


## Actividades divulgación Proyecto AGROALNEXT\_2023/24

<b>Lugar</b>	Sheraton Porto Hotel & Spa.
<b>Localidad</b>	Oporto, Portugal
<b>Provincia</b>	
<b>Fecha</b>	09/04/2024 a 11/04/2024
<b>Proyecto:</b>	LEGUMAX
<b>Código proyecto</b>	AGROALNEXT_2022/030
<b>Grupo de investigación</b>	<p>Instituto Universitario de Ingeniería de Alimentos-FoodUPV de la Universitat Politècnica de València.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> <p>UNIVERSITAT POLITÈCNICA DE VALÈNCIA</p> </div>  </div>

### INFORME DE LA ACTIVIDAD:

En el contexto del Congreso “8th International Conference on Food Digestion (ICFD2024)” celebrado en Oporto del 9 al 11 de abril de 2024 y organizado en el marco de INFOGEST, una red global de aproximadamente 700 científicos investigadores (académicos y empresas alimentarias) de 200 instituciones en 52 países y cuyo objetivo principal es "Mejorar las propiedades saludables de los alimentos compartiendo su conocimiento sobre el proceso digestivo" se presentó el poster “Impact of solid-state fermentation with *Pleurotus ostreatus* on in vitro digestibility of fava beans (*Vicia faba* L.)”.

La investigación realizada, vinculada al proyecto AGROALNEXT\_2022/030: “Desarrollo de nuevos productos saludables y sostenibles basados en legumbres fermentadas para la prevención del sobrepeso infantil (LEGUMAX)” tenía como objetivo realizar una primera aproximación sobre el impacto que sobre el valor nutricional, la digestibilidad, el perfil de aminoácidos y la actividad inhibidora de la enzima convertidora de angiotensina (ECA) de las habas tenía la fermentación en estado sólido con *Pleurotus ostreatus* de las mismas.

## FOTOS DE LA ACTIVIDAD:



**8<sup>th</sup> International Conference on Food Digestion**  
Porto, 9-11<sup>th</sup> April 2024  
Sheraton Hotel & spa

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P78 | Designing protein-rich snack based on fermented fava beans (*Vicia faba*)  
Khvostenko, Kateryna; Muñoz-Pina, Sara; García-Hernández, Jorge; Heredia, Ana; Andrés, Ana

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P80 | Exploring the Bioaccessibility of Immunogenic Peptides in Milk and Eggs: Influence of Dietary Polyphenols and Food Matrix  
Simões, Rodolfo Dinis; Brandão, Elsa; Soares, Susana; De Freitas, Vitor; Pérez-Gregorio, Rosa

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P81 | In vivo and in vitro effects of different dietary proteins on short-term food intake and intestinal hormone regulation  
Fieury, Léa; Theysseur, Sandy; Ravalet, Rozenn; Cudennec, Benoit; Dugardin, Camille

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P82 | Curcuminoids reduce intestinal epithelial glucose transport  
Dohmen, Colin; Muijsenberg, Art; Blaak, Ellen; Troost, Freddy; Stijls, Mirelle

