

### **Enrico Taglioni**

Data di nascita: 03/10/1998

Roma, Italia (Lavoro)

Nazionalità: Italiana Numero di telefono:

Indirizzo e-mail Indirizzo: Piazzale Aldo Moro, 5, Edificio CU014, Primo piano, 00185,

#### • ESPERIENZA LAVORATIVA

2022 – 2023 Roma, Italia VINCITORE BORSA DI COLLABORAZIONE (TRANCHE DOTTORANDI) PER IL TUTORAGGIO NELL'AMBITO DELLA CHIMICA INORGANICA I UNIVERSITÀ DEGLI STUDI DI ROMA LA SAPIENZA

2021 – 2022 Roma, Italia

TIROCINIO FORMATIVO UNIVERSITÀ DEGLI STUDI DI ROMA LA SAPIENZA

800 ORE DI TIROCINIO SVOLTENEL LABORATORIO DI RICERCA DELLA PROF.SSA ANNA LAURA CAPRIOTTI

2020 - 2021 Italia

VINCITORE BORSA DI COLLABORAZIONE STUDENTI SVOLTA NEL LABORATORIO DI Chimica analitica III università degli studi di Roma la Sapienza

2019 – 2020 Roma, Italia

#### VINCITORE BORSA DI COLLABORAZIONE STUDENTI SVOLTA NEL LABORATORIO DI CHIMICA-FISICA I

UNIVERSITÀ DEGLI STUDI DI ROMA LA SAPIENZA

2018 – 2019 Roma, Italia

VINCITORE BORSA DI COLLABORAZIONE STUDENTI SVOLTA NELLA BIBLIOTECA DI Chimica G. Illuminati università degli studi di Roma la Sapienza

#### ISTRUZIONE E FORMAZIONE

01/11/2022 – ATTUALE Roma, Italia **DOTTORATO IN SCIENZE CHIMICHE** Università degli Studi di Roma La Sapienza

L'attività di ricerca è incentrata sullo sviluppo e la validazione di metodi analitici innovativi basati sulla spettrometria di massa ad alta e bassa risoluzione accoppiata a tecniche separative., in particolare nell'ambito delle scienze omiche. L'obiettivo è lo sviluppo di workflow di metabolomica e lipidomica untargeted volti all'identificazione nei fluidi biologici di possibili biomarcatori innovativi correlati a patologie che necessitano di una diagnosi precoce.

Tesi Approcci multi-omici per l'identificazione di biomarcatori diagnostici e prognostici

09/2020 – 23/07/2022 Roma, Italia LAUREA MAGISTRALE Università degli Studi di Roma La Sapienza

Campo di studio Scienze naturali, matematiche e statistiche |Voto finale 110/110 e Lode |

Tesi Caratterizzazione untargeted di composti fenolici per la classificazione varietale e geografica della canapa industriale

09/2017 - 21/07/2020 Roma, Italia

LAUREA TRIENNALE IN CHIMICA Università degli Studi di Roma La Sapienza

Campo di studio Scienze naturali, matematiche e statistiche Voto finale 109/110

Tesi Studio del ruolo del rame sulla struttura del dominio amiloidogenico delle proteine prioniche dei mammiferi

#### Voto finale 90/100

08/2015 – 26/06/2016 Watertown (NY), Stati Uniti US HIGH SCHOOL DIPLOMA Watertown High School (WHS)

#### COMPETENZE LINGUISTICHE

Lingua madre: ITALIANO

Altre lingue:

	COMPRENSIONE		ESPRESSIC	SCRITTURA	
	Ascolto	Lettura	Produzione orale	Interazione orale	
INGLESE	C2	C2	C1	C1	B2
FRANCESE	A2	A2	A2	A2	A1

Livelli: A1 e A2: Livello elementare B1 e B2: Livello intermedio C1 e C2: Livello avanzato

#### • COMPETENZE DIGITALI

Social Network	Windows	Kaleidograph	LaTex	XCalibur	Padronanza del Pacchetto Office (Word Excel
PowerPoint ecc)	Compoun	d Discoverer	mMass	Basic MatL	ab

