



Analysis of Nicotine

Vegetable and Animal Products in the spotlight

Nicotine is an alkaloid which naturally occurs in solanaceous plants such as the tobacco plant *Nicotiana tabacum* and, in smaller quantities, in potatoes, tomatoes and egg plants.

Until well into the 1970s, nicotine was used as a pesticide, which is now prohibited. However, within tobacco brew it is a common household remedy to combat plant lice.

In 2006, traces of nicotine were found in chicken eggs and in 2009, they were increasingly found in ceps. In 2011 increased levels of nicotine in raw materials for tea, herbs and spices of European and non-European origin were reported. As a consequence, the European Union has established maximum residue levels in a number of additional commodity groups in August 2011.

Toxicology

In small concentrations, nicotine has a stimulating effect. In higher concentrations, however, it is a strong neurotoxin. In 2009, the European Food Safety Authority (EFSA) has set up an acceptable daily intake (ADI) and an acute reference dose (ArfD) of both 0.0008 mg/kg body weight only.

Regulatory Provisions

Within Europe, maximum residue levels (MRLs) in food are harmonised in Regulation (EC) No. 396/2005. For substances without an established MRL, a default limit of 0.01 mg/kg applies.

Within recent years the EU established new MRLs for **mushrooms, herbs, spices and tea**, which are clearly above the formerly valid default limit of 0.01 mg/kg (see table below).

In assessment 006/2008 by the German Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung – BfR), no harm to consumer health was seen concerning nicotine in chicken eggs which are loaded with less than 300 µg/kg nicotine.

Analysis

Our experts from the Competence Centre for organic contaminants as well as veterinary drug residues have longterm experience in the analysis of nicotine from various vegetable and animal matrices. Generally, we apply liquid chromatography with tandem-mass spectrometry.

Commodity Group	MRL [mg/kg]
Wild fungi	0,04
Dried ceps	2,3
Dried wild mushrooms other than ceps	1,2
Small fruits and berries	0,3
Herbs	0,4
Tea (dried leaves and stalks, fermented or otherwise of <i>Camellia sinensis</i>)	0,6
Herbal infusions (flowers, leaves, roots and others)	0,5
Spices (seeds, fruits, berries)	0,3
Spices (bark, roots, rhizomes, buds, flower stigma, arils)	4

Tab. 1: Maximum residue levels (MRLs) for nicotine in mushrooms, herbs, tea and spices (EC) No. 396/2005



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