2021 Beijing

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20th INTERNATIONAL CONFERENCE ON NEAR INFRARED SPECTROSCOPY

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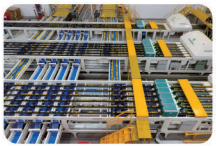
Able to grade the internal physiological indicators like brix, acidity, brown hear of apple or apple scald, pulp damage,etc.

部分应用案例 SOME APPLICATION CASES


脐橙 Navel orange

苹果 Apple

柚子 Grapefruit

菠萝 Pineapple

西瓜 Watermelon

水蜜桃 Honey Peach

部分合作客户 SOME COOPERATIVE CUSTOMERS

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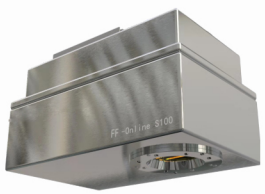

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Metrohm NIRS lab analyzers enable you to perform routine analysis quickly and with confidence – without requiring sample preparation or additional reagents and yielding results in less than a minute.

Handheld Raman Analyzers

Handheld Raman spectroscopy has contributed to increased quality control and sample screening through cost-effective, easy-to-use analyzers that can be used at the point of need.

Portable Raman Analyzers

Portable Raman spectrometers with fiber-optically coupled sampling offer you versatility to interface with accessories optimized for your sample needs, allowing you to do more with less.

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Portable Near-infrared Spectrum Analyzer
EXPEC 1330

The EXPEC 1330 analyzer features easy to operate and non-destructive. Within 20 seconds, you can get the detected values for multiple component indicators (such as moisture, crude protein, crude fat, crude fiber, crude ash, starch, and etc.). It has a wide range of applications in the feed industry, grain and oil processing, and grain purchasing.

Performance features

- Fast analysis, and multiple indicators such as moisture, oil content, oleic acid and other indicators possible to detected at the same time within one minute
- Suitable for a variety of sample forms, such as granules, flakes and powders, and simple and convenient for sample loading
- Rotatory sample tray, possible to enhance representativeness of non-uniform samples and improve accuracy of measurement results
- Instrument itself with standard materials, and instrument diagnosis and fault prompt functions
- Convenient for on-site testing

Online Near-infrared Spectrometer
EXPEC 1340

Mainly used for online monitoring and analysis of material quality in the production process of flow production line. The system is suitable for various grain and oil processing, feed, grain, wine, food, chemical industries and other application fields.

Performance features

- Online real-time monitoring of multiple component indicators of samples
- Analysis speed: 5 times/sec
- Supportive for setting upper and lower limits for primary and secondary alarms, drawing change trend graphs of multiple component indicators, and detecting abnormal values in time
- The 4-20 mA signal can directly send as feedback the measurement results to the automatic control system for production
- IP65 degree of protection

Portable Near-infrared Spectrum Analyzer
EXPEC 1360

EXPEC 1360 can meet the needs for rapid analysis of oil products in a laboratory, on a vehicle and on the site. It is mainly used in the field of liquid analysis: automotive gasoline, ethanol gasoline, automotive diesel, jet fuel, automotive urea, edible oil, beverages, and etc.

Performance features

- Results available in 10 seconds
- Simple operation, fast and accurate measurement
- Strong measurement applicability

Desktop Near-infrared Spectrometer
EXPEC 1370

Based on near-infrared diffuse reflectance spectroscopy technology. It is especially suitable for rapid inspection with laboratory precision of raw materials, processing processes and finished products in grain and oil processing, feed industry, petrochemical industry, pasture industry, textile and other industries.

Performance features

- Suitable for analysis of various types of samples, such as particles, flakes, powder, paste samples, and etc.
- Special sample trays possible to be customized to support testing of special samples such as fertilizers, asphalt; easy and simple to load samples, only requiring granular samples pressed flat, powder samples scraped flat
- Sample trays easy to clean and cross-contamination effectively prevented
- Accurate and fast inspection
- Simultaneous detection of multi-component indicators

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WELCOME TO NIR2021

On behalf of the organizing committee, we would like to invite you to join us at the 20th biennial meeting of the International Council for NIR Spectroscopy (ICNIRS), to be held from October 17th to 21st 2021 in Beijing, China. NIR2021 will provide an international forum for scientists, engineers, and postgraduate students to exchange and discuss new ideas, new findings, and new technologies for NIR spectroscopy and related areas.

The slogan of NIR2021 in Beijing is “Sense the Real Change”, meaning that we will sense the various spectral information of NIR, the development of spectral theory and chemometrics, the enhanced performance of instruments and measurement accessories. We also hope that every participant can personally sense the real changes in China, including the historical charm and modern atmosphere. And you can feel the passion of Chinese near-infrared researchers for NIR spectroscopy.

The theme of the conference is indicated by the logo, which is “Rainbow: Diversity, Optimization, and Inspiration”. The rainbow in the logo represents the spectrum, as well as the famous Chinese dragon. The dancing dragon signifies that NIR is taking off in the international technological arena, playing an increasingly important role in agriculture, food, pharmaceutical and chemical industries, and people's daily lives.

We hope that the NIR 2021 will make a great contribution to accelerate the advance of NIR technology through constructing a strong human network for NIR Spectroscopy in the world, and that you all will enjoy your stay in the wonderful city of Beijing, China.

We hope you can join us for this exciting event, and we look forward to seeing you all in Beijing in 2021.

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AWARDS

Karl Norris Award – Monday, October 18 at 16:15

Ceremony for Tomas Hirschfeld Address – Thursday, October 21 at 16:00

Workshop

The workshop will be held for two days just before the online meeting. (From 16th to 17th October, 2021).There are four representative issues in the workshop as follows.

Handheld Near-Infrared Spectroscopy: Quality Control and Protection against Product Counterfeiting

Heinz W. Siesler, Professor at Department of Physical Chemistry University of Duisburg-Essen, Germany and Hui Yan Professor at the School of Biotechnology Jiangsu University of Science and Technology, China

Miniaturization of handheld vibrational spectrometers is recently undergoing a rapid development and market research companies predict this instrumentation sector a bright future primarily based on its on-site and in-the-field applications, its easy implementation for industrial process control and its private use by non-experts.