#### • PATENTE DI GUIDA

Patentediguida:AMPatentediguida:A2Patentediguida:B

#### PROGETTI

11/2023 – 11/2024

Progetti per Avvio alla Ricerca - Tipo 1

Finanziamento di Euro 1.000 per la ricerca dal titolo "INVESTIGATION OF ACYLCARNITINE BIOMARKERS IN PROSTATE CANCER TISSUE BY HIGH-RESOLUTION MASS-SPECTROMETRY AND RETENTION TIME PREDICTION"

30/10/2024 – 29/10/2025 Progetti per Avvio alla Ricerca - Tipo 1

Finanziamento di Euro 1.000 per la ricerca dal titolo "CHARACTERIZATION OF BIOACTIVE COMPOUNDS IN MEDITERRANEAN SEAWEEDS FOR SUSTAINABLE BLUE ECONOMY AND BIO-BASED CIRCULAR ECONOMY"

#### CONFERENZE E SEMINARI

27/03/2023 - 28/03/2023 Florence, Italy

Comunicazione orale - "Le Giornate di Bioanalitica 2023 - La Chimica Bioanalitica verso il

2030"

"Untargeted characterization of phenolic compounds for varietal and geographical classification of industrial hemp" **Taglioni E**., Aita S. E., Capriotti A. L., Biancolillo A., Laganà A.

17/09/2023 - 21/09/2023 Vasto (CH), Italy

Comunicazione orale - XXX Congresso della Divisione di Chimica Analitica della Società Chimica Italiana

"A green extraction method based on carbon nitride sorbent for the simultaneous determination of free and conjugated estrogens in milk" **Taglioni E**., Cavaliere C., Laganà A., Montone C.M., Capriotti A.L.

12/10/2023 – 13/10/2023 Termoli (CB), Italy Comunicazione orale - Incontri di Scienza della Separazione "Development and optimization of a green enrichment method for monitoring trace residues of free and conjugated estrogens using a graphitic carbon nitride-based sorbent" **Taglioni E**., Cavaliere C., Laganà A., Montone C.M., Capriotti A.L.

15/04/2024 - 16/04/2024 Bologna, Italy

### Comunicazione orale - Giornate di Bioanalitica 2024 - One Health: Nuove frontiere per la chimica bioanalitica

"One-phase extraction coupled with photochemical reaction allows the in-depth lipid characterization of hempseeds by untargeted lipidomics" **Taglioni, E**., Aita, S. E., Cavaliere C., Cerrato A., Paniccia M. C., Laganà A.

#### 19/06/2024 – 19/06/2024 Amsterdam, Netherlands Poster - Van't Hoff Institue for Molecular Sciences (HIMS) Annual Symposium

"An untargeted analytical workflow based on Kendrick mass defect filtering reveals dysregulations in acylcarnitines in prostate cancer tissue" **Taglioni. E.**, Cerrato A., Aita S. E., Montone C. M., Sciarra A., Biancolillo A., Laganà A., Capriotti A. L.

#### 26/08/2024 – 30/08/2024 Milan, Italy Poster - XXVIII Congresso Nazionale della Società Chimica Italiana

"Comprehensive Structural Characterization of seaweeds Polar Lipidome by Coupling Single-Phase Extraction and Aza-Paternò-Buchi Derivatization" **Taglioni E**., Aita S. E., Cavaliere C., Cerrato A., Montone C. M., Piovesana S., Laganà A., Capriotti A. L.

#### 06/10/2024 – 10/10/2024 Liverpool, UK Poster - 34th International Symposium on Chromatography (ISC)

"An untargeted analytical workflow based on Kendrick mass defect filtering reveals dysregulations in acylcarnitines in prostate cancer tissue" **Taglioni. E.**, Cerrato A., Aita S. E., Montone C. M., Sciarra A., Biancolillo A., Laganà A., Capriotti A. L.

