the aluminium salts (lakes) of any of the permitted water-soluble colours and aluminium in leaf or powder form solely for external colouring of dragees and decoration of sugar-coated flour confectionery are permitted colouring matters in Hong Kong. As for the other aluminium-containing food additives, there is no specific subsidiary legislation to govern their uses. Nevertheless, the Public Health and Municipal Services Ordinance stipulates that all food on sale in Hong Kong must be fit for human consumption. In addition, the Food and Drugs (Composition and Labelling) Regulations require that if a prepackaged food contains a food additive including aluminium-containing food additive, such additive should be listed in the ingredient list with its specific name or identification number, and its functional class.

### **Advice to the Public**

1. Maintain a balanced and varied diet so as to avoid excessive exposure to aluminium from a small range of food items.
2. Make reference to the information in the ingredient list on food label and look for the names of aluminium-containing food additives or their identification numbers (e.g. 520, 521, 522, 523, 541, 554, 555, 556, 559) for making informed choices.

## **Advice to the Trade**

1. Reduce the use of aluminium-containing food additives in preparing food or replace them with other alternatives as far as possible.
2. Develop alternative techniques to reduce the use of aluminium-containing food additives during food processing.
3. Provide accurate information on food labels including specific food additives being used.

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