

# Call of Abstracts - "International conference on the E-Cigarette: patterns of use and health impacts"



## Call of abstracts

"International conference on the E-Cigarette: patterns of use and health impacts" - Paris, on 5-6th December 2022

### Submission form

Poster & oral presentation

### Contact details of the corresponding author

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### Background information

#### Type of submission

Oral

#### Theme of conference

Health impact

## Keywords

Fundamental sciences

Risk behaviors/protector behaviors

Toxicants

## Abstract title

Hazard analysis of vaping device: consequences of film boiling

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### Number of co-authors

2

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## Abstract details (poster & oral)

### Background, method, results and conclusions

Vaping products are all designed with the same elements. A heating element vaporises an e-liquid, mainly available in cotton behaving as a porous media. The physical phenomena occurring during their functioning are hence the same ones. One of them is boiling that leads to three identified functioning regimes following power supplied: under-heating, optimal and over-heating regimes. These regimes have specific characteristics on the mass of vaporised e-liquid and on the wire's temperature. Over-heating regime is correlated to film boiling leading to a significant temperature increasing. This work focuses on the link between film boiling and by-products' formations as their reactions are influenced by the temperature.

Different experiments have been performed by using two devices filled with glycerol and with their generated emissions. The first device is recommended for mouth-to-lungs inhalation and it is tested with ISO 20768 conditions. The other one should be used in direct lungs and an airflow rate of 13 L/min is applied instead of 1.1 L/min. The impact of the power is characterised on the mass of e-liquid vaporised through the device's mass loss and the collected amounts of aldehydes, levoglucosan

(tracker of cotton pyrolysis) and metals. Each molecule is quantified using its specific method described in this work.

The quantities are reported according to the supplied power. A maximal power was found around 24 W for the first device and 40W for the second one. Below these maximum powers' values, aldehydes, as formaldehyde or acetaldehyde, levoglucosan and metal are produced in low quantities. Above these values, all of their productions increased exponentially as higher powers are supplied.

Maximal power is a physical limit of functioning that should be determined and specified to the user. It provides relevant information on the hazard of high powers and on the possibility of reducing the risk of vaping device use.

## Main messages

Vaping devices show two physical limits due to their functioning. The maximal power is the source of a significant increasing in the undesirable compounds' production (released by the wire, coming from e-liquid degradation and cotton pyrolysis).

## Type of study / research

Quantitative

## Geography of the study

Europe

## Funding of study

### Federal source

No

### State source

Yes

### Nonprofit Grant Funding Entity Source

No

### Nonprofit Grant Funding Entity Source

No

### Academic Institution Source

Yes

### Pharmaceutical Industry Source

No

### Tobacco/E-Cigarette Industry Source

Yes

## Declaration of interest

**The submitter declares that during the past 5 years have a direct nor indirect link (professional\*, personal or financial\*\*) with the tobacco and e-cigarette companies**

Yes

**If yes, please specify**

Sébastien Soulet, Carine Casile and Léa Constants are employed by Ingésciences. Ingésciences is a centre of expertise on vaping products and analysed e-liquids and aerosols from e-cigarette companies independent from tobacco companies. Ingésciences declares its independence from the tobacco industry and its third parties