#### • PUBBLICAZIONI

#### 2023

## A green extraction method based on carbon nitride sorbent for the simultaneous determination of free and conjugated estrogens in milk

This study proposes a quick and green method based on carbon nitride sorbent to extract six free and five conjugated estrogens from milk samples simultaneously. The adsorption process was studied in detail via adsorption isotherms, while the rate-limiting steps were investigated using adsorption kinetics. An experimental design was carried out for the elution step optimization regarding elution time, pH, and percentage of organic solvent. The best elution condition was 40 min at alkaline pH without the use of dichloromethane. After the matrix solid phase extraction optimization, extraction was carried out using this magnetic material after a previous deproteinization step. Separation, determination, and quantification of the target analytes were achieved by ultra-high-performance liquid chromatography coupled with triple quadrupole-tandem mass spectrometry. The methodology was validated in 6 milk samples. The LODs and LOQs for free and conjugated estrogens investigated were in the range of 0.01–0.1 ng mL<sup>-1</sup>.

The recoveries of estrogens (concentration range of  $0.5-10 \text{ ng mL}^{-1}$ ) from milk samples were in the range of 89–100%, with standard deviations ranging between 1 and 3%. The method was successfully applied to milk samples leading to the identification of estrone, 17- $\alpha$ -estradiol, and 17- $\beta$ -estradiol and four forms of conjugated estrogens (17 $\beta$ -estradiol-3-glucuronide; estrone-3-sulfate; 17 $\beta$ -estradiol-3,17 $\beta$ -disulfate; 17 $\beta$ -estradiol-3.

C.M., et al. Green Analytical Chemistry, 2023, vol. 5, 100055

#### 2023

## Occurrence of per- and polyfluorinated alkyl substances in wastewater treatment plants in Northern Italy

Wastewater treatment plants are known to be relevant input sources of per- and polyfluoroalkyl substances (PFAS) in the aquatic environment. This study aimed to investigate the occurrence, fate, and seasonal variability of twenty-five PFAS in four municipal wastewater treatment plants (WWTP A, B, C, and D) surrounding the city of Milan (Northern, Italy). Composite 24-h wastewater samples were collected in July and October 2021 and May and February 2022 from influents and effluents of the four WWTPs. PFAS were detected at concentrations ranging between 24.1 and 66.9  $\mu$ g L<sup>-1</sup> for influent and 13.4 and 107  $\mu$ g L<sup>-1</sup> for effluent wastewater samples. Perfluoropentanoic acid was the most abundant (1.91–30.0  $\mu$ g L<sup>-1</sup>) in influent samples, whereas perfluorobutane sulfonic acid predominated (0.80–66.1  $\mu$ g L<sup>-1</sup>) in effluent samples. In sludge, PFOA was detected in plant A at concentrations in the range of 96.6–165 ng kg<sup>-1</sup> dw in primary sludge samples and 98.6–440 ng kg<sup>-1</sup> dw in secondary treatment sludge samples. The removal efficiency of

total PFAS varied between 6 % and 96 %. However, an increase of PFAS concentrations was observed from influents to effluents for plant D (during July and October), plant A (during October and May), and plant C (during May) indicating that biotransformation of PFAS precursors can occur during biological treatments. This was supported by the observed increase in concentrations of PFOA from primary to secondary treatment sludge samples in plant A. Moreover, the plant operating at shorter hydraulic retention times (plant D) showed lower removal efficiency.

Giannelli Moneta B., et al. Science of Total Envirnonment, 2023, Vol. 894, 165089

#### 2023

#### Dispersive solid phase extraction using a hydrophilic molecularly imprinted polymer for the selective extraction of patulin in apple juice samples

