A compound in smokers' breath

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A certain compound exists in smokers' breath. Credit: SINC

If you smoke, your breath contains 2,5-dimethylfuran. A team of Catalan researchers have proved that the presence of this chemical compound indicates that a person has smoked in the last three days. This substance does not appear in the breath of non-smokers, unless they have been in direct contact with tobacco smoke for a long time.

"2,5-dimethylfuran cannot be detected in breath samples of non-smokers, meaning that the only way to know if a person has smoked in the last 72 hours is to use its qualitative determination", Juan Manuel Sánchez, researcher with the Chemistry Department of the University of Girona (UdG) and co-author of a study that appears in the journal *Analytical and Bioanalytical Chemistry*, reports to SINC.

The team at UdG analysed different volatile organic compounds

(benzene, 2,5-dimethylfurane, toluene, o-xylene and p-xylene) which could be used as bio-indicators of the condition of the smoker, and proved that 2,5-dimethylfuran is the only compound that provides effective results for breath samples.

"Benzene, which is sometimes appears in the bibliography, is only useful when tobacco consumption is relatively high and in short periods -between 1 and 2 hours- after having smoked a cigarette, which means it is of no use from a practical point of view", explains Sánchez.

On the contrary, the levels of toluene and xylenes are only significant for those who smoke a lot and only when little time has passed since the last cigarette.

To carry out the analysis the researchers took breath samples from 204 volunteers (100 smokers and 104 non-smokers), who answered a questionnaire to provide information on their habits. The results confirm that, except in the case of a false positive, the presence of 2,5-dimethylfuran is associated with the act of smoking.

This substance can also appear in passive smokers if they have had direct contact with tobacco smoke over a prolonged amount of time. As a result, the study suggests carrying out further research in the subject area and refining the technique more.

The micro-trap of adsorption

The scientists used a device designed in their own laboratory to analyse samples of 0.8 litres of breath. "It is an adsorption micro-trap in which in less than one second a desorption phase occurs (releasing a fluid that was previously absorbed into a substance), and which does not require a second cryogenic trap", highlights Sánchez.

Commercial teams need a higher sample volume (more than 2 litres) and require a cryogenic trap, which operates at extremely low temperatures, with two phases of thermal desorption, "which results in the problem of creating devices that make the analysis more complicated".

More information: Mónica Alonso, Mar Castellanos y Juan M. Sánchez. "Evaluation of potential breath biomarkers for active smoking: assessment of smoking habits". Analytical and Bioanalytical Chemistry 396 (8): 2987-2995, abril de 2010. DOI 10.1007/s00216-010-3524-z

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