In a short introduction the basic principles of the three vibrational spectroscopic techniques (Raman, mid-infrared (MIR) and near-infrared (NIR)) will be compared and from the summary of miniaturization for the three techniques a lucid explanation for the apparent advantages of handheld near-infrared spectrometers can be drawn. Thus progress in miniaturization and level of prize are the clear benefits of NIR and the reason why Raman and MIR spectroscopy are limited only to industrial, institutional and first-responder customers.

Contrary to the exaggerated claims of several direct-to-consumer companies that advertise their “NIR scanners” with “cloud evaluation of big data”, this tutorial will provide an overview on the realistic application potential of these handheld instruments for a broad range of materials (food, pharmaceuticals, textiles, polymers, etc.) and will also point out where the authors believe handheld NIR spectroscopy can offer a better analytical alternative than current methods.

NIRS for the Assessment and Authentication of Agrifood Products: from Lab to On-Site Applications

Dolores Pérez-Marín, Professor at Department of Animal Production University of Cordoba

Currently, the analytical needs in the agrifood sector require not only the fulfilment of the regulations to meet quality standards and protect their products from food frauds, but also to the need to self-control their processes to improve their efficiency. In addition, a key aspect is being able to control and trace the products along the entire food chain — “from farm to fork”— and for these purposes NIRS sensors are a great fit. This lecture will address the potential of NIRS to respond to specific applications in agriculture and food products (oils, feed, meat, fruit & vegetable), the main aspects in the development of a successful NIR application, together with the lastest and future advances and challenges in using NIR sensors for food quality, safety and authenticity issues, focusing on on-site applications using portable or on-line devices or the use of NIRS as a non targeted method.

A simple guide to complex world of overtone and combination bands. Theoretical simulation and interpretation of NIR spectra

Krzysztof B. Bec, Professor at University of Innsbruck, Austria

Recent progress in theoretical NIR spectroscopy largely improved our understanding of NIR spectra, e.g. it is possible to accurately simulate NIR absorption lineshape of various molecules and assign in full detail the measured bands to the corresponding vibrational modes. The example demonstrating the complex structure of overtones and combination bands, in this case in the NIR spectrum of thymol, is shown in the Figure.
The opportunity to accurately reconstruct NIR lineshape brings a new perspective on NIR spectroscopy, which will be thoroughly discussed during this workshop. Several myths will need to be debunked as well. It is often said that NIR spectroscopy is the spectroscopy of overtones, but in fact, it is the spectroscopy of combination bands. The example of the NIR spectrum of thymol shown in the Figure serves a good evidence.
This workshop is accessible and prepared with care for participants with little experience in computational chemistry and theoretical spectroscopy. As several common misconceptions about NIR spectra will be cleared throughout this workshop, more experienced professional will equally benefit from participating. The accessible form of the workshop makes it equally suitable for experienced practitioners, as well as students and participants just beginning their adventure with NIR spectroscopy.

Chemometrics Workshop

Tom Fearn, Professor of Applied Statistics University College London, UK

This will take the form of 4 pre-recorded videos, each lasting approximately 45 minutes. The intention is that they should be accessible to beginners in chemometrics, but I hope that more experienced users will also find them useful. The content will be:
1.Need for calibration in NIR and issues relating to experimental design and validation
2.Spectral pre-treatments including derivatives and scatter corrections
3.PCA, PCR and PLS
4.Nonlinear calibration methods

SCIENTIFIC PROGRAM DAY-BY-DAY

The online meeting of NIR2021 will be held from 18th to 21st October, 2021. Taking into account the time difference for the international participants, NIR2021 will be held from 4 pm to 7 pm (UTC+8, Beijing Time).

Monday, October 18

16:00-16:15	**Conference Welcome & Introduction** Chair: Hongfu Yuan & Tom Fearn
16:15-16:25	**Ceremony for Karl Norris Award** Introduced by Satoru Tsuchikawa
16:25-16:55	**A-01 NIR Spectroscopy-What a Wonderful World!** Yukihiro Ozaki Kwansei Gakuin University, Japan
	Section II: Instrument Chair: Hongfu Yuan
16:55-17:10	**O-16 Current Status and Future Trends in Sensor Miniaturization** Christian Huck University of Innsbruck, Austria
17:10-17:25	**O-17 Enhanced cavity absorption technology advances for greenhouse gas flux measurements and mobile gas leak detection** Frederic Despagne ABB, France
17:25-17:30	BREAK

Section I: Spectroscopy Theory and Chemometrics Chair: Yukihiro Ozaki	
17:30-17:50	**K-01 The Ever-Shrinking Spectrometer: New Technologies and Applications** Richard Crocombe Crocombe Spectroscopic Consulting, USA
17:50-18:05	**O-01 Modeling in near-infrared spectroscopy: Chemometric studies** Xueguang Shao Nankai Univeristy, China
18:05-18:20	**O-02 Hydrogen bonding free OH of water in hydrate melt** Yusuke Morisawa Kindai University, Japan
18:20-18:35	**O-03 Class-modeling revisited: the algorithms' new clothes** Federico Marini University of Rome La Sapienza, Italy
18:35-18:40	BREAK
Section I: Spectroscopy Theory and Chemometrics Chair: Christian Huck	
18:40-18:55	**O-04 NIR application in industry quality control** Wei Gong Jiangsu University, China
18:55-19:10	**O-05 Probabilistic Model-based Clustering for Geographical Origin Discrimination of Ganoderma Lucidum Using FTIR Spectroscopy** Ying Zhu Nanyang Technological University, Singapore
19:10-19:25	**O-08 Selecting important and stable feature wavelengths to prolong the service life of NIR calibration model of total plant alkaloids** Lijun Ni East China University of Science & Technology, China

Tuesday, October 19 (Conference Room A)

Section VII: Aquaphotomics Chair: Xueguang Shao	
16:00-16:20	**K-05 Aquaphotomics as an Innovative Science and Technological Platform** Roumiana Tsenkova Kobe University, Japan
16:20-16:35	**O-63 Near Infrared Aquaphotomics evaluation of nasal secretions as a potential diagnostic tool for Bovine Respiratory Syncytial Virus (BRSV) infection in cattle** Mariana Santos-Rivera Mississippi State University, USA
16:35-16:50	**O-64 Aquaphotomics as a Basis for Future NIRS Biomeasurement Technologies** Jelena Muncan Kobe University, Japan
16:50-17:00	**O-65 Investigation of Protective Effect of Ethanol on the Natural Structure of Protein** Cui Yang Shandong University, China
17:00-17:10	**O-66 Understanding the structure of water in aqueous solutions by temperature-dependent near-infrared spectroscopy** Yan Sun Nankai University, China
17:10-17:15	BREAK

