ISO-TOPICS: THE FIRMS NETWORK NEWSLETTER

October 2019

ABOUT US

The Forensic Isotope Ratio Mass Spectrometry (FIRMS) Network was founded to develop the scope of stable isotope techniques in forensic applications.

FIRMS brings together chemists, physicists, materials scientists, and life scientists who employ isotopic analysis in their respective fields. FIRMS is helping to focus collective knowledge and expertise on improving methods for crime detection and reduction.

See more photos from the 7th FIRMS Network Conference by visiting the FIRMS website.

WELCOME

Welcome to the FIRMS October 2019 newsletter.

DISCLAIMER

Reference to or mention of any commercial product or process by specific trademark or manufacturer within this newsletter does not necessarily represent an endorsement by the FIRMS Network.

CONFERENCE RECAP

The 7th FIRMS Network Conference was held 16 to 19 September at the Fondazione Edmund Mach (FEM) in San Michele all'Adige, Italy. Monday included workshops for a packed house on (1) good practice in IRMS analysis, with presentations from Rebecca Kraft and Phil Dunn; and (2) isoscapes, with presentations from Jason West, Stefano Larsen, and Gabe Bowen. An evening icebreaker was held at FEM's winery.

Thank you to everyone who attend the 7th FIRMS Network Conference! We enjoyed seeing you in Italy.

Dr Jason West from Texas A&M University provided the plenary lecture Tuesday morning to open the meeting. Oral presentations covered a variety of topics, including isoscapes, origin/traceability, human remains, food, quality control (QC), methods, drugs, and the environment. A copy of the conference program and the abstract booklet can be downloaded from the FIRMS website.

Poster presentations on Tuesday evening took place in conjunction with a reception. Attendees had a chance to visit the isotope laboratory at FEM on Wednesday; the tour was led by Dr Federica Camin. The conference dinner was held Wednesday evening at Rotari and included a tour of the facility. The meeting ended Thursday at lunchtime.

Special thanks are due to FIRMS Members Federica Camin and Luana Bontempo; their efforts preceding and during the meeting ensured it was a success. Refreshments—including coffee breaks, lunches, the poster reception, and conference dinner—would not have been possible without the support of sponsors, including Elementar, Picarro, ThermoFisher Scientific, AMETEK, Nu Instruments, Santis Analytical Italia, and Sercon.

Additional photos from the conference are available on the FIRMS website. Please feel free to submit your own photos by contacting us via email.

UPDATES FROM THE STEERING GROUP

Don't forget that attendees of the 7th FIRMS Network Conference who have not previously participated in the FIRMS Proficiency Test Scheme, but would like to, can get **25% off the fee** for the next round of analyses. Please contact firms@forensic-isotopes.org if you would like to take advantage of this offer.

Reminder: New participants in the FIRMS Proficiency Test Scheme may be eligible for a 25% savings!

Members will have an opportunity to publish presentations from the conference in an upcoming **special issue of the journal *Forensic Chemistry***. Details are coming soon on the submission process and deadlines. Please write to register your interest in contributing to the special issue. We look forward to seeing your submission.

NEWS AND NOTICES

The IUPAC Periodic Table of the Elements and Isotopes Project has published a series of online resources at https://www.isotopesmatter.com to answer the questions "What are isotopes, and why do I need to know about them?"

The IAEA is now selling GRESP (Greenland Summit Precipitation). This reference material can be used in lieu of GISP, which is out of stock. For more information, please visit nucleus.iaea.org.

A recent query on the listserve ISOGEOCHEM highlighted some tools for isotope data management being developed by the Kopf Lab at the University of Colorado, Boulder. Dubbed "isoverse," the tools may be of interest to FIRMS members. More details are available here: https://www.kopflab.org/isoverse/

The **International Symposium on Isotope Hydrology** took place 20-24 May 2019 in Vienna, Austria. The event was live streamed and archived videos are now available: http://streaming.iaea.org/21084

The American Geophysical Union (AGU) celebrates its centennial year at the **AGU Fall Meeting 2019**, which returns to San Francisco from 9 to 13 December. The program has been published and includes many presentations featuring isotopes.

Isotope symposia have been organized for the 2020 annual scientific meetings of both the **American Academy of Forensic Sciences (AAFS)**, which takes place in February (Anaheim, CA), and the **American Association of Physical Anthropologists (AAPA)**, which takes place in April (Los Angeles, CA). Presentations in the symposia will focus on applications of forensic isotope analysis to human remains.

The abstract submission period for the next **International Conference on Applications in Isotope Ecology** (IsoEcol) is planned to open in October 2019. The meeting will take place in Gaming, Austria from 31 May to 6 June 2020.

Dates are now decided for the 2020 **Joint European Stable Isotope Users Group Meeting** (JESIUM). The meeting will take place 4-9 October in Kuopio, Finland.

HIGHLIGHTED PUBLICATIONS

In conjunction with the launch of isotopesmatter.com, *Chemistry International* published the article "Isotopes Matter," which describes a new digital interactive version of the IUPAC Periodic Table of the Elements and Isotopes: https://doi.org/10.1515/ci-2019-0107.

Working with NIST, researchers have developed and certified two new reference materials for lead isotope amount ratios and lead isotopic composition. Details of the work were published in *Geostandards and Geoanalytical Research*: https://doi.org/10.1111/ggr.12253.

PUBLICATIONS LIST

Disclaimer: This section contains a non-comprehensive list of recent publications that may be of interest to members. Inclusion does not necessarily mean that the FIRMS Network approves the content. You are encouraged to consider critically whether (i) the experimental work complies with SI guidelines and the Good Practice Guide; and (ii) the conclusions drawn are based on sound scientific background information.

