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The new BUME method for rapid automated chloroform-free lipid extraction of biofluids and tissue samples - An option for metabolomics

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The aim of this work was to develop new rapid and automated chloroform-free methods for total lipid extraction from biological samples and to replace the need for the laborious gold-standard chloroform-based method. We based the development work on the capabilities of a standard 96-well robot and the use of non-halogenated solvents. For biofluids we defined a protocol based on repeated solvent extraction steps with small volumes of solvents aiming at 100% automation. Non-chloroform solvents and solvent mixtures were then screened for high lipid recoveries, spontaneous and clear phase separation and full compatibility with automation. For tissue samples, our rapid semi-automated all-in-one-tube protocol for tissue collection, homogenization and extraction was then evaluated for lipid extraction. A fully automated protocol for biofluids - the BUME method - was developed delivering lipid recoveries identical to the Folch method for the investigated lipids for 10-100 µl biofluids in the 96-well format. The lipid extraction protocol was successfully applied to our generic protocol for tissue samples and a semi-automated all-in-one-tube process defined and validated. The BUME method for tissue delivered identical lipid results for all investigated lipids except for PS, PA and PG where the BUME method delivered significantly higher recoveries than the Folch method. The developed BUME lipid extraction protocols now allow high-quality high-through-put sample preparation matching new fast lipidomics methods. Finally we discuss an application for metabolomics using BUME single-phase extraction

Biography

Lars Löfgren completed his PhD in 1993 from Chalmers University of Technology, where he developed sampling devices for - and characterized human exposure to - volatile hydrocarbons in urban air. He has continued his scientific work, published in peer-reviewed journals, in the field of sample preparations for lipids and rapidly metabolized biomarkers in biological samples in his current position as an Associate Principal Scientist in Translational Science, AstraZeneca.

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