Section III: Agriculture, Food, Forestry Chair: Roumiana Tsenkova	
17:15-17:30	**O-21 Forestry 4.0: Application of near infrared spectroscopy in precision forestry** Roger Meder Meder Consulting, Australia
17:30-17:45	**O-22 Feasibility Study of Evaluation of Tetramethylthiuram Disulfide in Concentrated Latex using Near Infrared Spectroscopy** Panmanas Sirisomboon King Mongkut's Institute of Technology, Thailand
17:45-18:00	**O-23 Determination of Trace Components in Burley Tobacco by Near Infrared Analysis** Yanjun Ma Shanghai Tobacco Group Beijing Cigarette Factory, China
18:00-18:10	**O-24 Perfluorocarbon-incorporated near-infrared spectroscopic discrimination of cultivation region of agriculture product** Haeseong Jeong Hanyang University, Korea
18:10-18:20	**O-25 Stand-alone LED sensors for future field monitoring of grape (Vitis vinifera L.) ripeness** Alessio Tugnolo Università degli Studi di Milano La Statale, Italy
18:20-18:25	BREAK
Section III: Agriculture, Food, Forestry Chair: Roger Meder	
18:25-18:40	**O-26 Visualize and simulate the three-dimensional water distribution within softwood using near-infrared hyperspectral imaging coupled with a mass transfer simulation method** Te Ma Nagoya University, Japan
18:40-18:55	**O-27 Chemical characterization of pine nuts coming from different origin by using near-infrared hyperspectral imaging and chemometrics** Rocío Ríos-Reina Instituto de la Grasa, Spain
18:55-19:10	**O-28 Use of Near Infrared Spectroscopy for estimation of Nitrogen Credits of different Cover Crops** Nicolo Pricca CREA-ZA, Italy
19:10-19:20	**O-29 Infrared guided processing: a potential strategy to predict processed purees properties from spectra of intact apples** Weijie Lan French National Institute for Agriculture, Food, and Environment , France
19:20-20:30	ICNIRS General Meeting

Tuesday, October 19 (Conference Room B)

Section VII: PAT and Imaging Chair: Søren Balling Engelsen	
16:00-16:15	**O-56 Chemical and textural changes between batch and continuous manufacturing procedures of Danish Buttered Cookies with NIR-HSI** Jose Amigo University of the Basque Country, Spain
16:15-16:30	**O-57 Multivariate Statistical Process Control charts for milk renneting** Silvia Grassi Università degli Studi di Milano, Italy
16:30-16:45	**O-58 Investigation of the influence of embryogenesis on water structure in a Medaka fish egg using NIR imaging** Mika Ishigaki Shimane University, Japan
16:45-16:55	**O-59 Use of virtual standards and a NIR portable spectrometer to monitor the alkyl-ester content in the transesterification process** Flávio de Andrade Federal University of Pernambuco, Brazil
16:55-17:00	BREAK
Section VII: PAT and Imaging Chair: Yiping Du	
17:00-17:20	**K-04 Real-Time and On-Site Quality Control by Miniature Near-Infrared Spectroscopy: Science Meets Every-Day-Life** Heinz Siesler University of Duisburg-Essen, Germany
17:20-17:35	**O-60 Online real-time monitoring of a rapid enzymatic oil degumming process using free-run FT-NIR spectroscopy** Jakob Larsen University of Copenhagen, Denmark
17:35-17:50	**O-61 FT–NIR, FT-MIR and Raman spectral imaging comparison for lactose prediction in dry milk on metallic surfaces** Vicky Caponigro UCD School of Biosystems and Food Engineering, Ireland
17:50-18:00	**O-62 Multivariate shelf-life of chia seeds based on NIR-hyperspectral imaging: validation by re-sampling approach** Luis Jam Pier Cruz Tirado University of Campinas, Spain
18:00-18:05	BREAK

Section I: Spectroscopy Theory and Chemometrics Chair: Heinz Siesler	
18:05-18:20	**O-07 Compensation method and its application of fusion for multi-modal NIR spectral pattern recognition** Tao Pan Jinan University, China
18:20-18:35	**O-06 Applications of Sampling Error Profile Analysis (SEPA) in NIR Spectroscopic Analysis** Yiping Du East China University of Science & Technology, China
18:35-18:50	**O-09 The new avenue–theoretical simulation of NIR spectra and its potential in analytical applications** Krzysztof Bec University of Innsbruck, Austria
18:50-19:00	**O-10 Introducing Transformer Architecture to Joint Calibration of vis-NIR Spectra Across Instruments** Tong Lei University College Dublin, Ireland
19:00-19:10	**O-11 Derivation of an extended radiative transfer equation from the electromagnetic wave equation** Toshiaki Aoki Hokkaido University, Japan

Wednesday, October 20 (Conference Room A)

Section III: Agriculture, Food, Forestry Chair: Dolores Pérez-Marín	
16:00-16:20	**K-03 Advances in Hyperspectral Imaging Technology for Food Quality and Safety Detection and Control** Da-Wen Sun University College Dublin, Ireland
16:20-16:35	**O-30 Development of Monitoring Method for Water Activity of Beef Cut during Drying Process by Short Wavelength NIR Spectroscopy** Daitaro Ishikawa Fukushima University, Japan
16:35-16:50	**O-31 Forage calibrations transfer from laboratory to portable NIR instruments** Paolo Berzaghi University of Padua, Italy
16:50-17:00	**O-32 A non-integer order Savitzky–Golay differential filter and its application to predict soil Phosphorus from on-line Vis-NIR spectra** Jian Zhang Ghent University, Belgium
17:00-17:05	BREAK

