

An investigation of perchlorate levels in fruit and vegetables consumed in the UK

Area of research interest: [Chemical hazards in food and feed](#)

Study duration: 2013-11-01

Project code: FS102077

Conducted by: Fera

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Background

The study gathered information and data on the presence of perchlorate in food, in particular, fruits and vegetables especially leaf vegetables, fresh herbs and celery grown in glasshouses and cloches.

Perchlorate occurs naturally in the environment and can be formed in the atmosphere and precipitate into soil and groundwater. Perchlorate also occurs as an environmental contaminant arising from the manufacture, use and disposal of ammonium perchlorate used in rocket propellants, explosives, fireworks, flares and air bag inflators and from the use of nitrate fertilizers. Perchlorate can also be formed during the degradation of sodium hypochlorite used to disinfect water.

Water, soil and fertilizers are therefore considered to be potential sources of perchlorate contamination in food.

The study, in response to a European Commission Recommendation on the monitoring of the presence of perchlorate in food, provided new information and data that has helped inform on-going EU discussions on maximum limits of perchlorate in food which are likely to be introduced sometime in the future.

The [European Commission has previously issued a statement on the presence of perchlorate in food](#).

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Research Approach

Levels of perchlorate were measured in all samples of fruits, vegetables, milk and infant food collected during the period of the study. Where possible, samples of UK grown fruits and vegetables were sourced directly on-farm and associated soil and irrigation water also sampled.

The 342 sampled foods comprised of a wide range of fruits, vegetables and other foods such as milk and infant food and included:

- apples, oranges, lemons and melon
- strawberries, blackberries, blueberries and grapes
- beetroot, carrot, parsnip, potato and swede
- broad beans, runner beans and peas
- broccoli, Brussels sprouts, cauliflower and cabbage

- fresh herbs
- milk (on-farm and retail)
- infant food.

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Key findings

The results of the study indicated that of the 342 food samples tested, 77 samples were found to contain perchlorate with one infant food sample and one cabbage sample exceeding the reference levels for intra-Union trade. Note that these are not legal maximum levels, but are the levels included in the European Commission statement as regards the presence of perchlorate in food to facilitate intra-Union trade, in advance of further data on occurrence required to establish legal maximum levels. Key findings were:

1. **Infant food:** 80 infant food samples were tested with 7 samples found to contain perchlorate. One sample was found to contain perchlorate above the reference level for intra-Union trade.
2. **Fruit** (e.g. apples, oranges, strawberries): 36 fruit samples were tested with 5 samples found to contain perchlorate.
3. **Fruiting vegetables** (e.g. tomato, cucumber): 27 samples of fruiting vegetables were tested with 5 samples found to contain perchlorate.
4. **Herbs** (e.g. parsley, thyme, rosemary): 33 samples of herbs were tested with 27 of these samples found to contain perchlorate.
5. **?Leafy vegetables** (e.g. broccoli, spinach, lettuce): 40 samples of leafy vegetables were tested with 20 of these samples found to contain perchlorate.
6. **?Root vegetables** (e.g. carrot, parsnip, potato, swede): 32 samples of root vegetables were tested with 4 samples found to contain perchlorate.
7. **?Miscellaneous vegetables** (e.g. cauliflower, Brussels sprouts, cabbage): 55 samples of miscellaneous vegetables were tested with 9 samples found to contain perchlorate, one of which being a Tenderheart cabbage found to contain perchlorate above the reference level for intra-Union trade.?
8. **Milk** (e.g. semi-skimmed milk, whole milk): 39 milk samples were tested and none found to contain perchlorate??.

Research report

England, Northern Ireland and Wales

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England and Northern Ireland

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