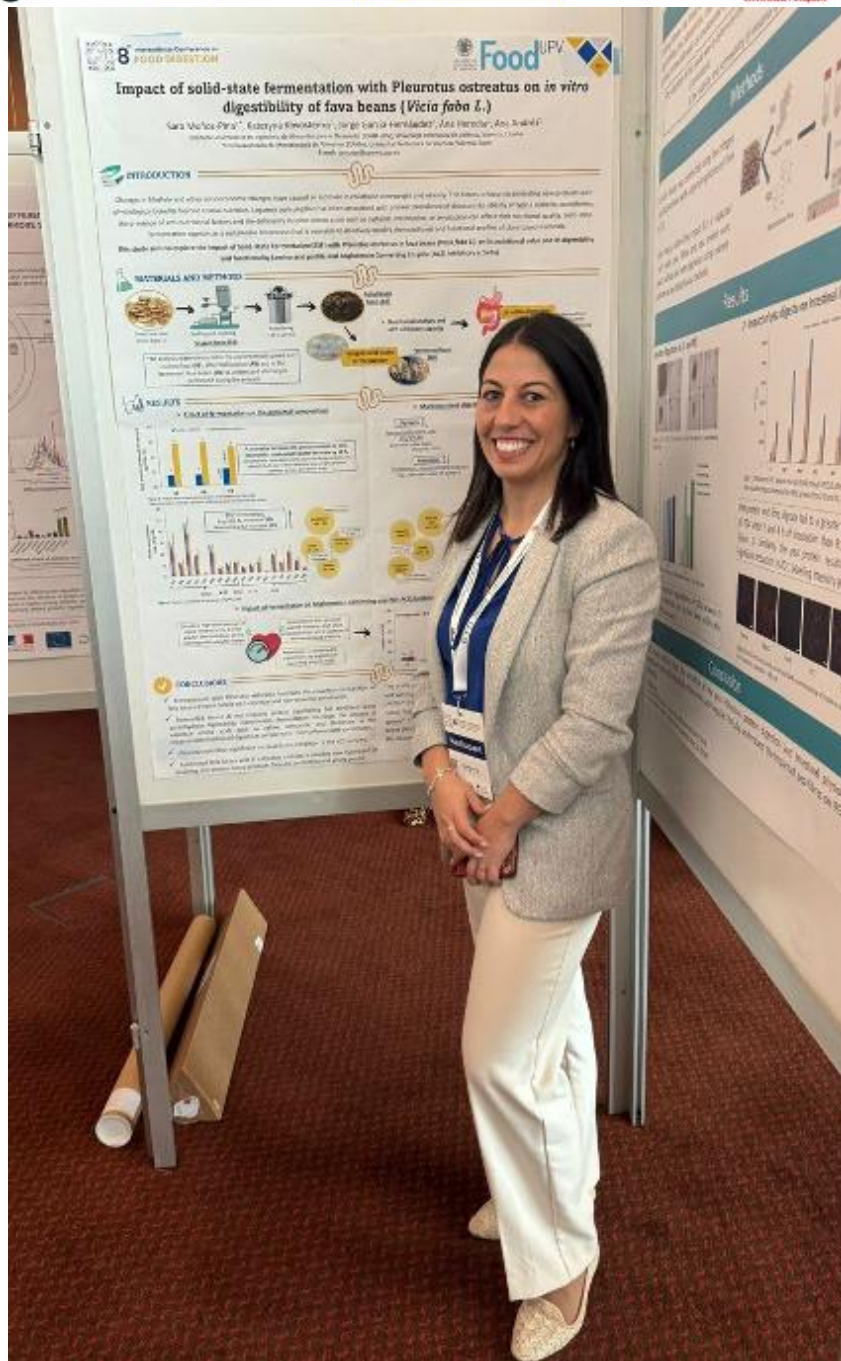
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 P83 | Impact of Solid-state fermentation with *Pleurotus ostreatus* on in vitro digestibility of fava beans  
Muñoz-Pina, Sara; Khvostenko, Kateryna; García-Hernández, Jorge; Heredia Gutiérrez, Ana; Anfrés Grau, Ana

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P84 | Impact of pea dietary fibres on protein digestibility and intestinal cell integrity  
Perruchot, Marie-Hélène; Wiat-Letort, Sandra; Mayeur-Nickel, Frédérique; Boudry, Gaëlle; Gundy, Myriam

**Figura 1.** Programa de Posters donde se incluye el poster presentado: “Impact of solid-state fermentation with *Pleurotus ostreatus* on in vitro digestibility of fava beans (*Vicia faba* L.)”.



**Figura 2.** Presentación por parte de la investigadora Dra. Sara Muñoz Pina del poster: “Impact of solid-state fermentation with *Pleurotus ostreatus* on in vitro digestibility of fava beans (*Vicia Faba L.*)”.

# Impact of solid-state fermentation with *Pleurotus ostreatus* on *in vitro* digestibility of fava beans (*Vicia faba L.*)

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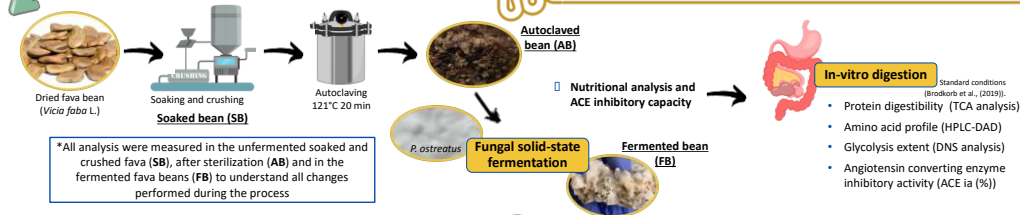
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## INTRODUCTION

Changes in lifestyle and other socioeconomic changes have caused an increase in childhood overweight and obesity. This forces to focus on generating new products with physiological benefits beyond crucial nutrition. Legumes consumption has been associated with a lower prevalence of diseases like obesity or type 2 diabetes; nonetheless, the presence of anti-nutritional factors and the deficiency in some amino acids such as cysteine, methionine, or tryptophan can affect their nutritional quality. Solid-state fermentation appears as a sustainable bioprocess that is available to positively modify the nutritional and functional profiles of plant-based materials.