A molecularly imprinted polymer with a specific selectivity for patulin was successfully synthesized. The molecularly imprinted material was prepared using the two functional monomers dopamine and melamine and formaldehyde as the cross-linker. The resulting material possessed a large number of hydrophilic groups, such as hydroxyls, imino groups, and ether linkages. For the first time, uric acid was used as a dummy template for its structural similarity to patulin. Comprehensive characterization and detailed studies of the adsorption process were carried out via adsorption isotherms, while the rate-limiting steps were investigated using adsorption kinetics. Separation, determination, and quantification of patulin were achieved by ultra-high performance liquid chromatography coupled with both photodiode array detection and tandem mass spectrometry. The latter was applied to patulin confirmation in the analysis of real samples. The methodology was validated in 20 apple juice samples. The results showed that the developed hydrophilic molecularly imprinted polymer had high selectivity and specific adsorption towards patulin, with mean recoveries ranging between 85 and 90% and a relative standard deviation lower than 15%. The developed molecularly imprinted polymer exhibited good linearity in the

range 1–100 ng mL<sup>-1</sup> with coefficient of determination

 $(R^{2}) > 0.99$ . The limit of detection was 0.5 ng mL<sup>-1</sup>, and the limit of quantification was 1 ng g<sup>-1</sup>. The developed method showed a good purification capacity for apple juices due to its hydrophilic nature and the polar interactions established with the target analyte.

Cavaliere C., et al. Microchimica Acta, 2023, Vol. 190, 485

#### 2024

#### **Untargeted Analysis of Short-Chain Peptides in Urine Samples Short Peptides Analysis**

Short-chain peptides have attracted increasing attention in different research fields, including biomarker discovery, but also a well-known analytical challenge in complex matrices due to their low abundance compared to other molecules, which can cause extensive ion suppression during mass spectrometric acquisition. Moreover, there is a lack of analytical workflows for their comprehensive characterization since ordinary peptidomics strategies cannot identify them. In this context, an enrichment strategy was introduced and developed to isolate and clean up short-chain peptides by graphitized carbon black solid phase extraction. For better coverage of peptide polarity, urine samples were analyzed by ultrahigh performance liquid chromatography by reversed-phase and hydrophilic interaction liquid chromatography. High-resolution mass spectrometry allowed the detection of the eluting peptides by data-dependent mode using a suspect screening strategy with an inclusion list; peptides were identified by a semiautomated workflow implemented on Compound Discoverer. The complementarity of the orthogonal separation strategy was confirmed by peptide identification, resulting in 101 peptides identified from the RP runs, and 111 peptides from the HILIC runs, with 60 common identifications.

Aita S.E., et al. Methods in Molecular Biology, 2024, Vol. 2745, 31-43

#### 2024

#### Transformation products of antibacterial drugs in environmental water: Identification approaches based on liquid chromatography-high resolution mass spectrometry

In recent years, the presence of antibiotics in the aquatic environment has caused increasing concern for the possible consequences on human health and ecosystems, including the development of antibiotic-resistant bacteria. However, once antibiotics enter the environment, mainly through hospital and municipal discharges and the effluents of wastewater treatment plants, they can be subject to transformation reactions, driven by both biotic (e.g. microorganism and mammalian metabolisms) and abiotic factors (e.g. oxidation, photodegradation, and hydrolysis). The resulting transformation products (TPs) can be less or more active than their parent compounds, therefore the inclusion of TPs in monitoring programs should be mandatory. However, only the reference standards of a few known TPs are available, whereas many other TPs are still unknown, due to the high diversity of possible transformation reactions in the environment. Modern high-resolution mass spectrometry (HRMS) instrumentation is now ready to tackle this problem through suspect and untargeted screening approaches. However, for handling the large amount of data typically encountered in the analysis of environmental samples, these approaches also require suitable processing workflows and accurate tandem mass spectra interpretation. The compilation of a suspect list containing the possible monoisotopic masses of TPs retrieved from the literature and/or from laboratory simulated degradation experiments showed unique

advantages. However, the employment of in silico prediction tools could improve the identification reliability. In this review, the most recent strategies relying on liquid chromatography-HRMS for the

analysis of environmental TPs of the main antibiotic classes were examined, whereas TPs formed during water treatments or disinfection were not included.

