



BIOANALYSIS – Forefront technologies and applications

Welcome to the website for our new PhD-course in BIOANALYSIS. In the following you will find more information about the course, including registration and preparations. We are looking forward to see you in Oslo for our PhD-course, which we intend to develop in the future as a biannual high-level international course in the beautiful capital of Norway!

Time and place

October 16-20, 2017, School of Pharmacy, University of Oslo (UiO), Oslo, Norway

Street address: Sem Sælands vei 3, Oslo, Norway

Course content

This course focuses on the latest research and development of new *technologies* and *applications* in bioanalytical chemistry, and is anchored in *scientific publications* from 2016 and 17. The main focus will be directed towards techniques related to *chromatography*, *electrophoresis* and *mass spectrometry*, including *sample preparation*. Applications for small molecule drugs, peptides, and proteins in biological fluids will be highlighted. Also, the course will focus on presentation of scientific data in bioanalytical research, and how to communicate with reviewers and editors during manuscript submission.

Learning outcome

After completing the course the student should:

- Have an overview of the main research trends in bioanalytical chemistry
- Be able to critically evaluate the potential of new technologies and techniques in bioanalytical chemistry
- Be able to critically evaluate the applicability of published methods in bioanalytical chemistry
- Be able to present research data in bioanalytical chemistry in a research paper
- Be able to present research data in bioanalytical chemistry in a lecture
- Be able to communicate with reviewers and editors during manuscript submission

Teaching

The course is centered on a one week COMPULSORY SESSION held in Oslo from October 16 (9:00 am) to October 20 (4:00 pm). More details about the COMPULSORY SESSION are found on the following link:

http://www.uio.no/studier/emner/matnat/farmasi/FRM-KJM9930/frm9930-schematic_program_2017.pdf

The COMPULSORY SESSION in Oslo will include lectures (22 hours) and discussion sessions (12 hours). The lectures will be given by the participants and by the course team, while discussions will be organized by the course team. During the COMPULSORY SESSION the participants will give a short presentation of their own research project (RESEARCH PRESENTATION). In addition, the participants will present one pre-selected research articles during the week in Oslo (ARTICLE PRESENTATION). How to prepare the RESEARCH PRESENTATION and ARTICLE PRESENTATION is given below under "Preparations". Finally, after the COMPULSORY SESSION, the participants have to prepare a short WRITTEN CONTRIBUTION (article, tutorial, reviewer report or similar) based on one of the subjects covered by the course (compulsory). This is specified below under "Post session work"

Preparations

Prior to the COMPULSORY SESSION in Oslo (October 16-20, 2017), each participant has to prepare the following:

- RESEARCH PRESENTATION
- ARTICLE PRESENTATION

The RESEARCH PRESENTATION is a 10 minutes oral presentation about your research. The presentation should be prepared in Microsoft PowerPoint, and should answer the following questions:

- What is the research question?
- What are the methods?
- What are the main findings so far?
- What are the perspectives
- When do you plan to defend your thesis?
- What is your dream position in the future?

The research presentation should not be too technical.

The ARTICLE PRESENTATION is a 20 minutes oral presentation of an article selected by the course team. Shortly after registration deadline (September 18, 2017), you will receive the article from the course team (by e-mail) along with instructions on how to prepare the presentation. The presentation should be prepared in Microsoft PowerPoint, and one example is illustrated below.


The participant will also receive a package of all the articles to be discussed in the course (40-45 articles in total). These should be printed or downloaded to personal laptop by the participant, to be available during the COMPULSORY SESSION. It is not expected that all papers are read before the

COMPULSORY SESSION, but reading the abstracts will provide the participant with a favorable starting point.


Below, the title and abstract for one of the research articles to be discussed during the 2017 course is given, along with guidelines how to structure the presentation of this particular paper.

Journal of Chromatography B, 1048 (2017) 77–84

Contents lists available at ScienceDirect

 **Journal of Chromatography B**

journal homepage: www.elsevier.com/locate/chromb



Parallel artificial liquid membrane extraction of new psychoactive substances in plasma and whole blood

Linda Vårdal^a, Hilde-Merete Askildsen^a, Astrid Gjelstad^a, Elisabeth Leere Øiestad^{a,b}, Hilde Marie Erøy Edvardsen^b, Stig Pedersen-Bjergaard^{a,c,*}

^a School of Pharmacy, University of Oslo, P.O. Box 1068, Blindern, 0316 Oslo, Norway
^b Norwegian Institute of Public Health (NIPH), Department of Forensic Sciences, Oslo University Hospital, Oslo, Norway
^c Faculty of Health and Medical Sciences, School of Pharmaceutical Sciences, University of Copenhagen, Universitetsparken 2, 2100 Copenhagen, Denmark

ARTICLE INFO

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Keywords:
Liquid-phase microextraction
Parallel artificial liquid membrane extraction
New psychoactive substances
Plasma samples
Whole blood samples

ABSTRACT

Parallel artificial liquid membrane extraction (PALME) was combined with ultra-high performance liquid chromatography-mass spectrometry (UHPLC-MS) and the potential for screening of new psychoactive substances (NPS) was investigated for the first time. PALME was performed in 96-well format comprising a donor plate, a supported liquid membrane (SLM), and an acceptor plate. Uncharged NPS were extracted from plasma or whole blood, across an organic SLM, and into an aqueous acceptor solution, facilitated by a pH gradient.

