



BIO-SUSTENTABILIDADE E BIO-SEGURANÇA ALIMENTAR, INOVAÇÃO E QUALIDADE ALIMENTAR

23-26 de outubro de 2022

Castelo Branco



Livro de Resumos

XVI Encontro de Química dos **Alimentos**



Ficha Técnica

Título

Livro de Resumos do XVI Encontro de Química dos Alimentos - Bio-Sustentabilidade e Bio-Segurança Alimentar, Inovação e Qualidade Alimentar

Autores

Ofélia Anjos, Soraia I. Pedro, Carlos Antunes

Edição

Ofélia Anjos, Soraia I. Pedro, Natália Martins Roque, Carlos Antunes

Outros colaboradores:

Fátima Peres

Cecília Gouveia

Cláudia Adriana Fernandes Vitória

Ilustrações

Luísa Ferreira Nunes

Editor

Sociedade Portuguesa de Química

Esta publicação reúne os trabalhos apresentados no XVI Encontro de Química dos Alimentos: Bio-sustentabilidade e Bio-segurança alimentar, Inovação e qualidade alimentar, Castelo Branco 2022, e inclui ainda o programa científico do encontro.

As doutrinas expressas em cada um dos resumos são da inteira responsabilidade dos autores.

ISBN

978-989-8124-36-4

Data

Outubro de 2022

- PC40 Dynamic sensory characterization of functional chocolate ice creams using Temporal Check-All-That-Apply (TCATA) methodologies**
Ricardo Isaías, Rui Costa Lima, Célia Rocha, Sandra Guimarães, Mahnoor Ayub, Miguel Cerqueira, António Vicente, Luís Miguel Cunha
- PC41 Effect of pulsed electric fields and mild heating combination on physicochemical properties of goat milk**
Alexandre Romão, Alberta Araújo, Verónica Solheiro, Paulo Fernandes, M. Rui Alves
- PC42 Sunflower oil enriched with bioactive compounds from Sea Fennel (*Crithmum maritimum* L.) flowers by ultrasound-assisted extraction**
Gabriela Sousa, Célian Pasquet, Carla Tecelão, Suzana Ferreira-Dias
- PC43 Sub-lethal pressure pre-treatments for subsequent shorter and improved egg yolk thermal pasteurization**
Ana C. Ribeiro, Susana Casal, José Lopes-da-Silva, Jorge A. Saraiva
- PC44 Influence of electrical stimulation on the final pH of bovine carcasses and evolution of cooling temperature in washed and unwashed carcasses**
Silvina Ferro Palma, Henrique Palma Gonçalves, Maria João Carvalho, Inês Fernandes
- PC45 Optimization and characterization of cultivation substrates for edible mushroom species – the *MicoCoating* initiative.**
Carla Miranda, Catarina Nunes, João Nunes
- PC46 Characterization of waste biomass generated in mushroom production and their potential for the extraction of bioactive compounds for food coatings**
Carla Miranda, Catarina Nunes, Carolina Nunes, João Nunes
- PC47 Innovative edible coatings to increase the shelf life of smoked sausages**
Sónia Ribeiro, Catarina Nunes, Diana Farinha, João Nunes
- PC48 Development of bioactive food products and ingredients using endogenous Portuguese agricultural resources for healthy nutrition**
Sónia Ribeiro, Catarina Nunes, Diana Farinha, João Nunes
- PC49 Natural food ingredients from quince peel: Towards a "zero-waste" production system**
Alexis Pereira, Mikel Añibarro-Ortega, António Nogueira, José Pinela, Lillian Barros
- PC50 Nutritional quality of mealworm (*Tenebrio molitor*) oil obtained by extrusion**
Adriana K. Molina, Beatriz Helena Paschoalinotto, Mikel Añibarro-Ortega, Carla Pereira, José Pinela, Vasco Teixeira Esteves, Maria Inês Dias, Lillian Barros
- PC51 Application of autochthonous lactic acid bacteria as starter cultures for ewes' milk cheese production**
Sandra Gomes, Nuno Alvarenga, Maria Paula Esteves, António Pedro Louro Martins, Helena Araújo-Rodrigues, José Soares, Manuela Pintado, Paulo Serol, Célia Lampreia, Maria João Carvalho, João Dias, Olga Amaral, Antónia Macedo, Miguel Floro, Manuela Costa, Maria Teresa Santos
- PC52 Microencapsulation of a phenolic-enriched fraction of *Gunnera tinctoria* with natural polymers: starch, pectin, and a starch/pectin complex**
Faezeh Fathi, Samad N. Ebrahimi, Alireza Fathi, Rita C. Alves, M. Beatriz P. P. Oliveira
- PC53 Evaluation of coagulation kinetics using cardoon flower extracts and rennet in sheep milk from different origins in the Alentejo region**
Gomes S, Pina I, Dias J, Caeiro J, Martins J, Alvarenga N, Martins APL
- PC54 Physical characterization and preservation studies of a clean label mayonnaise containing carrot powder**
Luisa Castro, Sara Simões, Joana Sales, Diogo Castelo Branco, Diogo Figueira, Ana Tasso, Vítor D. Alves, Margarida Moldão-Martins

