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BfR
German Federal Institute for Risk Assessment

„Hot chilli peppers“
Health risks of capsaicin(oids)

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Hot chilli peppers

Emerging risk "Challenges with extremely hot chips"

- Poisoning cases, including hospitalizations and even some fatalities have been associated with exposure to extremely hot chips

- Approx. 40 cases associated with oral exposure to hot chips were registered by German poisoning centres between 2021 and 2023

  ⇨ Severity: mostly mild and some moderate clinical symptoms

  ⇨ Symptoms: include gastrointestinal and circulatory complaints

Hot tortilla chips

Hot chilli peppers

Relevant ingredients

- Capsaicinoids
- Occurrence in *Capsicum* species in highly variable amounts (< 0,3 to > 1 % per dried matter)

- Total capsaicinoids

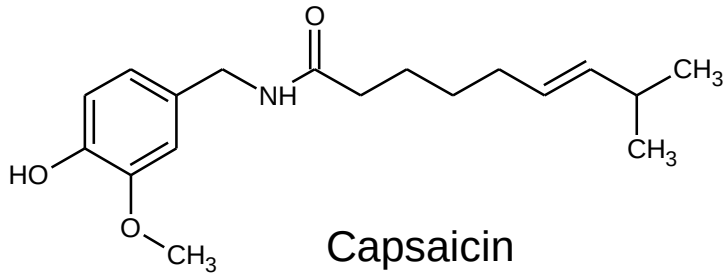
Capsaicin	→ 63-77 %	→ 16,000,000 Scoville
Dihydrocapsaicin	→ 20-32 %	→ 16,000,000 Scoville
Nordihydrocapsaicin	→ 1-8 %	→ 9,100,000 Scoville
Minor congeners		

Various *Capsicum* species

Hot chilli peppers

Hazards of capsaicinoids following oral ingestion

- Gastrointestinal irritation
- Neurophysiological effects (blood pressure alterations etc.)



Capsaicin

Mode of action

- Capsaicinoids: agonistic activity at TRPV1 (heat receptor), located, e.g., at sensory peripheral neurons

  (a) Signal transduction to the CNS

  → Pain sensation

  (b) Release of substance P and calcitonin gene-related-peptide (CGRP)

  → Activation of the unspecific immune system

  → Neurogenic inflammation (e.g. vasodilatation)

Hot chilli peppers

Risk assessment

- BfR´s current risk assessment is based on detrimental effects to the stomach mucosa observed in a human intervention study (Myers et al. 1987)
  - Parietal secretion, Pepsin secretion, Gastric cell exfoliation (reflected by DNA loss into gastric content)

→ NOAEL: 8,3 mg hot chilli pepper/kg bw corresponding to approx. 12-83 µg capsaicin/kg bw

→ LOAEL: 25 mg hot chilli pepper/kg bw corresponding to approx. 36-250 µg capsaicin/kg bw

BfR is currently working on an updated risk assessment for capsaicin(oids)

Hot chilli peppers

Challenges for risk assessment

- Activation of TRPV1 leads to a very complex downstream effect cascade affecting certain endpoints
- Effect vs. adversity (relevance of certain endpoints)
- High interindividual (and also intraindividual) variability in susceptibility
  - Tolerance development
- Relevance of matrix effects
- Relevance: systemic dose vs. local (bolus) concentration at gastrointestinal mucosa

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