DETERMINATION OF TOBACCO COMSUMPTION BIOMARKERS IN WASTEWATER – PRELIMINARY STUDY

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INTRODUCTION

Tobacco is one of the most consumed legal substance of abuse worldwide. The implications of smoking are quite considerable, not only in terms of health conditions that it potentiates, but also because of the social and economical impacts. According to the World Health Organization (WHO), each year, tobacco is responsible for more than 8 million deaths around the world. Because of the consequences of smoking, it is essential to monitor the consumption behaviour of the populations, in order to promote health policies that protect people from smoking and to help smokers to quit tobacco consumption. The aim of the present work is to develop, validate and apply a faster, greener and cost-effective analytical methodology to monitor nicotine and cotinine (main biomarker for tobacco consumption) using wastewater-based epidemiology (WBE). To achieve this we, propose the use of bar adsorptive microextraction (BAμE) to enrich the target compounds, followed by liquid desorption and analysis by gas chromatography-mass spectrometry (GC-MS).
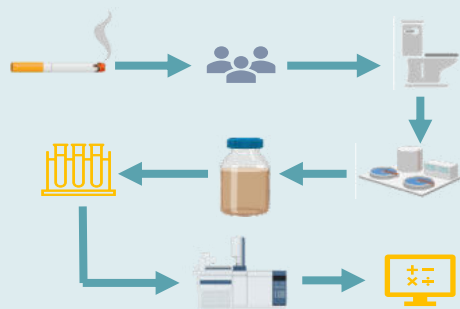
WHAT IS WASTEWATER-BASED EPIDEMIOLOGY?

Figure 1: WBE approach.

METHODOLOGY

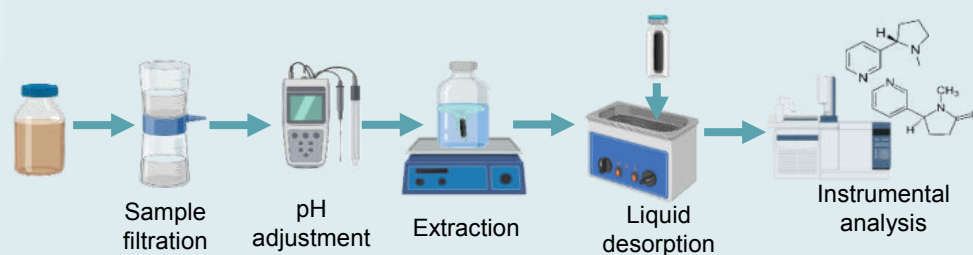Sample filtration — pH adjustment — Extraction — Liquid desorption — Instrumental analysis

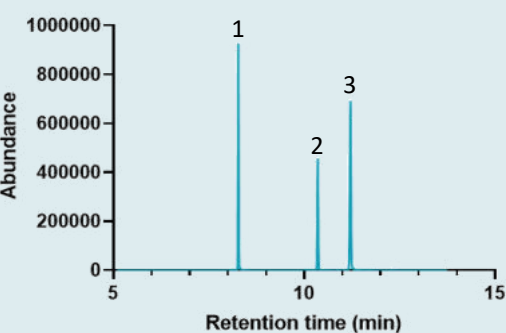**Figure 2:** Proposed analytical approach.

RESULTS

Figure 3: Chromatogram (1 – Nicotine; 2 – Internal Standard (Diphenylamine); 3 – Cotinine).
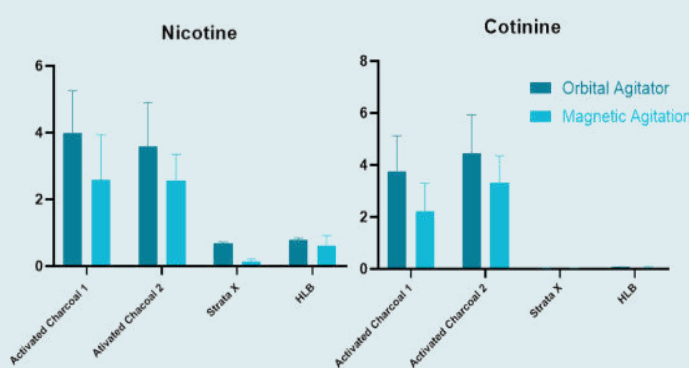

Figure 4: Comparison of sorbents and agitation type for the extraction of the target compounds.
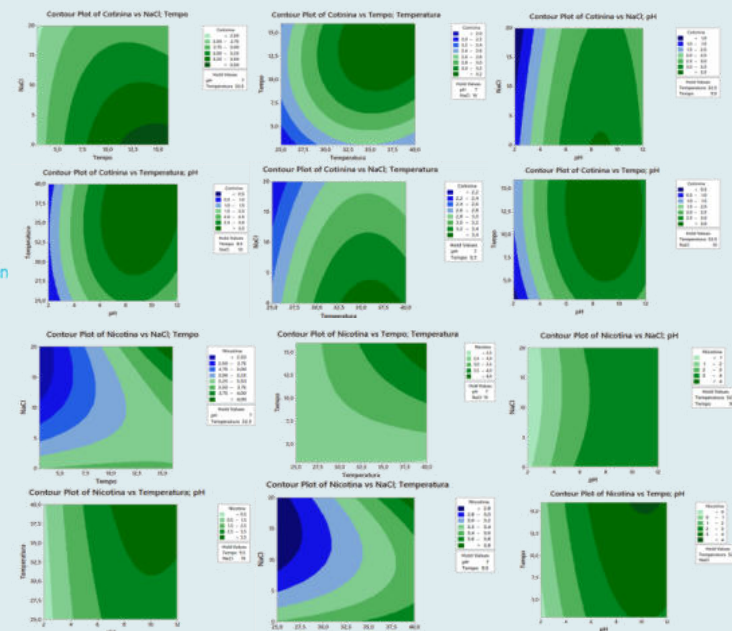

Figure 5: Optimization of the extraction parameters by design of experiments (pH, time, salting-out and temperature).

CONCLUSION

- ✓ Activated charcoal showed to be the best sorbent coating for BAμE to extract the studied compounds;
- ✓ Orbital agitation was successfully applied for the first time using this approach;
- ✓ The best conditions for the microextraction stage are achieved using a matrix pH of 10, 16 h of extraction at 40ºC.
- ✓ Next steps will be optimization of the liquid desorption stage, method validation and, it's application to real wastewater samples