Montone C.M., et al. Journal of Pharmaceutical and Biomedial Analysis, 2024, Vol. 238, 115818

2024

# Hempseed protein-derived short- and medium-chain peptides and their multifunctional properties

Nowadays, the growing knowledge about the high nutritional value and potential functionality of hempseeds, the edible fruits of the Cannabis sativa L. plant, has sparked a surge in interest in exploring the worthwhile attributes of hempseed proteins and peptides. This trend aligns with the increasing popularity of hemp-based food, assuming a vital role in the global food chain. This chapter targets the nutritional and chemical composition of hempseed in terms of short- and medium-chain bioactive peptides. The analytical approaches for their characterization and multifunctional properties are summarized in detail. Moreover, the processing, functionality, and application of various hempseed protein products are discussed. In the final part of the chapter—for evaluating their propensity to be transported by intestinal cells—the transepithelial transport of peptides within hempseed protein hydrolysate is highlighted.

Aita S. E., et al. Advances in Food and Nutrition Research, 2024

2024

### Preparation of Monolith for Online Extraction and LC–MS Analysis of $\beta\text{-}Estradiol$ in Serum Via a Simple Multicomponent Reaction

Multicomponent reactions offer efficient and environmentally friendly strategies for preparing monoliths suitable for applications in analytical chemistry. In the described study, a multicomponent reaction was utilized for the one-pot miniaturized preparation of a poly(propargyl amine) polymer inside commercial silica-lined PEEK tubing. The reaction involved only small amounts of reagents and was characterized by atom economy. The resulting monolithic column was incorporated into an autosampler system for the online extraction and cleanup of  $\beta$ -estradiol from human serum. Sample pretreatment was simplified to a simple dilution with methanol and centrifugation to remove proteins. The resulting platform included LC–MS analysis in multiple reaction monitoring for quantitative analysis of β-estradiol. The method was validated in serum, demonstrating practical applicability for the monitoring of fertile women. Recoveries were above 94%, and LOD and LOQ values at 0.008 and 0.18 ng mL-1, respectively. The developed platform proved to be competitive with previous methods for solid-phase microextraction of β-estradiol in serum, with comparable recovery and sensitivity but with the advantage of nearly complete automation. The environmental impact of the process was evaluated as acceptable due to the miniaturization of the monolith synthesis and the automation of extraction. The drawback associated with the LC-MS technique can be reduced by the inclusion of additional analytes in a single investigation. The work demonstrates that multicomponent reactions are versatile, economical, and possibly a green methodology for producing reversed-phase and mixed-mode sorbents, enabling miniaturization of the entire analytical procedure from the preparation of extraction sorbents to analysis.

Cerrato A., et al. Analytical Chemistry 2024, 96, 11, 4639-4646

2024

### One-phase extraction coupled with photochemical reaction allows the in-depth lipid characterization of hempseeds by untargeted lipidomics

Due to their valuable nutritional content, several hemp-derived products from hempseeds have recently been placed in the market as food and food ingredients. In particular, the lipid composition of hempseeds has raised interest for their rich content in biologically active polyunsaturated fatty acids with an optimum ratio of omega-3 and omega-6 compounds. At present, however, the overall polar lipidome composition of hempseeds remains largely unknown. In the present work, an analytical platform was developed for the extraction, untargeted HRMS-based analysis, and detailed annotation of the lipid species. First, five one- and two-phase solid-liquid extraction protocols were tested and compared on a hempseed pool sample to select the method that allowed the overall highest efficiency as well as easy coupling with lipid derivatization by photochemical [2 + 2] cycloaddition with 6-azauracil. Underivatized lipids were annotated employing a data processing workflow on Compound Discoverer software that was specifically designed for polar lipidomics, whereas inspection of the MS/MS spectra of the derivatized lipids following the aza-Paternò-Büchi reaction allowed pinpointing the regiochemistry of carbon-carbon double bonds. A total of 184 lipids were annotated, i.e., 26 fatty acids and 158 phospholipids, including minor subclasses such as N-acylphosphatidylethanolamines. Once the platform was set up, the lipid extracts from nine hempseed samples from different hemp strains were characterized, with information on the regiochemistry of free and conjugated fatty acids. The overall analytical approach helped to fill a gap in the knowledge of the nutritional composition of hempseeds.