Section III: Agriculture, Food, Forestry Chair: Nicola Cavallini	
17:05-17:20	**O-33 Monitoring of Total Acidity Content in Continuous Vinegar Fermentation Using a Self-made Setup with a Modified MEMS NIR Spectrometer** Hui Yan Jiangsu University of Science and Technology, China
17:20-17:35	**O-34 Determination of Vegetable Oil Oxidation Causes by Near-Infrared Spectroscopy** Yurika Otoki Tohoku University, Japan
17:35-17:50	**O-35 Indices of marine finfish physiological condition to enhance fisheries research, monitoring capabilities, and management** Esther Goldstein National Oceanic and Atmospheric Administration, USA
17:50-18:00	**O-36 Measurement of 6-gingerol and 6-shogaol in ginger using NIRS** Joel Johnson CQ University Australia
18:00-18:10	**O-37 Non-Destructive Detection of Chilling Injury in Kiwifruit with a Dual-Laser System** Mark Wang New Zealand Institute for Plant & Food Research
18:10-18:15	BREAK
Section III: Agriculture, Food, Forestry Chair: Panmanas Sirisomboon	
18:15-18:30	**O-38 Texturized vegetable proteins surface characterization with NIR hyperspectral imaging** Giacomo Squeo University of Bari Aldo Moro, Italy
18:30-18:45	**O-39 Freshness Evaluation of Stored Cabbage: An alternative to the gene-expression based method** Miho Sesumi National Agriculture and Food Research Organization, Japan
18:45-18:55	**O-40 Development of an adulterant detection model (starch and chalk) for quality control of garlic powder** Kelly Patarroyo León Universidad Nacional de Colombia, Colombia
18:55-19:05	**O-41 Data fusion strategy combined with chemometrics to trace the origins of Tibetan medicine Meconopsis integrifplia (Maxim.) Franch. from Qinghai-Tibet Plateau** Duo Li Northwest Institute of Plateau Biology, China
19:05-19:15	**O-42 Spectral Denoising Method Based on Variational Mode Decomposition** Mengxuan Ling Tiangong University, China

Wednesday, October 20 (Conference Room B)

Section IV: Pharmaceutical and Chemistry Chair: Satoru Tsuchikawa	
16:00-16:15	**O-43 Near-infrared Observation of Mg(OH)2 dehydration and MgO hydration** Masato Takeuchi Osaka Prefecture University, Japan
16:15-16:30	**O-44 Mid-level data fusion of NIR spectra and process sensor data for the real time monitoring of ABS production** Lorenzo Strani University of Modena and Reggio Emilia, Italy
16:30-16:45	**O-45 Hyperspectral Imaging of the Thickness Distribution of Thin Printed Layers of PEDOT:PSS** Tom Scherzer Leibniz Institute of Surface Engineering, Germany
16:45-16:55	**O-46 Spatially and Angularly Resolved Diffuse Reflectance Measurements for the Monitoring of Moisture Content During the Drying of Pharmaceutical Solids** Mais Al-Attili University of Strathclyde, UK
16:55-17:00	BREAK
Section IV: Pharmaceutical and Chemistry Chair: Pierre Esseiva	
17:00-17:15	**O-47 Establishing a Global Network of Pharmaceutical Quality Compliance Screening Using Low-Cost and Portable NIR Spectrometers and Open-Source Software** Matthew Eady FHI 360, USA
17:15-17:30	**O-48 The application of Nir in plant extracts** Wenjie Shi Chenguang Biotech Group Co., Ltd, China
17:30-17:45	**O-49 VIAVI MicroNIRTM NIR Spectrometers for Diverse Handheld and Process Monitoring Applications** Pengcheng Yu Viavi Solutions, Singapore
17:45-18:00	**O-50 Accuracy evaluation of moisture determination in food and grains application** Guo Tang Intelligent Analysis Service Co., Ltd, China
18:00-18:05	BREAK

Section V: Biomedicine, Environment, and fNIR Chair: Ying Zhu	
18:05-18:20	**O-52 Rapid detection of malaria parasites in red blood cells using NIR** Maggy Lord The University of Queensland, Australia
18:20-18:35	**O-51 NIR spectroscopy coupled with chemometrics for the classification of waste wood and the assessment of the best-suited reuse** Manuela Mancini University fo Copenhagen, Denmark
18:35-18:50	**O-53 The influence of inorganic carbon on the spectral analysis of organic carbon in marine sediments** Pingping Fan Instrument of Oceanographic Instrumentation, Shandong Academy of Sciences, China
18:50-19:00	**O-54 Giant Panda gender discrimination using Near Infrared Spectroscopy (NIRS) with fecal samples of different processing modes and sampling seasons** Qingyu Sheng Mississippi State University, USA
19:00-19:10	**O-55 Near-infrared spectroscopic analysis of bile juice samples obtained from patients with various gallbladder diseases** Eunjin Jang Hanyang University, Korea

Thursday, October 21

16:00-16:10	Ceremony for Tomas Hirschfeld Address Introduced by Pierre Dardenne
16:10-16:40	**A-02 The treachery of NIRS applications: authentic or not?** Vincent Baeten Walloon Agricultural Research Center, Belgium
Section II: Instrument Chair: Zengling Yang	
16:40-16:55	**O-18 Real time qualification and quantification of drugs using handheld Near-Infrared spectroscopy connected with mobile phone application. An opportunity for forensic laboratories to cope with the trend toward the decentralization of forensic capabilities.** Pierre Esseiva University of Lausanne, Switzerland
16:55-17:10	**O-19 Reemoon NIR Technology for Fruit Grading Applications** Yue Lin Jiangxi Reemoon Technology Holding Co., LTD., China
17:10-17:25	**O-12 Recent advances of variable selection methods based on hybrid strategy in near-infrared spectroscopy** Yong-Huan Yun Hainan University, China
17:25-17:30	BREAK