This study aims to explore the impact of Solid-State Fermentation (SSF) with *Pleurotus ostreatus* in fava beans (*Vicia faba L.*) on its nutritional value and its digestibility and functionality (amino acid profile and Angiotensin Converting Enzyme (ACE) inhibitory activity).

## MATERIALS AND METHODS



## RESULTS

### Effect of fermentation on the proximal composition

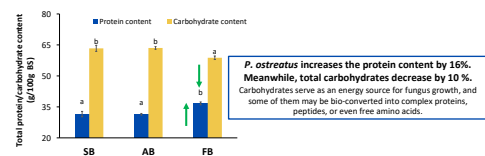


Figure 1. Protein and carbohydrate content of fava beans (g/100 g DB). Lowercase letters indicate significant differences (p<0.05) between the beans.

### Macronutrient digestibility after intestinal stage

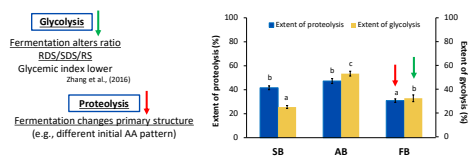


Figure 3. Extent of proteolysis (%) and extent of glycolysis (%) in fava beans obtained after GI digestion. Lowercase letters indicate significant differences (p<0.05) between the beans.

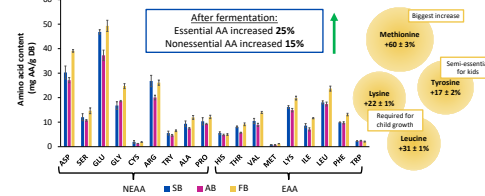


Figure 2. Amino acid profile of fava beans (mg AA/g DB)

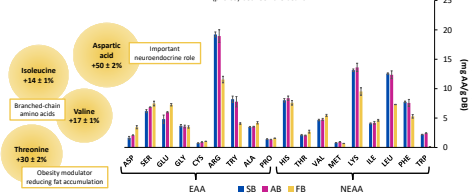


Figure 4. Amino acid profile (mg free AA/g DB) of bioaccessible fraction of digested fava beans

### Impact of fermentation on Angiotensin I-converting enzyme (ACE) inhibition before and after GI digestion

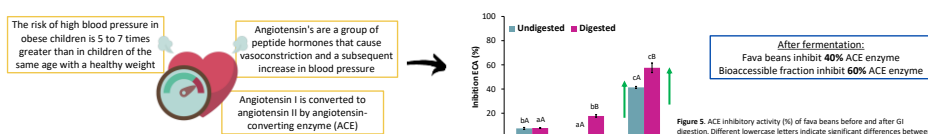


Figure 5. ACE inhibitory activity (%) of fava beans before and after GI digestion. Different lowercase letters indicate significant differences between fava and capital letters indicate significant differences between undigested and digested samples (p<0.05).

## CONCLUSIONS

- Fermentation with *Pleurotus ostreatus* improves the proximal composition of fava beans by enriching it with essential and non-essential amino acids.
- Fermented beans do not improve protein digestibility but exhibited lower carbohydrate digestibility. Nonetheless, fermentation increases the amount of essential amino acids such as valine, isoleucine, and threonine in the bioaccessible fraction of digesta as compared to their unfermented counterparts.
- *Pleurotus ostreatus* significant increase in the inhibition of the ACE enzyme.
- Fermented fava beans with *P. ostreatus* could be a valuable new ingredient for designing rich protein-based products focused on children and young people

## ACKNOWLEDGEMENTS

This study forms part of the AGROALNEXT programme (AGROALNEXT/2022/030) and was supported by MCIN with funding from European Union NextGenerationEU (PRTR-C17.11) and by Generalitat Valenciana. Also, authors are grateful for a grant called "Initiative: reception of Ukrainian research personal in the Valencian R+D+i system" from Generalitat Valenciana, and financial support from Post-doctoral Grant (PAID-10-21) and Postdoctoral Research Fostering Grant (PAID-PD-22) from the Universitat Politècnica de València

Figura 3. Poster "Impact of solid-state fermentation with *Pleurotus ostreatus* on *in vitro* digestibility of fava beans (*Vicia Faba L.*)" presentado por parte de la investigadora Dra. Sara Muñoz Pina.

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Y para que conste a los efectos oportunos

Firma del IP1.

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