

General information

The tobacco industry is made up of many companies that make and sell different types of tobacco products. Whether it is smoked, chewed, sniffed or inhaled second-hand, the use of these tobacco products can and does cause debilitating and life-threatening diseases, as well as premature death. The cigarette is the single most commonly used tobacco product in the European Union (EU). Most people are aware that smoking cigarettes is harmful, as thousands of compounds are produced and released in the smoke, some of which (hundreds) are toxic. But what people may not be aware of is that most tobacco manufacturers add ingredients other than tobacco to cigarettes that affect the chemical make-up of the smoke. These ingredients are known as tobacco additives and are reportedly used, for example, to:

- give a cigarette a particular flavour;
- control the way the cigarette burns;
- keep the tobacco moist thus preventing it from drying out.

To some people, the reasons for adding these substances to a consumer product may appear perfectly reasonable. They may argue that this is not necessarily a bad thing as it makes for a better consumer experience. However, helping people to better tolerate and enjoy a product like cigarettes, which is well known to be toxic and carcinogenic, is an entirely different issue and a matter of great concern.

Additives can make cigarettes more attractive by disguising some of the undesirable effects of inhaling burnt tobacco. For example, they:

- mask the bitter taste and harsh smell of the smoke that is inhaled;
- make the inhaled smoke milder, reducing the irritation of the airways (which essentially silences any warning that the smoke is dangerous);
- turn the ash and smoke white;
- improve the appearance of cigarettes.

Ultimately, by using additives, tobacco manufacturers encourage cigarette use in people who may otherwise be deterred from smoking due to the unfavourable characteristics of raw tobacco. The more pleasant the cigarette, the easier it is for a smoker to sustain their habit, and therefore the more likely it is that they could become addicted.

Studies have also shown that burning tobacco additives can result in the formation of harmful compounds. However, it is very difficult to consider the effects of a single additive in isolation due to the overall combined effect of all the chemicals present in the tobacco smoke. Moreover, the burnt derivatives of some additives are also known to indirectly boost the effects of nicotine on the brain (nicotine being the main reason why people become addicted to smoking).

Despite this, the tobacco industry is allowed to use additives and continues to do so, on the basis that they have been considered safe for use in food or cosmetics by relevant regulatory authorities. However, this is not a sufficiently scientific basis upon which to justify their use in tobacco products. This is because people do not generally consume/use these food and cosmetic products in a state where the additives are burnt (from being exposed to very high temperatures) and then inhaled. In food and cosmetic goods, consumers are exposed to these additives in a completely different way to how they would be exposed to them through smoking tobacco products. Therefore, these additives should not be considered to have comparable effects on the body when consumed in this way. Furthermore, the fact that these additives can make tobacco products more attractive and increase their use is particularly concerning given the toxic and addictive nature of tobacco products.

Tobacco manufacturers also market 'natural' or 'clean' cigarettes that reportedly have no chemicals or additives. However, potential consumers of these cigarettes are reminded that there is no such thing as a safe cigarette, because the smoke that is produced still contains carcinogens and other toxic compounds that come from the tobacco itself.

Take home message:

Tobacco manufacturers make cigarettes more attractive, which encourages their use, and makes it easier for anyone smoking to become addicted.

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This fact sheet on the tobacco additive *acetaldehyde* has been created by the National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands. It is part of a series of 14 fact sheets on tobacco additives written in the context of the EU project Public Information Tobacco Control

(PITOC). The fact sheets aim to inform the public on the general uses, tobacco industry uses and harmful health effects of selected tobacco additives.

Seven of these fact sheets have been created by the RIVM, and seven by the German Cancer Research Center, (DKFZ), Heidelberg, Germany. The introduction is a common product. The electronic versions of the fact sheets can be found on the RIVM website www.tabakinfo.nl (sugars, sorbitol, propylene glycol, glycerol, ammonium compounds, cocoa, furfural and acetaldehyde) and the DKFZ website <http://www.dkfz.de/de/tabakkontrolle> (menthol, carob bean, cellulose fibre, prune juice, vanillin, guar and licorice).

Additives in Tobacco Products

Acetaldehyde

Additives are substances intentionally added to tobacco products by tobacco industry in order to render toxic tobacco products palatable and acceptable to consumers.

Acetaldehyde is a substance produced in the body during metabolism, for e.g. when alcohol is broken down by the body. It occurs widely in nature as a chemical by-product in plants and many organisms. It is also naturally present in various food items such as ripened fruit, coffee, and bread. Acetaldehyde is described as having a refreshing taste, and a fruity and musty odour.

General uses

Acetaldehyde is commonly used to help make other industrial chemicals. It is used as a solvent in the rubber, tanning and paper industries, and as a preservative for fruit and fish. It is also used as a flavouring agent.

Reported tobacco industry uses

Tobacco manufacturers do not use acetaldehyde as an additive in cigarettes. However, other tobacco additives (such as sugars, sorbitol and glycerol) produce acetaldehyde, which is released in the cigarette smoke, when burnt.

The smoke that is inhaled from smoking a single cigarette (i.e. mainstream smoke) contains on average 1 milligram of acetaldehyde. However, some cigarettes can produce double this amount. This makes acetaldehyde a major component of cigarette smoke (after tar, nicotine and carbon monoxide).

Harmful health effects

Acetaldehyde is a very reactive compound, which is known to react with many compounds in the body. Acetaldehyde causes irritation of the airways, and has been classed as a possible cancer-causing agent by the expert cancer organisation IARC (the International Agency for Research on Cancer).

Acetaldehyde is indirectly harmful due to its potential to cause smoking dependence. This would ultimately cause smokers to be exposed to higher levels of the toxic substances in cigarette smoke.

Acetaldehyde does not improve the taste or smell of cigarettes and is not thought to have any impact on the attractiveness of cigarettes. However, acetaldehyde is thought to increase the addictiveness of cigarettes by boosting the addictive potential of nicotine, which is the main substance in tobacco responsible for the dependence of smokers on cigarettes.

Acetaldehyde may indirectly enhance the addictiveness of cigarettes due to the actions of one of its reactive products 'harman' on the brain. Harman is believed to behave in a similar way to anti-depressant drugs by its ability to improve mood. Smoking dependence could therefore be stimulated by the mood-enhancing effects of harman in cigarettes.

Additives in tobacco product, when burnt, produce e.g. acetaldehyde



can **increase**

- attractiveness,
- addictiveness and
- toxic emissions

therefore **increase** smokers' exposure to toxic smoke emissions

Increase

- health risk,
- cancer risk,
- morbidity and
- mortality

Lifetime smokers lose an average of 14 years of life

Smokers die younger

http://ec.europa.eu/health/tobacco/law/pictorial/index_en.htm