Section I: Spectroscopy Theory and Chemometrics Chair: Vincent Baeten	
17:30-17:50	**K-02 NIR spectroscopy methods for nondestructive quality analysis of oilseeds and edible oils** Peiwu Li Chinese Academy of Agricultural Sciences, China
17:50-18:05	**O-20 Application of NIRS Technology in the Development of Green Animal Husbandry** Zengling Yang China Agricultural University, China
18:05-18:20	**O-13 NIR spectroscopy coupled with chemometrics to discriminate between fresh and thawed cephalopods** Nicola Cavallini Polytechnic of Turin, Italy
18:20-18:35	**O-14 Generalized Least Squares filter on highly noisy data. Improvement on the Spectral Variability of Autochthonous Chilean Trees** Leire Kortazar University of the Basque Country, Spain
18:35-18:50	**O-15 Comparison between ParSketch-PLSDA and PLSDA in a context of large amounts of spectral data for sunflower genotype discrimination** Maxime Ryckewaert Univ Montpellier, France
18:50-19:00	Information for NIR2023
19:00-19:10	Best Poster Award
19:10-19:15	Close

POSTER SESSION

P-01 A parameter-free framework for calibration enhancement of near infrared spectroscopy based on correlation constraint
Jin Zhang

P-02 Near Infrared Spectroscopy in China
Xiaoli Chu, Hongfu Yuan

P-03 Feature extraction method of infrared spectra with convolutional neural network
Jingjing Xia, Yanmei Xiong*, Shungeng Min*

P-04 Prediction of α-Lactalbumin and β-Lactoglobulin Composition of Aqueous Whey Solutions Using Fourier Transform Mid-Infrared Spectroscopy and Near-Infrared Spectroscopy
Margherita Tonolini, Klavs Martin Sørensen, Peter B. Skou, Colin Ray and Søren Balling Engelsen

P-05 Determination of K, Na, Ca, Mg in cigarette paper by NIR spectroscopy combined with LS-SVM
Weixin Xu, Yueyao Chen, Shungeng Min*, Yanmei Xiong*

P-06 Quantitative analysis of tobacco chemical constituents based on near-infrared spectroscopy
Yun Wei, Xinran Mao, Yanmei Xiong*, Shungeng Min*

P-07 Removal of External Influences from On-line Vis-NIR Spectral Data for Predicting Soil Organic Carbon: Comparison of Spectra Transfer vs Orthogonalization methods
Muhammad Abdul Munnaf, Abdul Mounem Mouazen*

P-08 Progress and application of ICA in NIR Spectroscopy
Xiu Huang, Xiaoyu Yang and YanKun Li*

P-09 Feature Selection of NIR Spectra for Diagnosis of Carcinoma Tissues
Zhuoyong Zhang

P-10 An innovative chemometric strategy coupled with visible and infrared spectroscopies to guide apple puree formulation
Benoit Jaillais, Weijie Lan, Songchao Chen, Alexandre Leca, Catherine M.G.C Renard, Sylvie Bureau

P-11 Theoretical Simulation of Near-infrared Spectrum of Piperine. Insight into Band Origins and the Features of Regression Models from Different Spectrometers
Justyna Grabska, Krzysztof B. Bec and Christian W. Huck

P-12 LASSO based near infrared spectral multivariate calibration methods
Kaiyi Wang, Xihui Bian*, Xiaotong Shang, Caiyun Guo and Xiaoyao Tan

P-13 Study on near-infrared light scattering in colloidal suspensions using time-resolved measurements
Yuki Inoue, Hiroyuki Fujii, Goro Nishimura, Toshiaki Aoki, Kazumichi Kobayashi and Masao Watanabe

P-14 The influence of derivative spectral smoothing parameters on the transfer performance of near infrared spectral model of total plant alkaloids in tobacco leaves
Liguo Zhang, Yun Qu, Shijun Hong, Jiong Ge, Shun Ye, Haoran Sun and Lijun Ni*

P-15 Unsupervised temporal analysis of NIRS spectra: application of the MWPCA to the characterization of leaf senescence in wheat
Héloïse Villesseche, Elsa Ballini, Ryad Bendoula, Martin Ecarnot, Nathalie Gorretta and Pierre Roumet

P-16 Weighted multi-scale support vector regression based on variational mode decomposition for spectral quantitative analysis of complex samples
Xihui Bian*, Kui Zhang, Shuyu Wang and Xiaoyao Tan

P-17 Application of Convolutional Neural Network Model Based on Combined NIR-Raman Spectra in Feed Composition Analysis
Wenjie Zhang, Yihao Liang, Gongyi Cheng, Chao Dong, Bin Wang and Xiaoxuan Xu*

P-18 Differentiation and comparison of quality control in Tibetan medicine Meconopsis quintuplinervia Regel. based on multi-spectral analysis and chemometric method
Long Ruolan, Li Peipei, Li duo, Feng Dan, Sun Jing*

P-19 Qualitative and Quantitative Analysis of Rheum tanguticum Maxim. in Different Months from Qinghai-Tibet Plateau based on Multi-Spectroscopy
Feng Dan, Long Ruolan, Li Duo, Li Peipei and Sun Jing*

P-20 Research on nonlinear quantitative of Rebaudioside A crystallization process based on near infrared sensor fusion
Hailing Dong, Lian Li*, Hengchang Zang

P-21 Regularization in Spectroscopic Data Analysis with application to the prediction of percentage purity in olive-sunflower oil blends
Chin Gi Soh and Ying Zhu

P-22 Spatial and Spectral Limits of Detection (LoD) in the detection of microplastics in sand by Near Infrared Hyperspectral Imaging
Reaha Goyetche and José Manuel Amigo

P-23 Product monitoring and exploratory analysis of historical data
Emanuele Farinini and Riccardo Leardi

P-24 The discretization of swarm intelligence optimization algorithm for spectral variable selection
Rongling Zhang, Xihui Bian* and Peng Liu

P-25 A Probing Device to Improve the Performance of Multivariate Models Using Compact Near-infrared Spectrophotometers
Celio Pasquini and Maria do Carmo Hespanhol

P-26 Unstable Light Radiation Effect of Light Source for NIR Mobile Device
Krairuek Ngowsuwan*, Sumaporn Kasemsumran and Sunee Jungtheerapanich

P-27 Study On On-line Quantitative Analysis of Recycle Textile Near Infrared Spectroscopy Based on GAN Semi-supervised Regression Method
HU Jin-quan, YANG Hui-hua, ZHAO Guo-liang and ZHOU Rui-zhi

P-28 Active Hyperspectral Sensor for Mineralogy Mapping and Plastic Waste Sorting
Francisco Senna Vieira, Mikhail Mekhrengin, Teemu Kääriäinen, Ilkka Rytöluoto, Timo Dönsberg and Guillaume Genoud

