

Tobacco contains highly toxic compounds not regulated by law

October 1 2012



The concentration of certain harmful and carcinogenic substances varies significantly from one brand of cigarettes to another. Credit: SINC

Researchers from the University of Alicante (Spain) have analysed ten brands of cigarettes and found that the concentrations of certain harmful and carcinogenic substances vary significantly from one brand to another. Until now legislation has not covered these compounds and only establishes limits for nicotine, tar and carbon monoxide. Scientists have also developed catalysts to reduce the harmful products in tobacco.

In accordance with current legislation, [cigarette packets](#) indicate the [nicotine](#), tar and [carbon monoxide](#) concentrations in order to confirm that these do not exceed permitted levels. However the quantity of these substances is not always proportional to the [toxicity levels](#) of many other [compounds](#), "therefore more suitable parameters are required for

determining the toxicity level of tobacco".

This is a conclusion of a study by [chemical engineers](#) at the University of Alicante (Spain), published in the journal *Food and Chemical Toxicology*. The researchers analysed the gases and [particulate matter](#) –tar– from ten commercial brands of blond [tobacco cigarettes](#): seven American or British brands (Marlboro, Winston, Chesterfield, Camel, L&M, Lucky Strike and John Player) and three Spanish brands (Fortuna, Ducados and Nobel).

"Although the products generated appear similar, the relative performance (mg/cigarette) of certain highly toxic and carcinogenic compounds varies considerably from one brand to another", highlights to SINC María Isabel Beltrán, one of the authors.

According to the study, the proportion of compounds detected in the [gases](#) is maintained in each packet type, but there are some that do not follow this tendency, such as isoprene, crotonaldehyde and toluene, which are among the most carcinogenic and harmful ones.

The situation is similar in the case of particulate matter. The individual performance of these compounds is correlated with the global performance for each brand, but certain harmful substances, such as hydroquinone and cotinine do not adjust to this pattern and appear more in some brands than in others.

The results also reveal that the brands with the lowest production of gaseous compounds are not those with the lowest tar levels, and that the brand that generates the most isoprene, toluene and crotonaldehyde produces a lower quantity of tar than the average. "We should not therefore assume that a cigarette which generates more tars is going to be more toxic than another that produces fewer", notes Beltrán.

The researchers, who claim in the article not to have any conflict of interests, have preferred not to reveal the figures for each brand and have identified these with the letters A to J. To perform the analysis the cigarettes were inhaled in a 'smoking machine' and the smoke composition was measured in three fractions: one gaseous, in which 35 compounds were identified, and two of particulate matter, with 85 compounds, which were trapped respectively in the filter and in the smoke traps used to measure "what a person smokes".

It has, therefore, been observed that in the cigarettes containing more tobacco, the amount consumed in a set number of puffs is lower. According to the scientists, this is because there is less oxygen available due to the increased packing.

With respect to the regulated substances, when compared to other studies, it was found that the level of carbon monoxide in Spanish cigarettes is 'medium-high' with respect to the others, and one of the brands ('C') even slightly exceeded the value established by law (10 mg/cigarette), containing 11.1 mg/cigarette.

"The results must be considered with caution and compared to those from other laboratories as, although we experimented with 200 cigarettes, sometimes the data may vary depending on the batch of packets or the environmental conditions", stated the researcher, "and in any case, we do not think we should be the ones to report them".

The performance of nicotine in the traps varies from 0.28 to 0.61 mg/cigarette, that is, the amount may double from one brand to another, while remaining within legal limits. "In fact, although nicotine is responsible for the addiction, it is not the most harmful part of the cigarette", says Beltrán. "Of the more than three thousand compounds in tobacco there are many which are worse, such as hydrogen cyanide, 1,3-butadiene or some of the families of aldehydes, nitrosamines and

phenols".

To reduce the quantities of toxic products in the cigarettes, the researchers have also tested and developed several catalysers. One of these, known as Al-MCM-41, reduces carbon monoxide emissions by 23% and nicotine emissions by more than 40%.

"The three-dimensional structure of this material, clay with silicon and aluminium oxides, permits the formation of 'caves' in which the long chain compounds are retained", says Beltrán, who confirmed that the flavour of the tobacco is hardly affected and that some of the leading companies have already expressed interest in the patent for the new catalyser.

More information: A. Marcilla, I. Martínez, D. Berenguer, A. Gómez-Siurana, M.I. Beltrán. "Comparative study of the main characteristics and composition of the mainstream smoke of ten cigarette brands sold in Spain". *Food and Chemical Toxicology* 50 (5): 1317, 2012.

A. Marcilla, A. Gómez-Siurana, D. Berenguer, I. Martínez-Castellanos, M.I. Beltrán. "Reduction of tobacco smoke components yields by zeolites and synthesized Al-MCM-41". *Microporous and Mesoporous Materials* 161: 14, 2012.

Provided by Spanish Foundation for Science and Technology (FECYT)

Citation: Tobacco contains highly toxic compounds not regulated by law (2012, October 1) retrieved 20 June 2024 from <https://medicalxpress.com/news/2012-10-tobacco-highly-toxic-compounds-law.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.