In the present study, an innovative analytical platform was developed for the straightforward albeit comprehensive characterization of acylcarnitines based on high-resolution mass spectrometry, Kendrick mass defect filtering, and confirmation by prediction of their retention time in reversed-phase chromatography. In particular, a customized data processing workflow was set up on Compound Discoverer software to enable the Kendrick mass defect filtering, which allowed filtering out more than 90 % of the initial features resulting from the processing of 25 tumoral and adjacent non-malignant prostate tissues collected from patients undergoing radical prostatectomy. Later, a partial least square–discriminant analysis model validated by repeated double cross-validation was built on the dataset of 74 annotated acylcarnitines, with classification rates higher than 93 % for both groups, and univariate statistical analysis helped elucidate the individual role of the annotated metabolites.

Cerrato A., et al. Analytica Chimica Acta, Vol. 1307, 342574

#### 2024 First Proof of Concept of a Click Inverse Electron Demand Diels-Alder Reaction for Assigning the Regiochemistry of Carbon-Carbon Double Bonds in Untargeted Lipidomics

Lipidomics by high-resolution mass spectrometry (HRMS) has become a prominent tool in clinical chemistry due to the proven connections between lipid dysregulation and the insurgence of pathologies. However, it is difficult to achieve structural characterization beyond the fatty acid level by HRMS, especially when it comes to the regiochemistry of carbon-carbon double bonds, which play a major role in determining the properties of cell membranes. Several approaches have been proposed for elucidating the regiochemistry of double bonds, such as derivatization before MS analysis by photochemical reactions, which have shown great potential for their versatility but have the navoidable drawback of splitting the MS signal. Among other possible approaches for derivatizing electron-rich double bonds, the emerging inverse-electron-demand Diels-Alder (IEDDA) reaction with tetrazines stands out for its unmatchable kinetics and has found several applications in basic biology and protein imaging. In this study, a catalyst-free click IEDDA reaction was employed for the first time to pinpoint carbon-carbon double bonds in free and conjugated fatty acids. Fatty acid and glycerophospholipid regioisomers were analyzed alone and in combination, demonstrating that the IEDDA reaction had click character and allowed the obtention of diagnostic product ions following MS/MS fragmentation as well as the possibility of performing relative quantitation of lipid regioisomers. The IEDDA protocol was later employed in an untargeted lipidomics study on plasma samples of patients suffering from prostate cancer and benign prostatic conditions, confirming the applicability of the proposed reaction to complex matrices of clinical interest.

Cerrato A., et al. Analytical Chemistry, Vol. 96, Issue 26, Pages 10817-10826

2024

### Detailed lipid investigation of edible seaweeds by photochemical derivatization and untargeted lipidomics

Seaweeds are macrophytic algae that have been gaining interest as alternative healthy foods, renewable drug sources, and climate change mitigation agents. In terms of their nutritional value, seaweeds are renowned for their high content of biologically active polyunsaturated fatty acids. However, little is known about the regiochemistry—the geometry and position of carbon–carbon double bonds—of free and conjugated fatty acids in seaweeds. In the present work, a detailed characterization of the seaweed lipidome was achieved based on untargeted HRMS-based analysis and lipid derivatization with a photochemical aza-Paternò–Büchi reaction. A triple-data processing strategy was carried out to achieve high structural detail on the seaweed lipidome, i.e., (i) a first data processing workflow with all samples for aligning peak and statistical analysis that led to the definition of lipid sum compositions (e.g., phosphatidylglycerol (PG) 34:1), (ii) a second data processing workflow in which the samples of each seaweed were processed separately to annotate molecular lipids with known fatty acyl isomerism (e.g., PG 16:0\_18:1), and (iii) the annotation of lipid regioisomers following MS/MS annotation of the lipid derivatives obtained following the aza-Paternò–Büchi reaction (e.g., PG 16:0\_18:1  $\omega$ -9). Once the platform was set up, the lipid extracts from 8 seaweed species from different seaweed families were characterized, describing over 900 different lipid species, and information on the regiochemistry of carbon–carbon double bonds uncovered unknown peculiarities of seaweeds belonging to different families. The overall analytical approach helped to fill a gap in the knowledge of the nutritional composition of seaweeds.

