

**OPINION OF THE MEMBER STATE COMMITTEE
ON THE IDENTIFICATION OF**

**1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one
(3-benzylidene camphor)**

AS A SUBSTANCE OF VERY HIGH CONCERN

**According to Articles 57 and 59 of
Regulation (EC) 1907/2006¹**

Adopted on 8 June 2016

This opinion concerns

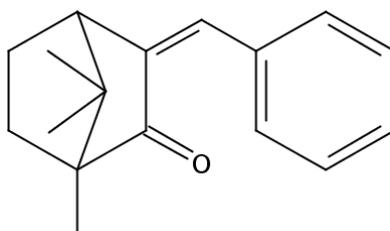
Substance name: 1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one (3-benzylidene camphor)

EC number: 239-139-9

CAS number: 15087-24-8

Molecular formula: C₁₇H₂₀O

Structural formula:



¹Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

Germany (dossier submitter) presented a proposal in accordance with Article 59(3) and Annex XV of the REACH Regulation (25 February 2016, submission number SPS-011980-16-1) on identification of *1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one* (*3-benzylidene camphor*) as a substance of very high concern with endocrine disruptive properties.

The Annex XV dossier was circulated to Member States on 29 February 2016 and the Annex XV report was made available to interested parties on the ECHA website on the same day according to Articles 59(3) and 59(4).

Comments were received from both Member States and interested parties on the proposal.

The dossier was referred to the Member State Committee on 17 May 2016 and was discussed in the meeting on 6-9 June 2016 of the Member State Committee.

MSC **did not reach** unanimous agreement on this proposal related to endocrine disruption properties of 3- benzylidene camphor to **environment** giving rise to an equivalent level of concern.

Pursuant to Articles 59 (9) and 85 (8) of REACH in order for the Commission to draft a proposal on the identification of the substance in accordance with the procedure outlined in Article 133 (3) of the REACH Regulation, the Member State Committee provides this opinion, consisting of the position of the majority of its members, including its grounds.

Two MSC members expressed a minority position, including their justification, that is made available in a separate document.

In accordance with Article 59 (9), a final decision on the identification of 3-benzylidene camphor shall be taken in accordance with the procedure referred to in Article 133 (3).

Opinion of the Member State Committee in accordance with Article 59(8):

***1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one* (*3-benzylidene camphor*) should be identified as a substance of very high concern, meeting the criteria of Article 57 (f) of Regulation (EC) 1907/2006 (REACH), because it is a substance with endocrine disrupting properties for which there is scientific evidence of probable serious effects to the environment which give rise to an equivalent level of concern to those for other substances listed in paragraphs (a) to (e) of Article 57 of REACH.**

UNDERLYING ARGUMENTATION FOR IDENTIFICATION OF SUBSTANCE OF VERY HIGH CONCERN

Endocrine disrupting properties – Article 57(f):

The *in silico*, *in vitro* and *in vivo* data presented and discussed within this dossier provide sufficient evidence to conclude that 1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one (3-BC) acts via an endocrine mode of action and that this endocrine activity leads to adverse effects in fish. Hence, 3-BC fulfils the WHO/IPCS definition of an endocrine disruptor for the environment.

The specific mode of action of 3-BC (estrogen receptor agonist and/or androgen receptor antagonist), the effects observed *in vivo* in fish and supporting information as reviewed by Hass et al. (2012) in rodent species as well as the comparison of these effects with known endocrine disruptors acting via the same molecular mode of action provide strong evidence that the endocrine mediated effects of 3-BC are of equivalent level of concern for the environment as those of PBT/vPvB and CMR substances. In detail, the following evidence of probable serious effects and reasons for their equivalent level of concern could be identified for 3-BC:

- The identified main mode of action (estrogenic and/or antiandrogenic) of 3-BC is comparable to that of known endocrine active substances like bisphenol A (EC No. 201-245-8) or ethinylestradiol (EC No. 200-342-2) and already identified endocrine disrupting chemicals under REACH like 4-nonylphenol, branched and linear and 4-tert-octylphenol (EC No. 205-426-2). Based on *in vitro* data 3-BC also shows antiprogesteric activity.
- It is probable that 3-BC causes irreversible and long lasting effects on wildlife populations and that even short term exposures during sensitive life stages of such organisms can have adverse effects during the entire life time.
- The specific mode of action (estrogenic and/or antiandrogenic) of 3-BC and the data available for fish and supporting information as reviewed by Hass et al. 2012 in rodent species point to a broad range of taxa that might be affected by exposure to 3-BC in the environment. This is due to the fact that the estrogen and androgen receptor proteins are highly conserved across different species. Binding agonistically to the estrogen receptor and/or antagonistically to the androgen receptor was identified in various *in vitro* studies to be the molecular initiating event leading to the endocrine activity of 3-BC. Mechanistic knowledge about invertebrate hormone receptors shows that also invertebrate species might

be affected by 3-BC.

- It is likely that the effects are adverse not only for single organisms but also for populations and/or subpopulations in the environment.
- Similar to certain other substances of very high concern it is difficult to quantify a safe level for 3-BC in the environment and therefore the risks using traditional risk assessment methods.

In addition to the endocrine disrupting properties, 3-BC shows the potential to be persistent and bioaccumulative at a screening level.

Taking together the evidence presented in this dossier, 3-BC is a substance of very high concern according to REACH Art. 57 (f) owing to its endocrine disrupting properties, which lead to probable serious effects in intact organisms in the environment. The specific adversity of these effects demonstrates the equivalent level of concern to those of other substances listed in points (a) to (e) of article 57 of REACH.

Taking into account all available information on the intrinsic endocrine disrupting properties of *1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1]heptan-2-one (3-benzylidene camphor)* and its adverse effects, it is concluded that should be regarded as a substance for which there is scientific evidence of probable serious effects to the environment which gives rise to an equivalent level of concern to those of other substances listed in points (a) to (e) of Article 57 of REACH.

Reference:

Support Document to the MSC opinion for *1,7,7-trimethyl-3-(phenylmethylene)bicyclo[2.2.1] heptan-2-one (3-benzylidene camphor)* (Member State Committee, 8 June 2016)