P-29 The combination of Firework algorithm and LSSVM algorithm is applied to the detection of hydrogen sulfide in natural gas
Jiao Yue, Yan Zhi-dan, Li Guo-lin, Ma Kun, Zhang Xue-na, Wu Yun-hui and Zhang Ze-cheng

P-30 A method based on GA-ELM for concentration prediction in the H2S detection system
Ma Kun, Yan, Zhi-dan, Li Guo-lin, Jiao Yue, Zhang Xue-na, Wu Yun-hui and Zhang Ze-cheng

P-31 NIR Spectral Imaging Chip Based on Metasurface
Hongbo Zhu, Kaiyu Cui* and Yidong Huang

P-32 Modeling for determining catechin compounds in Oolong tea using FT-NIRS coupled with multivariate data analysis
Guangjun Qiu, Wei Chen and Huazhong Lu*

P-33 Data augmentation: Hyperspectral imaging technology combined with deep convolutional generative adversarial network to identify haploid maize kernels
Liu Zhang, Haiyan Ji, Yaqian Wang, Yaoguang Wei and Dong An

P-34 Evaluation of Volatile Fatty Acid Number of Field and Concentrated Latex of Para Rubber by Near Infrared Spectroscopy
Jeerayut Hongwiangjan, Chayaporn Moryadee, Poramin Surason, Watchapol Kaeophanth, Chin Hock Lim and Panmanas Sirisomboon

P-35 Calibration development for lactose in milk protein concentrate using a NIR transflectance probe connected to a multiplexed FT-NIR spectrometer
Yuanyuan Pu*, Dolores Pérez Marín, Norah O'Shea and Ana Garrido-Varo

P-36 Application of near infrared spectroscopy to classify rice samples harvested in different years
Xuexue Miao*, Ying Miao, Shuhua Tao, Jiemin Wang, Zuwu Chen and Yingzi Chen

P-37 Online assessment of the nitrate content in spinach plants using a FT-NIR instrument and LOCAL algorithm
Miguel Vega-Castellote, María-Teresa Sánchez, Irina Torres and Dolores Pérez-Marín

P-38 Binary Differential Evolution Algorithm Applied for Wavelength Selection in NIR Analysis of Fishmeal
Youyou Zhang, Huazhou Chen*, Lili Xu, Chunting Li and Hanli Qiao

P-39 Exploration of the optimization method of feature wavelength screening in the classification data processing of frozen fish in near infrared spectroscopy
Gongyi Cheng, Sizhuo Meng, Shuhan Liu, Yiping Jiao, Xinghao Chen, Wenjie Zhang, Wang Zhang, Bin Wang and Xiaoxuan Xu

P-40 Non-destructive detection of adulterated sweet almond batches using portable NIRS sensors
Irina Torres, María-Teresa Sánchez, Miguel Vega-Castellote and Dolores Pérez-Marín

P-41 Application of Hyperspectral Imaging Technology in Agriculture
Haiyan Ji

P-42 Feasibility study of the prediction of fatty acids in sliced Iberian pig ham using a miniature Near Infrared sensor
Dolores Pérez-Marín, Irina Torres, José A. Entrenas, Lourdes Fresco and Ana Garrido-Varo

P-43 Influence of the instrument wavelength range for the prediction of olive oil quality attributes
Maria del Mar Garrido-Cuevas, Ana Garrido-Varo* and Dolores Pérez -Marín

P-44 Deep learning approach of visible microscopic and NIR macroscopic image for wood species classification
Fumiya Kimura, Te Ma, Satoru Tsuchikawa and Tetsuya Inagaki

P-45 Non-destructive Detection of Low-density Food Contaminations using Single Pixel based NIR Multispectral Imaging
Takumi Kimura, Satoru Tsuchikawa, Te Ma and Tetsuya Inagaki

P-46 Rapid and accurate simultaneous determination of the variety and geographical origin of Wuyou No.4 rice by Fourier transform near-infrared spectroscopy coupled with chemometrics
Peijin Tong*, Hongchao Zhang, Tingting Wei and Wenming Cao

P-47 Wine Fermentation Process Monitoring by NIR Analysis Method
Sumaporn Kasemsumran*, Antika Boondaeng, Kraireuk Ngowsuwan, Sunee Jungtheerapanich, Waraporn Apiwatanapiwat, Phornphimon Janchai, Jiraporn Meelaksana and Pilanee Vaithanomsat

P-48 Handheld NIR spectrometers to evaluate grass silage quality A study of calibration performance
Juan Antonio Fernández Pierna, Nicolas Chamberland, Philippe Vermeulen, Virginie Decruyenaere, Eric Froidmont, Oliver Minet, Bernard Lecler and Vincent Baeten

P-49 Vis-NIR spectroscopy combined with Bayes classifier based on wavelength screening applied to wine multi-brand identification
Jiaqi Li, Nailiang Chang, Lijun Yao and Tao Pan*

P-50 Wavelength selection method based on spectral separation degree with Vis-NIR spectroscopy applied to discrimination of milk powder adulteration
Tao Pan*, Yan Tang, Jiaqi Li and Jiemei Chen

P-51 NIR-NMR spectroscopy fusion, an approach to open the black-box of NIR spectroscopy used to monitor the freshness of vegetables
Xinyue Li, Yasuyo Sekiyama, Nobutaka Nakamura, Yoko Suzuki and Mizuki Tsuta

P-52 Handheld NIR and PLS-DA for onsite detection of injected water and discrimination of different injected solutions in tuna
Sonia Nieto-Ortega, Ángela Melado-Herreros, Idoia Olabarrieta, Giuseppe Foti, Graciela Ramilo-Fernández, Carmen G. Sotelo, Bárbara Teixeira, Amaya Velasco and Rogério Mendes

P-53 Comprehensive evaluation of Sargassum fusiforme from different havest times using near-infrared spectroscopy and chemometrics
Yang Yue, Mingjiang Wu and Haibin Tong

P-54 Development of NIRS calibrations for seed content of lipids and proteins in contrasting white lupin germplasm
Barbara Ferrari, Stefania Barzaghi and Paolo Annicchiarico

