LA-REIMS as a Rapid Screening Metabolomics Approach

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Organisation

Name of the organisation Ghent University (UGent)

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Country Belgium

Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Animal health, Human health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In chemico: Metabolomics

DESCRIPTION

Method keywords

metabolomics

screening

iknife

mass spectrometry

ms

ambient ionization

lipidomics

LA-REIMS

Scientific area keywords

analytical chemistry

Method description

This method provides a rapid untargeted screening metabolomics method, which can be used to evaluate whether or not metabolic changes can be appointed according to the metabolic state in your matrix of choice. It applies an ambient ionization technique in which a laser beam or diathermy probe is directed at a native (non-pretreated) *ex vivo* sample, whereupon the resulting aerosol is directed into the REIMS source for ionization. Finally, the resulting ions are measured using a Q-ToF mass spectrometer. The method has currently been optimized and successfully applied for muscle and adipose tissue, urine, blood plasma, saliva, and feces, but can be readily extrapolated to any other type of animal/human tissue or biofluid sample (CSF, bile, etc.). Following the analysis, univariate and/or multivariate statistical analysis is performed to determine if a generated metabolic fingerprint can be associated with a particular condition or metabolic state.

Lab equipment

Q-ToF, REIMS source, laser equipment or iKNife diathermy probe.

Method status

Internally validated

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

Rapid metabolomics screening, high throughput (500 samples in 2h), no sample preparation, suitable for a wide range of matrices.

Challenges

Identification of compounds is challenging, number of detected metabolites is more limited as compared to UHPLC-HRMS.

Modifications

The method is automated for the analysis of liquid samples and can be automated for solid matrices.

Future & Other applications

Rapid detection method for boar taint, species identification, meat defects, etc. at the slaughter line

Rapid detection for fish species identification and fraud at the production line

Rapid metabolic screening to detect changes occurring in metabolic diseases or disorders (food allergy, obesity, diabetes type 2, etc.) in biofluids

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Verplanken et al (2017) Talanta, 169, 30-36

Van Meulebroek et al (2020) Talanta, 217

Wijnant et al (2020) Analytical Chemistry, 92(7)

Plekhova et al (2021) Nature Protocols, 16(9), 4327-4354

Van Meulebroek et al., Talanta, 2020.pdf

Associated documents

Verplanken et al, 2017.pdf

Plekhova et al. 2021.pdf

Wijnant et al., Analytical Chemistry, 2020.pdf

1. Van Meulebroek et al., Talanta, 2020.pdf