Montone, C. M., et al. Analytical and Bioanalytical Chemistry, Vol. 416, Issue 28, Pages 6269 - 6282

2024

## Validation of a global method for the simultaneous analysis of polar and non-polar pesticides by online extraction and LC-MS/MS

Background: Multi-residue methods for pesticide analysis in food are available for many compounds, but polar pesticides are not generally included due to their specific properties, which include high polarity and low molecular weight. Single residue methods are therefore needed for sample preparation, while chromatographic separation often requires derivatization, ion paring, or dedicated methods suitable for polar compounds, mostly ion chromatography and hydrophilic interaction liquid chromatography (HILIC). These challenges affect the important pesticide glyphosate and the related compounds aminomethylphosphonic acid (AMPA) and glufosinate. There are only a few methods

including these compounds in large-scale analysis, mostly complex methods based on multidimensional chromatography. Results: A new method, for the global online extraction and analysis of pesticides in beer was developed and validated. The method exploited an online trapping device, with reversed-phase (RP) and anion exchange properties, that can trap small molecules from liquid samples. The ion exchange mechanism was used to retain the very polar pesticides glyphosate, AMPA, and glufosinate. The hydrophobic properties of the trapping column were also exploited to trap pesticides suitable for multi-residue investigations. The chromatographic separation was optimized by comparison of HILIC and RP C30, which could separate pesticides, including the polar ones, with modulation by the trapping column after proper selection of the mobile phase composition and basic modifier. The validation for beer provided recoveries in the range 71–112 %, with <15 % RSD, and LOD and LOQ values of 0.02–1 and 0.3–3  $\mu$ g L<sup>-1</sup>, respectively. The result was competitive with previous methods on polar pesticide analysis in beer.

Significance: The method was validated for 15 pesticides, over the log  $K_{ow}$  range from -4.4 to 4.5, using a methodology with single and fast chromatographic separation under conditions compatible with multi-residue analysis by RP-LC-MS/ MS. In the case of beer, for which the method was validated, the sample preparation was also performed online, after simple degassing, and sample dilution.

Piovesana, S., et al. Analytica Chimica Acta, Vol. 1329, Article number 343231

#### 2024

## Ultrasonication coupled to enzymatic hydrolysis of soybean okara proteins for producing bioactive and bioavailable peptides

This work was aimed to explore the antioxidative properties, bioavailability and the safety of bioactive peptides obtained by the enzymatic hydrolysis of ultrasound-treated (UO) and untreated (nUO) soybean okara proteins. Particularly, the peptidomic profiles of both hydrolysates were examined using an untargeted metabolomics technique for suspect screening that was specifically designed for the profiling of short-chain peptides and relied on ultra-high- performance liquid chromatography coupled to high-resolution mass spectrometry (UHPLC-HRMS) and bioinformatics. Next, both UO and nUO hydrolysates reduce Dipeptidyl peptidase-IV (DPP-IV) enzyme activity until  $39.54 \pm 0.26$  % and  $43.29 \pm 0.36$  % respectively and inhibit angiotensin converting enzyme (ACE) activities by  $30.54 \pm 0.42$  % and  $30.76 \pm 0.02$  %, respectively. Moreover, they demonstrate to exerted antioxidant properties. Particularly, they show a comparable in vitro antioxidant activity but when the oxidative stress is induced by H<sub>2</sub>O<sub>2</sub> in Caco-2 cells, UO hydrolysate is more active in lowering the levels of reactive oxygen species (ROS) and of lipid peroxidation induced of 48% and 20% respectively. In addition, UO- and nUO-derived peptides trans-epithelial transported by human differentiated intestinal cell monolayer, were identified. Lastly, the possible hepatotoxicity of UO and nUO hydrolysates in HepG2 cells has not been observed by measuring alanine transferase (ALT) and aspartate transferase (AST) levels and cytotoxic effects.

d'Adduzio, L., et al. Current Research in Food Science, Vol. 9, Article number 100919