P-55 Estimation of texture change during cheese maturation using spatially resolved diffuse reflectance
Karin Agena, Mito Kokawa and Yutaka Kitamura

P-56 Irreversible changes of woods under multiple tensile load-unload cycles evaluated by the eigenvalue distribution of NIR spectral matrices
Takaaki Fujimoto

P-57 Assessment of kernel presence in winter wheat ears using Near-Infrared Hyperspectral Imaging
Damien Vincke, Benoît Mercatoris, Damien Eylenbosch, Vincent Baeten and Philippe Vermeulen

P-58 Identification of Acacia clones wood using Near-infrared hyperspectral imaging and deep learning method
Viet Dang Duc, Te Ma, Tetsuya Inagaki and Satoru Tsuchikawa

P-59 NIR and IR study on amylose-amylopectin mixture for evaluation of hydration of starches
Norihisa Katayama, Takanari Ikeda and Mayumi Kuwano

P-60 The AS7265x chipset as an alternative low-cost multispectral sensor for agricultural applications
Arnaud Ducanchez, Simon Moinard, Guilhem Brunel, Ryad Bendoula, Daphné Héran and Bruno Tisseyre

P-61 Determination of quail egg freshness using a portable NIR spectrometer
Yasmin Lima Brasil, J.P. Cruz-Tirado and Douglas Fernandes Barbin

P-62 Use of Vis-NIR spectroscopy to predict nutrient composition of poultry excreta
Andrés Cruz-Conesa, Itziar Ruisánchez, M. Pilar Callao, Anna M. Pérez-Vendrell* and Joan Ferré

P-63 Simultaneous updating of NIR calibration models to predict protein, gross energy, fat and fibre in pig feces using a sample selection algorithm based on D-optimal criterion
Andres Cruz-Conesa, Joan Ferré*, M. Pilar Callao, Anna M. Pérez-Vendrell and Itziar Ruisánchez

P-64 Abnormal egg detection using visible/near-infrared spectral system with optimized lighting source
Juntae Kim and Byoung-Kwan Cho

P-65 Exploring the use of Fourier transform near infrared spectroscopy as a tool to predict maturity and spawning status in marine fishes with variable reproductive strategies
Todd T. TenBrink, Morgan B. Arrington, Irina M. Benson, Thomas E. Helser and Sandi K. Neidetcher

P-66 Estimating Fish Age from Otolith Near Infrared Spectra and Machine Learning
Irina M. Benson, Thomas E. Helser, Brenna C. Groom and Beverly K. Barnett

P-67 Smart-HAND: a simplified LED device for intact olives quality evaluation
Alessia Pampuri*, Valentina Giovenzana, Roberto Beghi, Alessio Tugnolo, Andrea Casson and Riccardo Guidetti

P-68 Rapid determination of Nitrogen, Iron and Potassium in citrus leaves by VIS / NIR spectroscopy and chemometrics
Maylin Acosta, Isabel Rodriguez, Fernando Viosconti, Sandra Munera, Ana Quiñones, Jose Miguel de Paz and José Blasco

P-69 Estimating the single-point nitrogen content of rubber leaves from single-point spectra based on CNN
Chuang Li, Xiaochuan Luo, Jingjin Wu and Rongnian Tang

P-70 Portable NIR combined with iPLS for the measurement of cherry tomato quality
Tai-Sheng Yeh, Feng-Zhi Zuo, Phan Quoc Lap Nguyen and Thao Nhi Doan

P-71 Mid-level data fusion of NIR spectra and process sensor data for the real time monitoring of ABS production
Zhiqiang Wu, Qing Zhang, Juan Li, Xingyu Wang and Wenjie Zheng*

P-72 Efficient Recognition and Automatic Sorting of Waste Textiles by Online Near Infrared Spectroscopy Based on Convolutional Neural Network
Wenxia Li, Yujun Du, Zhengdong Liu, Jiahui Zheng, wenqian Du and Huaping Wang

P-73 Application of Near-Infrared Analysis technology in intermediate control analysis of refinery
Yanbin Wang, Xiaorui Zhao, Siping Du, Yuan Xiu and Lina He

P-74 Rapid monitoring the extraction process of Stevia rebaudiana Bertoni leaves using near infrared spectroscopy
Lele Gao, Liang Zhong, Yongheng Wei, Lian Li and Hengchang Zang*

P-75 Rapid analysis of properties of hydro-upgrading diesel by NIR without fractionation
Lina He, Yuan Xiu and Yanbin Wang

P-76 Embedded NIR spectroscopy for rotary tablet press
Yves Roggo, Laurent Pellegatti, Markus Krumme, Anna Novikova and Alexander Evers

P-77 Evidencing the importance of preprocessing NIR spectra to determine the physicochemical properties of diesel using chemometric strategies
M. Suliany Rodríguez-Barrios, Montserrat Montragull, Enric Ruiz, M. Soledad Larrechi and Joan Ferré

P-78 Determination of nitrogen and phosphorus in dairy slurry using near infrared diffuse reflection spectroscopy
Mengting Li, Di Sun, Run Zhao* and Renjie Yang

P-79 Resnet combined with transfer learning for drug classification using near-infrared spectroscopy
Fu Pengyou, Li Lingqiao, Wang Qibing, Lu Haoxiang and Yang Huihua*

P-80 Method Development and Validation of a Near-infrared spectroscopic method for In-line API quantification during fluidized bed granulation
Liang Zhong, Lele Gao, Yongheng Wei, Lian Li and Hengchang Zang*

P-81 Rapid Determination of Ethylene content in anti-impact Polypropylene via Near-Infrared Techniques
Tong Guo, Longhai Guo

P-82 Research Progress of Near-Infrared Spectroscopy in Quality Evaluation of the Valuable Chinese Materia Medica
Zhiwei Huang, Denghui Wang, Haoran Xu, Chuxuan Ye, Wenjing Huang, Jinfang Ma* and XueXiao*

P-83 Mapping of executive function and decision-making impairments in gambling addiction by using fused EEG-fNIRS
Zhen Yuan

P-84 Study on Feature Spectrum Extraction and Classification of Sediments in Different Regions
Xueying Li, Zongmin Li, Pingping Fan*, Huimin Qiu and Guangli Hou

