

Citric acid has the potential to produce respiratory sensitisers in e-cigarette vapor

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The use of citric acid in e-liquids needs to be investigated to further understand its potential to form potentially harmful anhydrides in the vapour.

Citric acid occurs naturally in the body, is 'generally recognised as safe' in the USA, and is used in pharmaceutical inhalation products. However, thermal degradation of citric acid can occur at the operating temperatures of some vaping devices. Starting at around 175-203°C, citric acid can degrade to form citraconic anhydride and its isomer itaconic anhydride.

These anhydrides are respiratory sensitisers—chemicals that, on inhalation, can trigger an allergic reaction varying from hay fever symptoms to anaphylactic shock.

Scientists at British American Tobacco used gas chromatography coupled to time-of-flight mass spectrometry to analyse the vapour generated when an e-liquid containing citric acid is heated in a vaping device. The device used was a first-generation (cig-a-like) e-cigarette. The scientists were able to measure significant amounts of anhydrides in the vapour.

The results are presented today the annual conference of the Society for Research on Nicotine and Tobacco in Florence, Italy.

'Citric acid in an e-liquid may lead to significant amounts of citraconic and/or itaconic anhydride in vapour, depending on the device,' says Dr Sandra Costigan, Principal Toxicologist Vaping Products.

'But we believe that flavourings can be used responsibly and we have already rejected the use of some flavourings in our products. Based on this case study using a first generation e-cigarette, we recommend that the potential for formation of citraconic and itaconic anhydrides should be investigated further before commercialisation of e-liquids containing [citric acid](#),' Costigan said.

Many in the public health community believe e-cigarettes offer great

potential for reducing the public health impact of smoking. Public Health England, an executive body of the UK Department of Health, recently published a report saying that the current expert estimate is that using e-cigarettes is around 95% safer than smoking cigarettes. The Royal College of Physicians have said that the public can be reassured that e-cigarettes are much safer than smoking and that they should be widely promoted as an alternative to cigarettes.

Provided by R&D at British American Tobacco

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