

Qutenza

MR (F)

Grunenthal Sweden

Kutant plåster 179 mg

(Genomskinligt plåster, 14 x 20 cm)

Lokalanestetikum

Aktiv substans:

Kapsaicin

ATC-kod:

N01BX04

Läkemedel från Grunenthal Sweden omfattas av Läkemedelsförsäkringen.

Miljöpåverkan

Kapsaicin

Miljörisk: Användning av capsaicin har bedömts medföra försumbar risk för miljöpåverkan.

Nedbrytning: Capsaicin bryts ned i miljön.

Bioackumulering: Capsaicin har låg potential att bioackumuleras.

Detaljerad miljöinformation

Environmental Risk Classification

Predicted Environmental Concentration (PEC)

PEC is calculated according to the following formula:

$$\text{PEC } (\mu\text{g/L}) = (A \cdot 10^9 \cdot (100 - R)) / (365 \cdot P \cdot V \cdot D \cdot 100) = 1.5 \cdot 10^{-6} \cdot A \cdot (100 - R)$$

$$\text{PEC} = 0.000000663 \mu\text{g/L}$$

Where:

A = 0,40159325 kg (total sold amount API in Sweden year 2016, data from QuintilesIMS). Reduction of A may be justified based on metabolism data.

R = 98.9% as the maximum cutaneous dose absorbed of the drug substance in the patch is 1.1% (Ref. III). The patch administration is carried out under medical supervision. After patch removal, the patch, containing ca. 98.0% of the total drug substance is disposed as biohazard waste. Biohazard waste is usually incinerated and does therefore not enter the terrestrial or aquatic environment.

P = number of inhabitants in Sweden = $9 \cdot 10^6$

V (L/day) = volume of wastewater per capita and day = 200 (ECHA default) (Ref. I)

D = factor for dilution of waste water by surface water flow = 10 (ECHA default) (Ref. I)

Predicted No Effect Concentration (PNEC)

Ecotoxicological studies

Algae (Selenastrum capricornutum) (guideline eg OECD 201) (Reference II):

EC₅₀ 72 h (endpoint) = 5.114 mg/L

Fish (Brachydanio rerio):

Acute toxicity

LC₅₀ 96 h (endpoint) = 5.98 mg/L (guideline eg OECD 203) (Reference II)

Mussel (Dreissena polymorpha):

Acute toxicity

EC₅₀ 48 h (endpoint) = 4,9 mg/L (guideline eg ASTM E2455) (Reference IV)

Other ecotoxicity data:

PNEC = 0.49 µg/L (justification of chosen assessment factor (AF) - see below)

The PNEC in water environment can be calculated by dividing the lowest LC₅₀ with an assessment factor (AF). Among the toxicity data from the references and study presented in Ref II, the lowest value of LC₅₀/EC₅₀ is 4.9 mg/L. The value of AF depends on the number of available toxicity tests. With the toxicity data mentioned above, 10 000 is the conservative and protective AF for the calculation of the PNEC.

Environmental risk classification (PEC/PNEC ratio)

PEC/PNEC = $0.000000663/0.49 = 0.000001352$, i.e. PEC/PNEC ≤ 0.1 which justifies the phrase "Use of Capsaicin has been considered to result in insignificant environmental risk."

Degradation

Biotic degradation

Ready degradability:

Test results eg 67.3-73.7% degradation in 14 days (guideline eg OECD 301B). (Reference II)

Justification of chosen degradation phrase:

The biodegradation mainly occurred from the 5th day to the 17th day. More than 60% of inorganic carbon was produced within the 10 d window. It can be concluded that capsaicin is readily biodegradable under aerobic conditions according to the criteria of the OECD standard procedure (OECD 301B).

The phrase "Capsaicin is degraded in the environment" is thus chosen.

Bioaccumulation

Bioconcentration factor (BCF): 47-170 (Ref. II)

Partitioning coefficient:

e.g. $\log K_{ow} = 3.5$ at pH 7 (guideline eg OECD 107). (Reference III)

Justification of chosen bioaccumulation phrase:

Since $BCF < 500$, the substance has low potential for bioaccumulation.

Excretion (metabolism)

Potential human capsaicin metabolites were determined in vitro. The pharmacokinetics of metabolites in humans could not be determined in clinical trials (below Limit of Quantification) (Ref. III). The pharmacological activity of the metabolites is not known.

References

- I. ECHA, European Chemicals Agency. 2008 Guidance on information requirements and chemical safety assessment.
http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_en.htm
- II. Chemosphere 104 (214) 85-90 "Environmental risk assessment on capsaicin used as active substance for antifouling systems on ships"; Jianbing Wang, Ting Shi, Xialong Yang, Wenya Han, Yunrui Zhou.
- III. EMEA/CHMP/95213/2009: CHMP ASSESSMENT REPORT FOR QUTENZA
- IV. American Society for Testing and Materials. ASTM E2455. Standard Guide for Conducting Laboratory Toxicity Tests with Freshwater Mussels