Nutritional quality of mealworm (*Tenebrio molitor*) oil obtained by extrusion

Adriana K. Molina,¹ Beatriz Helena Paschoalinotto,¹ Mikel Añibarro-Ortega,¹ Carla Pereira,¹ José Pinela,¹ Vasco Teixeira Esteves,² Maria Inês Dias,^{1,*} Lillian Barros ¹

¹Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal;

²Tecmafoods – Insect Based Feed & Food, Rua Sousa Prata 678, Armazém B, Leça do Balio, Portugal

*maria.ines@ipb.pt

The world is rapidly changing, obviously at an environmental level, always at an economic level, and unfortunately at a social level, leading all of this to significant cultural changes, namely what people eat. One of the main issues of concern is precisely the availability of food resources in parallel with its nutritional and bioactive potential, which is why the industry and academia have been looking for alternative sources of essential molecules for the well-being and health of the consumers, such as: proteins, bioactives, essential fatty acids, and fibres. Edible insects have gained some prominence for their protein content and fatty acid content. However, there is still a great aversion on the part of consumers to insect-based food products, especially at the organoleptic level (texture, taste and appearance). Oil-rich components are just one of the answers to maximize the use of these new sources of fatty acids, mainly omega-3 and -6, such as the oil extracted from *Tenebrio molitor* (mealworm).¹ The larvae are traditionally used for animal feed, pets and fish, but in some countries like China and Netherlands, they have been already consumed for food purposes. Its legal acceptance for incorporation and development of new food products was already established and, since it is tolerant to various environmental conditions and does not require a large area for growth, it is perfectly suitable for mass production.² In this context, the present work aimed to characterize the mealworm oil, obtained by extrusion techniques, regarding its content in fatty acids by gas-chromatography coupled to a flame ionization (GC-FID) detector, as also its salt content (NaCl) by the Mohr titration method. The results regarding the fatty acids profile in terms of total saturated (SFA), monounsaturated (MUFA), and polyunsaturated fatty acids (PUFA) are described in **Table 1**. Twenty-two individual fatty acids were identified, having been found, in percentages higher than 0.1%, the following compounds: elaidic acid (C18:1n9, 44.7±0.1%), linoleic acid (C18:2n6, 31.4±0.5%), palmitic acid (C16:0, 14.2±0.4%), octadecanoic acid (C18:0, 2.9±0.2%), α-linoleic acid (C18:3n3, 1.293±0.001%), and heptadecanoic acid (C17:1, 0.123±0.002%), which are in accordance with previous bibliography.³ Regarding salt content, 2.3±0.1 mg/mL was within the accepted limits. This is one of the attributes that most affects the organoleptic acceptance of mealworms for food purposes, besides the particle size; as such, future studies are needed to further investigate the physicochemical characteristics of the studied oil sample. The results obtained revealed the huge potentiality of mealworm larva for the development of new food products, representing one of the greatest answers to the increasing unavailability of sustainable natural sources rich in molecules beneficial for human health.

Table 1. Fatty acid profile (relative percentage, %) and salt content (mg/mL) of mealworm oil (Mean±SD).

Saturated fatty acids (%)	17.4±0.4
Monounsaturated fatty acids (%)	49.9±0.1
Polyunsaturated fatty acids (%)	32.7±0.5
Salt (mg/mL)	2.3±0.1

Acknowledgements:

The authors thank the Fundação para a Ciência e a Tecnologia (FCT, Portugal) and the national funds FCT/MCTES for the financial support to CIMO (UIDB/00690/2020). To FCT for the PhD studentship granted to A.K. Molina (2020.06231.BD) and M. Añibarro-Ortega (2020.06297.BD), and the contracts of C. Pereira (CEECINS), J. Pinela (CEECIND/01011/2018), M.I. Dias (CEECINS), and L. Barros (CEECINS). To Tecmafoods – Insect Based Feed & Food company for providing the mealworms oil.

References:

1. Y.J. Son, S.Y. Choi, I.K. Hwang, C.W. Nho, S.H. Kim. *Foods* 9 (2020) 40.
2. Y.H. Jeon, Y.J. Son, S.H. Kim, E.Y. Yun, H.J. Kang, I.K. Hwan. *Food sci. Biotech.* 25 (2016) 105-110.
3. H.S. Siow, K. Sudesh, P. Murugan, S. Ganesan. *Fuel* 299 (2021) 120905.