P-85 Spectral Model Comparison Analysis of Carbon and Nitrogen Content in Coastal Tidal Flat Sediments Based on Visible-Near Infrared Spectroscopy
Huimin Qiu, Xueying Li, Guangli Hou and Pingping Fan*

P-86 Near Infrared spectroscopy is used to study the structural changes of human serum albumin
Chen Yu, Lian Li and Hengchang Zang*

P-87 Model Fusion for Identification Analysis with Vis-NIR Spectroscopy Applied to Serum Breast Cancer Screening
Tao Pan*, Jing Zhang, Jianhua Xu, Lijun Yao and Dawei Wang

P-88 FT-NIR transmission analysis of urine samples: a feasibility study for the early screening of prostatic cancer
Monica Casale, Eleonora Mustorgi, Cristina Malegori, Paolo Oliveri, Luca Brizzi, Alessio Tognarelli and Riccardo Bartoletti

P-89 Detection of microplastics in soil by near-infrared spectroscopy
Chunhong Zhang, Norio Yoshimura and Masao Takayanagi

P-90 The potential of NIR technique for diagnosis of Trichuris muris and Schistosoma mansoni
Silvia Ciocchetta, Paul Robert Giacomin, Tharanga Niroshini Kariyawasam, Paul Visendi, Floyd Ercell Dowell, Ricardo Soares Magalhães and Maggy Sikulu-Lord

P-91 Search for a potential non NIR-absorbing liquid for NIR spectroscopic detection of microplastics in water
Yunjung Kim and Hoeil Chung

P-92 Monitoring of insect pests in crop fields using spectral imaging
Rosalba Calvini, Veronica Ferrari, Lara Maistrello and Alessandro Ulrici

P-93 Microplastics identification and characterisation in aquatic samples by means of hyperspectral imaging (NIR-HSI) and chemometrics
Cristina Malegori, Stefania Piarulli, Ferrante Grasselli, Laura Airoldi, Silvia Prati, Rocco Mazzeo, Giorgia Sciutto and Paolo Oliveri

P-94 Identification and classification of Fungal Colonies in Walls by using Near Infrared Hyperspectral Imaging
Iñaki Vázquez-de la Fuente, Saioa Cendon-Sanchez, Jose Manuel Amigo, Nagore Prieto-Taboada, Ainara Gredilla-Altonaga, Xabier Guruceaga, Aitor Rementeria, Fernando L. Hernando, Andoni Ramírez-García, Gorka Arana and Juan Manuel Madariaga

P-95 Continuous blending monitoring and end-point identification by means of a near-infrared-based PAT tool
Cristina Malegori, Paolo Oliveri, Vanina Borghi, Diana Carolina Angela, Paola Melli, Eleonora Mustorgi and Monica Casale

P-96 NIR-HSI and MCR for the evaluation of fibre distribution in enriched pasta
Amanda Teixeira Badaró*, José Manuel Amigo, Jose Blasco, Nuria Aleixos, Amanda Rios Ferreira, Maria Teresa Pedrosa Silva Clerici and Douglas Fernandes Barbin

P-97 Chemometric Methods for Quantitative Analysis of Aqueous Samples by Temperature-Dependent Near-Infrared Spectra
Li Han, Changlin Su, Xiaoyu Cui, Wensheng Cai and Xueguang Shao*

P-98 Investigating the water structures in reverse micelles by temperature-dependent near-infrared spectroscopy
Mian Wang, Shiying Wang, Wensheng Cai and Xueguang Shao*

P-99 Fountain graph for temperature-dependent variable selection in near-infrared spectra
Xiaoyu Cui, Wensheng Cai and Xueguang Shao*

P-100 Water as a probe to diagnose urine of rats with acute blood stasis syndrome treated by Xinkeshu tablets based on temperature-dependent near-infrared spectroscopy
Yongheng Wei, Lele Gao, Liang Zhong and Hengchang Zang

P-101 The Aquaphotomics and E-nose approaches to evaluate the shelf life of ready-to-eat rocket salad
Laura Marinoni, Giulia Bianchi and Tiziana M.P. Cattaneo

P-102 Spectroscopic characterization of phoenician glass bead excavated in the philippines: bird bead
Chatdanai Boonruang, Krit Won-in* Joanna Cheock and Pisutti Dararutana

P-103 Insight into hydration behavior of poly (hydroxypropyl acrylate) block copolymer by temperature-dependent infrared spectroscopy
Chongwen Xiong, Yulin Guo, Shiwei Han and Longhai Guo

P-104 Prediction of rubber leaf nitrogen content based on fractional order GWO-SVR
Tang Rongnian, Li Xiaowei, Li Chuang and Wu Jingjin*

P-105 Comparison between gasoline samples for forensic purposes using handheld and benchtop instruments
Luan Cássio Barbosa Patricio, Maria Eduarda Fernandes da Silva, Rafaella Figueiredo Sales, Neirivaldo Cavalcante da Silva, Lívia Rodrigues e Brito and Maria Fernanda Pimentel

P-106 A handheld NIR spectroscopy system with online chemometrics
Robert Lovrincic, Michel Kettner and Alexander Klein

P-107 Ultraviolet-visible-near infrared spectroscopy for detection of low-level malaria parasitemia in whole blood
John A. Adegoke, Amanda De Paoli, Isaac O. Afara, Kamila Kochan, Darren J. Creek, Philip Heraud and Bayden R. Wood*

P-108 Transformation of NIR to HPLC fingerprint: A feasibility research with Gastrodiae rhizoma as an example
Qi Zeng and Wenlong Li*

P-109 Research on non-destructive detection of cotton seed plumpness based on terahertz time-domain spectroscopy and imaging technology
Li Yang, Wu Jing-Zhu*, Sun Li-Juan, Liu Cui-Ling and Sun Xiao-Rong

P-110 Study on detection method of internal mildew of peanut based on hyperspectral technology
Qian Zhang, Jingzhu Wu*, Cuiling Liu and Xiaorong Sun

P-111 Discrimination of adulterated milk using temperature- dependent two-dimensional near-infrared correlation spectroscopy
Mingyue Huang, Haiyun Wu, Hao Jin, Yanrong Yang and Renjie Yang*

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