

Monitoring of chlorate in fruit and vegetables

Research programme: Chemical hazards in food and feed

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Conducted by: Fera

Background

Chlorate was an EU-approved herbicide until 2008, when its approval was withdrawn. Due to the way in which plant protection product legislation (Regulation 396/2005) is applied, from 2010 any chlorate present in food became subject to a default limit of 0.01 mg/kg, based on the assumption that, as a non-approved herbicide, it should not be present in food. It has subsequently become apparent that chlorate can arise in food for many reasons including as an impurity from the use of chlorine-based disinfectants in food processing and the use of hypochlorite and chlorine dioxide in water treatment. There is no regulatory limit for chlorate in drinking water but WHO guidance allows a level of up to 0.7 mg/kg. An initial risk assessment by EFSA recommended that further monitoring and more information on the impact of food processing on chlorate residues should be collected, and the European Commission agreed to the suspension of enforcement while the MRL was reviewed. This project was carried out to generate data to support the UK position in negotiations.

Objective and Approach

89 samples of fruit, fruiting vegetables (tomatoes, cucumbers etc.), herbs, leafy greens, root vegetables, brassicas, legumes and liquid milk were collected between 2014 and 2015, including 22 samples directly from farms and for which the growing conditions were therefore known. 59 samples were of UK origin, 13 from Spain, 2 from Italy and the remainder from various Third countries. The foods targeted were among those previously reported to contain raised levels of chlorate. They were tested for chlorate using an analytical methodology adapted from a European Reference Laboratory method and based on acidified methanol / water extraction followed by ion chromatography and tandem mass-spectrometry. The limit of detection for the method was 0.005 mg/kg.

Results

89 samples comprising fruit, vegetables, herbs and milk were tested for chlorate. Of these, 29 contained chlorate above the existing MRL of 0.01 mg/kg. In all but three of the remaining samples, chlorate was below the limit of detection of 0.005 mg/kg. The results did not raise any health concerns.

Research report

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