Burns DT, Walker MJ (2019) Critical review of analytical and bioanalytical verification of the authenticity of coffee. Journal of AOAC International. https://doi.org/10.5740/jaoacint.18-0392

Camin F, Bontempo L, Ziller L, et al (2019) Assessing the authenticity of animal rennet using $\delta^{15}N$ analysis of chymosin. Food Chemistry 293:545–549. https://doi.org/10.1016/j.foodchem.2019.04.106

Chesson LA, Kenyhercz MW, Regan LA, Berg GE (2019) Addressing data comparability in the creation of combined data sets of bioapatite carbon and oxygen isotopic compositions. Archaeometry 61:1193–1206. https://doi.org/10.1111/arcm.12480

Correia MA, Foley R, O'Connell TC, et al (2019) Carbon and nitrogen isotopic signatures of hair, nail, and breath from tropical African human populations. Rapid Communications in Mass Spectrometry. https://doi.org/10.1002/rcm.8524

Demény A, Gugora AD, Kesjár D, et al (2019) Stable isotope analyses of the carbonate component of bones and teeth: The need for method standardization. Journal of Archaeological Science 109:104979. https://doi.org/10.1016/j.jas.2019.104979

Galera L de A, Abdalla Filho AL, Reis LS, et al (2019) Carbon and nitrogen isotopic composition of commercial dog food in Brazil. PeerJ 7:e5828. https://doi.org/10.7717/peerj.5828

Gordon G, Rhoads A (2019) Field-deployable measurements of free-living individuals to determine energy balance: Fuel substrate usage through $\delta^{13}C$ in breath CO_2 and diet through hair $\delta^{13}C$ and $\delta^{15}N$ values. Isotopes in Environmental and Health Studies 1–10. https://doi.org/10.1080/10256016.2018.1562448

Hu L, Fernandez DP, Cerling TE (2019) Trace element concentrations in horn: Endogenous levels in keratin and susceptibility to exogenous contamination. Chemosphere 237:124443. https://doi.org/10.1016/j.chemosphere.2019.124443

Imaizumi VM, Sartori MMP, Ducatti C, Venturini Filho WG (2019) Use of stable isotopes of carbon to detect coconut water adulteration. Scientia Agricola 76:261–265. https://doi.org/10.1590/1678-992x-2017-0289

Jiguet F, Kardynal KJ, Hobson KA (2019) Stable isotopes reveal captive vs wild origin of illegally captured songbirds in France. Forensic Science International 302:109884. https://doi.org/10.1016/j.forsciint.2019.109884

Lihl C, Renpenning J, Kümmel S, et al (2019) Toward improved accuracy in chlorine isotope analysis: Synthesis routes for in-house standards and characterization via complementary mass spectrometry methods. Analytical Chemistry 91:12290–12297. https://doi.org/10.1021/acs.analchem.9b02463

Meier-Augenstein W (2019) From stable isotope ecology to forensic isotope ecology — Isotopes' tales. Forensic Science International 300:89–98. https://doi.org/10.1016/j.forsciint.2019.04.023

Meier-Augenstein W (2019) Forensic stable isotope signatures: Comparing, geo-locating, detecting linkage. Wiley Interdisciplinary Reviews: Forensic Science 1:. https://doi.org/10.1002/wfs2.1339

Meikle J, Cresswell SL, Boyd SE, et al (2019) A stable isotope ratio approach to investigate the origins of illicit methylamphetamine in Queensland, Australia. Forensic Chemistry 16:100174. https://doi.org/10.1016/j.forc.2019.100174

Pederzani S, Britton K (2019) Oxygen isotopes in bioarchaeology: Principles and applications, challenges and opportunities. Earth-Science Reviews 188:77–107. https://doi.org/10.1016/j.earscirev.2018.11.005

Perini M, Paolini M, Pace R, Camin F (2019) The use of stable isotope ratio analysis to characterise saw palmetto (*Serenoa Repens*) extract. Food Chemistry 274:26–34. https://doi.org/10.1016/j.foodchem.2018.08.093

Putman AL, Bowen GJ (2019) Technical note: A global database of the stable isotopic ratios of meteoric and terrestrial waters. Hydrology and Earth System Sciences Discussions 1–14. https://doi.org/10.5194/hess-2019-173

Sena-Souza JP, Costa FJV, Nardoto GB (2019) Background and the use of isoscapes in the Brazilian context: essential tool for isotope data interpretation and natural resource management. Ambiente e Agua - An Interdisciplinary Journal of Applied Science 14:e2282. https://doi.org/10.4136/ambi-agua.2282

Serna A, Prates L, Valenzuela LO, Salazar-García DC (2019) Back to the bases: Building a terrestrial water $\delta^{18}O$ baseline for archaeological studies in North Patagonia (Argentina). Quaternary International. https://doi.org/10.1016/j.quaint.2019.06.008

Sluis LG, Reimer PJ, Ogle N (2019) Adding hydrogen to the isotopic inventory—Combining $\delta^{13}C$, $\delta^{15}N$ and $\delta^{2}H$ stable isotope analysis for palaeodietary purposes on archaeological bone. Archaeometry 61:720–749. https://doi.org/10.1111/arcm.12441

Stoll-Werian A, Flierl L, Rienitz O, et al (2019) Absolute isotope ratios – Analytical solution for the determination of calibration factors for any number of isotopes and isotopologues. Spectrochimica Acta Part B: Atomic Spectroscopy 157:76–83. https://doi.org/10.1016/j.sab.2019.04.008

Yen Y-T, Chen T-Y, Lai P-J, et al (2019) Linking opiate metabolites to heroin through gas chromatography–combustion–isotope ratio mass spectrometry. Analytical Methods. https://doi.org/10.1039/C8AY02494D

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