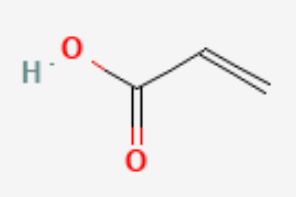
Additive Toxicity Statement
2-Propenoic Acid

DESCRIPTION

Name	2-Propenoic acid
IUPAC name	Prop-2-enoic acid
CAS no	79-10-7
EINECS no.	201-177-9
Molecular formula	$C_3H_4O_2$
Structural formula	
Molecular weight (g/mol)	72.06

CLP HEALTH HAZARD CLASSIFICATION

This ingredient has been classified under Regulation (EC) No 1272/2008 of the European Parliament and of the Council and is in the classification and labelling inventory.

The CLP classifications of this ingredient are not considered applicable for one, or more, of the following reasons:

- the level required to elicit a response in a toxicological study, with a relevant route of exposure, is far higher than that of its use in BAT products
- the toxicological effect identified does not relate to the route of exposure associated with its use in BAT products
- no relevant toxicological study was identified relating to the route of exposure, and there is only limited consumer exposure to this ingredient associated with its use in BAT products

AVAILABLE STUDIES

The available toxicity studies indicated in the Commission Implementing Decision (EU) 2015/2186 have been provided as a bibliography of published papers. The studies were obtained by BAT for toxicological assessments, to ensure that additives do not increase the inherent risk associated with the use of our products.

The risk assessment starts with a comprehensive search for relevant papers, using the additive's name, major synonyms and CAS Registry Number. The main sources searched are: TRACE[1],

Toxnet[2], RTECS[3], TSCATS[4], INCHEM[5], Europa Food Flavouring[6], ECHA[7], EAFUS[8], ChemIDplus[9] and eChemportal[10].

RISK ASSESSMENT

Toxicological assessments are carried out by our scientists (including a number of European Registered Toxicologists (ERT)) at our Research and Development facilities in the UK. Our approach excludes the use of formally classified genotoxicants, non-threshold carcinogens, mutagens, reproductive and developmental toxicants as additives. Based on Levels of Concern and weight-of evidence, our approach ensures that additives are used at levels lower than the relevant toxicological reference value.

Following a comprehensive search for all available toxicological information, our toxicologists select the most appropriate studies for evaluation for the intended route of exposure. To do this, our toxicologists evaluate the quality of all pertinent studies identified and the data used. The evaluation of data quality includes an assessment of its relevance and reliability as well as the adequacy of the information for hazard/risk assessment purposes, following the principles described by Klimisch *et al*[11].

In the majority of BAT's products, a number of the additives are heated or combusted. The effects of heating or combustion on additive toxicity, have been addressed by extensive testing. The results of pyrolysis, smoke chemistry, *in vitro* cytotoxicity, *in vitro* genotoxicity, inhalation toxicity and tumourigenicity studies have been widely published in peer-reviewed journals. These studies are included in our risk assessments where applicable by product class.

Examples of our assessment processes can be found in published literature for example:

- An overview of the effects of tobacco ingredients on smoke chemistry and toxicity[12]
- An approach to ingredient screening and toxicological risk assessment of flavours in e-liquids[13]
- Contact sensitisation risk assessment approach for pouched snus ingredients[14]
- Assessment of the irritation potential of Swedish snus ingredients using the Epioral™ tissue model[15]

Further examples of our scientific publications are available at www.bat-science.com.

Health risks of tobacco use have primarily been determined in long term human epidemiological studies. For example, the smoking population in countries such as Canada, Australia and the UK have historically smoked Virginia style cigarettes, which contain few additives. In other countries such as the US and Germany smokers prefer American-blended style cigarettes, which contain significantly more additives. Notwithstanding the distinction in historical use of additives in these countries, there appears to be no obvious difference in the relative risks of cigarette smoking for these types of cigarette, or on the incidence of diseases such as lung cancer and chronic obstructive pulmonary disease[16], suggesting that the addition of additives to cigarettes may not increase the incidence of diseases associated with smoking.

ADDICTIVENESS

In its 2010 opinion on Addictiveness and Attractiveness of additives[17], SCENIHR came to the clear conclusion that no additive could be identified which has an "addictive" effect in isolation, and that there are no indications that additives increase the "addictive" effect of nicotine itself. In a more recent final opinion[18], SCENIHR reviewed 1260 additives and selected only 14 substances for further study because of their contribution to addictiveness to smoking.

CONCLUSION

Based on the available scientific evidence, BAT's scientists have concluded that the additives used in BAT's tobacco products, do not add to the toxicological risks of using those products.

1. Available at: http://www.bibra-information.co.uk/supported access to our chemical toxicology database TRACE.html
2. Available at: http://toxnet.nlm.nih.gov/index.html
3. Available at: http://ccinfoweb.ccohs.ca/rtecs/search.html
4. Available at: http://www.srcinc.com/what-we-do/databaseforms.aspx?id=384
5. Available at: http://www.inchem.org/
6. Available at: http://ec.europa.eu/food/food/chemicalsafety/flavouring/database/dsp_search.cfm
7. Available at: http://echa.europa.eu/information-on-chemicals
8. Available at: http://www.accessdata.fda.gov/scripts/fcn/fcnNavigation.cfm?rpt=eafusListing
9. Available at: http://chem.sis.nlm.nih.gov/chemidplus/chemidheavy.jsp
10. Available at: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
11. Klimisch, H.J., Andreae, E., Tillmann, U., (1997). A systematic approach for evaluating the quality of experimental and ecotoxicological data. *Regul. Toxicol. Pharmacol*. 25, 1–5.
12. R. R. Baker, E. D. Massey and G. Smith. An overview of the effects of tobacco ingredients on smoke chemistry and toxicity. Food Chem. Toxicol. 42 Suppl:S53-S83, 2004.
13. S. Costigan and C. Meredith. An approach to ingredient screening and toxicological risk assessment of flavours in e-liquids. Regul. Toxicol. Pharmacol. 72 (2):361-369, 2015.
14. B. Lang, S. Costigan, S. Goodall and C. Meredith. Contact sensitisation risk assessment approach for pouched snus ingredients. Toxicology Letters 229S:S109, 2014. (Abstract)
15. L. Neilson, S. Faux, S., Hinchcliffe, T. Jai and C. Meredith. Assessment of the irritation potential of swedish snus ingredients using the epioral™ tissue model. Society of Toxicology, Baltimore, USA, March 15-19th. The Toxicologist, Volume 108, no 1, pg 307-308 (March 2009) (Conference Poster)
16. World Health Organisation, 2004. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Volume 83. Tobacco smoke and involuntary smoking. p 171. International Agency for Research on Cancer (IARC), Lyon, 2004
17. SCENIHR, 2010. Addictiveness and Attractiveness of Tobacco Additives. The Scientific Committee on Emerging and Newly Identified Health Risks. ISBN 978-92-79-12788-5. European Union. Available at: http://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_029.pdf.
18. SCENIHR, 2015. Final Opinion on Additives used in Tobacco Products (Opinion 1). The Scientific Committee on Emerging and Newly Identified Health Risks. European Union. Available at: http://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_051.pdf.

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APPENDIX

Statement:
This ingredient has been assessed by BAT for its toxicity and carcinogenic, mutagenic or toxic for reproduction (CMR) properties. Based on an investigation of available and relevant internal and external data, it has been concluded that this ingredient does not have any CMR properties. Furthermore, this ingredient is not subject to a harmonised classification as CMR under CLP (1272/2008).