#### 2025

# Detection of antibacterial peptides in artisanal rennet and evaluation of their antibacterial activity

This study assessed the antimicrobial effectiveness of artisanal lamb and goat rennet compared to industrial calf rennet against Gram-negative Escherichia coli and Gram-positive Staphylococcus aureus. Results showed all three rennets were more effective against E. coli than S. aureus. Only lamb rennet achieved complete inhibition of both bacteria at a minimum inhibitory concentration of 7000 ppm. An extensive peptidomics analysis was conducted to characterize these rennet samples and correlate their antimicrobial activity with the data on endogenous peptides. Moreover, a prediction of the potential antimicrobial activity of the peptides was carried out with specific bioinformatic tools available online, proving that the isolated peptides did have the tested biological activity. Lamb rennet was found to contain 73 antimicrobial peptides with bioactivity scores between 1 and 0.52, including casocidin-I, known for its broad-spectrum antibacterial activity. Further research is ongoing to explore the applications of artisanal rennet in cheese production.

Montone, A. M. I., et al. International Dairy Journal, Vol. 160, Article number 106074

#### COMPETENZE TECNICHE

#### 2021 – ATTUALE

#### Competenze tecniche nell'utilizzo di strumentazioni analitiche

- Ottime capacità specifiche nell'ambito della purificazione del campione, validazione di metodi analitici e nell'utilizzo di metodi di cromatografia liquida accoppiata a spettrometria di massa ad alta risoluzione per la risoluzione di problematiche analitiche su matrici complesse come fluidi biologici.
- Ottime competenze tecniche nell'utilizzo di sistemi HPLC (Dionex UltiMate 3000 RSLC, ShimadzuNexera Ultra High Performance, UHPC Thermo-Vanquish) e di spettrometri di massa (Thermo TSQ 8000, Thermo QExactive, Thermo Elite LTQ/XL) derivanti dall'esperienza di tirocinio magistrale.

• Buone competenze tecniche nell'utilizzo di sistemi GC-FID e HPLC-UV/VIS acquisite nel periodo di svolgimento delle borse di collaborazione studenti.

#### ONORIFICENZE E RICONOSCIMENTI

15/05/2024

Premio "Laureato Eccellente" dell'A.A. 2021/2022 – Fondazione Sapienza

#### • ATTIVITÀ SOCIALI E POLITICHE

2023 - ATTUALE Università degli Studi di Roma La Sapienza

NOMINA NEL COMITATO ORGANIZZATORE DEI SEMINARI DEI DOTTORANDI "ConoScienza in Condivisione"

2023 – ATTUALE Università degli Studi di Roma La Sapienza NOMINA COME RAPPRESENTANTE DEGLI STUDENTI E DEI DOTTORANDI NEL COMITATO PARI OPPORTUNITA'

2023 – ATTUALE Università degli Studi di Roma La Sapienza NOMINA COME RAPPRESENTANTE DEGLI DOTTORANDI NEL COLLEGIO DEI DOCENTI DELLA SCUOLA DI DOTTORATO IN SCIENZE CHIMICHE

2023 – ATTUALE Università degli Studi di Roma La Sapienza NOMINA COME RAPPRESENTATE DEGLI STUDENTI E DEI DOTTORANDI NELLA GIUNTA DI DIPARTIMENTO

2023 – ATTUALE Università degli Studi di Roma La Sapienza NOMINA COME RAPPRESENTANTE DEGLI STUDENTI E DEI DOTTORANDI NEL CONSIGLIO DI DIPARTIMENTO

01/2024 – 28/06/2024 Università degli Studi di Roma La Sapienza NOMINA COME MEMBRO DEL COMITATO ORGANIZZATORE PER IL SECOND SYMPOSIUM FOR YOUNG CHEMISTS (SYNC)

Il presente curriculum vitae, è redatto ai fini della pubblicazione nella Sezione "Amministrazione trasparente" del sito web istituzionale dell'Ateneo al fine di garantire il rispetto della vigente normativa in materia di tutela dei dati. Il C.V. in versione integrale è conservato presso gli Uffici della Struttura che ha conferito l'incarico.

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Roma, 14/01/2025

f.to ENRICO TAGLIONI