CONGRESO NACIONAL DE BIOTECNOLOGÍA

biTEC2017

Murcia 18-21 junio 2017

Sociedad Española de Biotecnología

SEBiot Sociedad Española de Biotecnología Regional Branch Office (EFB)

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DE BIOTECNOLOGÍA

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- Libro de Resúmenes -

ORGANIZA

Sociedad Española de Biotecnología

UNIVERSIDAD DE MURCIA

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PÓSTERES

4. BIOTECNOLOGÍA ALIMENTARIA

P4-2: Valorising rice husk as sources of bioactive compounds

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Topic: Biotecnología alimentaria: alimentos funcionales

Abstract: Rice husk, a by-product of the rice milling industry, is one of the agricultural waste materials that has received high attention. An annual yield of rice production is about 600 million tons all over the world, being generated more than 100 million tons of rice husk[1]. The husk is the outer part of paddy rice, a protective layer of the rice grain, having in its composition biomolecules with protective functions such as antioxidants, and in particularly, phenolic compounds. In this sense, this study aimed to characterize the husk fraction from *Japonica* (Ariete), *Indica* (Gládio) varieties provided by Cotarroz from Salvaterra de Magos, Portugal, in terms of bioactivity and phenolic compounds, valorising these by-products.
The antioxidant activity was evaluated by DPPH radical-scavenging activity, reducing power, inhibition of β-carotene bleaching in the presence of linoleic acid radicals and inhibition of lipid peroxidation using TBARS in brain homogenates. Four Gram-positive bacteria (*Enterococcus faecalis* isolated from urine; *Listeria monocytogenes* isolated from cerebrospinal fluid; MSSA: methicillin-sensitive *Staphylococcus aureus* isolated from wound exudate and MRSA: methicillin-resistant *Staphylococcus aureus*, isolated from expectoration), and six Gram-negative bacteria (*Acinetobacter baumannii* and *Pseudomonas aeruginosa* isolated from expectoration; *Escherichia coli*, *Escherichia coli* spectrum extended producer of β-lactamases (ESBL); *Klebsiella pneumoniae*, *Klebsiella pneumoniae* ESBL, all isolated from urine) were used to screen the antimicrobial activity. The cytotoxicity was tested using MCF-7 (breast adenocarcinoma), NCI-H460 (non-small cell lung cancer), HeLa (cervical carcinoma) and HepG2 (hepatocellular carcinoma) cell lines and a non-tumor cell line PLP2. The phenolic compounds were identified and quantified by high-performance liquid chromatography coupled to a diode array detector and a mass spectrometry using the electrospray ionization interface (HPLC-DAD-ESI/MS).
Ariete husk presented the highest reducing power, DPPH scavenging activity and β-carotene bleaching inhibition capacity, while Gládio presented the best results for TBARS; these two varieties of rice husk showed good antimicrobial activity against the tested bacterial strains, namely, two Gram-positive (methicillin-resistant *Staphylococcus aureus* and methicillin-susceptible *S. aureus*) and two Gram-negative (*Eschericia coli* and extended-spectrum beta-lactamase *E. coli*). Both, Ariete and Gládio samples revealed good cytotoxicity for all the cell line, without toxicity for non-tumor cells (PLP2). Gládio presented the highest levels of total phenolic compounds, being *p*-coumaric acid the most abundant compound. This study highlights the importance of the recovery and valorisation of rice husk residues, in order to obtain valuable products for different industrial applications.

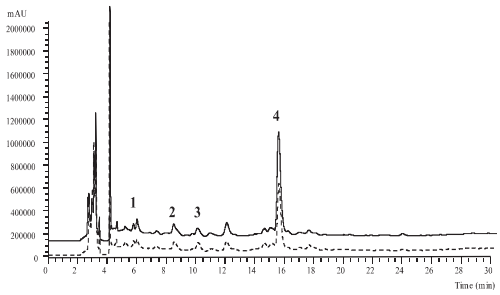

Fig 1. Individual profile of phenolic compounds in Ariete (--) and Gládio (-). 1- Protocatechuic acid; 2- *p*-Hydroxybenzoic acid; 3- Ferulic acid dihexoside/6´-*O*-feruolysucrose; 4- *p*-Coumaric acid.

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References

1. J. Cui, F. Cheng, J. Lin, J. Yang, K. Jiang, Z. Wen, J. Sun, *Powder Techn*, **2017**, 311, 1-8.