MDAI (5,6-methylenedioxy-2-aminoindane), methylone, PFA (para-fluoroamphetamine), mCPP (meta-chlorophenylpiperazine), pentadrone, methoxetamine, MDPV (methylenedioxypropylvalerone), ethylphenidate, 2C-E (2,5-dimethoxy-4-ethylphenethylamine), bromo-dragonfly, and AH-7921 (3,4-dichloro-N-([1-(dimethylamino)cyclohexyl]methyl)benzamide) were selected as representative NPS. Optimization of operational parameters was necessary as the NPS were novel to PALME, and because PALME was performed from whole blood for the very first time. In the PALME method developed for plasma, NPS were extracted from a 250 μ L alkalized donor solution consisting of 125 μ L plasma sample, 115 μ L 40 mM NaOH, and 10 μ L internal standard. In the PALME method from whole blood, the 250 μ L alkalized donor solution consisted of 100 μ L whole blood, 50 μ L deionized water, 75 μ L 80 mM NaOH, and 25 μ L internal standard. In both methods, extraction was accomplished across an SLM of 5 μ L dodecyl acetate with 1% trioctylamine (w/w), and further into an acidic acceptor solution of 50 μ L 20 mM formic acid. The extraction was promoted by agitation at 900 rpm and was carried out for 120 min. Method validation was performed and the following parameters were considered: linearity, limits of quantification (LOQ), intra- and inter-day precision, accuracy, extraction recoveries, carry-over, and matrix effects. The validation results were in accordance with FDA guidelines.

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Based on the article above, prepare a 20 minutes presentation addressing the following questions:

- Explain the principle of PALME
- Explain the advantages of PALME as mentioned in the article
- Explain the PALME and LC-MS procedures in detail, step-by-step
- Give an overview of the main findings
- Explain the conclusions and perspectives as mentioned in the paper?
- Discussion point 1 – are the experiments done properly, or do you miss additional data?
- Discussion point 2 – what are the challenges or weak points of the concept?

The PowerPoint presentations should be finished and submitted to the course team no later than October 12, and will be accessible from this date for all participants from the course homepage.

Literature

The course is based on 40-45 articles preselected by the course team. The articles will be original research papers and review papers published in 2016 and 2017, and are focused on sample preparation, chromatography, mass spectrometry, and applications for small molecule drugs, peptides, and proteins in biological fluids. All the articles will be sent to participants as pdf-files on September 19, 2017. Participants are expected to have skills in bioanalysis corresponding to the level of the following textbook:

Bioanalysis of Pharmaceuticals, Honoré Hansen, Pedersen-Bjergaard, Reubsaet, Grønhaug Halvorsen, Gjelstad, Jørgensen, Kall, Wiley 2015, ISBN 978-1-118-71682-3

<http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1118716825.subjectCd-CH60.html>

Post session work

After the COMPULSORY SESSION, each participant has to prepare a short WRITTEN CONTRIBUTION. This can be a short article, a short tutorial, a reviewer report, or related written scientific material. The total workload associated with the WRITTEN CONTRIBUTION should not exceed 50 hours. The course team will discuss this with each participant during the COMPULSORY SESSION, and in consensus define the WRITTEN CONTRIBUTION. The deadline for submission of the WRITTEN CONTRIBUTION is December 1, 2017. The course team can assist in proof reading the WRITTEN CONTRIBUTION if desired. The course is approved on the date of submission for the WRITTEN CONTRIBUTION, and if this is a short article for a journal, the course approval is independent of acceptance/rejection by the journal.

Assessment

This course has no exam. Each participant has to be present full-time during the one week in Oslo. Each participant has to give a short lecture (10 min, RESEARCH PRESENTATION) about own research, one lecture (20 min) related to a pre-selected article (ARTICLE PRESENTATION), and submit a WRITTEN CONTRIBUTION based on one of the subjects covered by the course (limited to 50 hours).

Course team

Professor Leon Reubsaet, Associate professor Trine Grønhaug Halvorsen, Associate professor Astrid Gjelstad, Professor Elsa Lundanes, Associate professor Steven Wilson, and Professor Stig Pedersen-Bjergaard. More information is found on the following link:

<http://www.mn.uio.no/kjemi/english/research/groups/diatech/>

Admission

The final registration deadline is September 18, 2017. Registration is done by filling out an online application form. PhD candidates who are admitted to other education institutions than UiO must at the same time apply for visiting status. They must submit the same documentation as regular visiting status applicants, but the application and documentation is to be sent by e-mail to The School of Pharmacy, studieadmin@farmasi.uio.no and not to the Faculty point of contact. Applicants must be able to present original documentation on request. If the number of applicants exceeds the number

of places available, PhD students who are members of the Norwegian School of Pharmacy or PhD students from Department of Chemistry (UiO) will have priority.

Grading scale

Grades are awarded on a pass/fail scale

Organizer

The course is organized by the School of Pharmacy at the University of Oslo in cooperation with the National PhD School in Pharmacy (NFIF) and the Department of Chemistry at the University of Oslo

Responsible

Stig Pedersen-Bjergaard, stigpe@farmasi.uio.no

Travel and accommodation

Travel and accommodation have to be organized by the participants

Course fee

Participation is free of charge. Coffee is free of charge for all participants. Lunch (daily) and dinner (October 16 and 19) is free of charge for members of NFIF.

Facts about this course

Credits: 5 ECTS

Level: PhD

Teaching: October 16-20, 2017

Teaching language: English

Registration deadline: September 18, 2017

Host institution: University of Oslo