XXII Encontro Luso-Galego

Química

9 a 11 novembro 2016

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TIRAGEM
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Antioxidant and chelating activities of fermentation broths containing fructooligossacharides

Aelina Lama[1], Teresa Dias[2], António M. Peres[3,*]
[1]ESA, Instituto Politécnico de Bragança, Campus Santa Apolónia, 5300-253 Bragança, Portugal
[2]CIMO, ESA, Instituto Politécnico de Bragança, Campus Santa Apolónia, 5300-253 Bragança, Portugal
[3]Laboratory of Separation and Reaction Engineering - Laboratory of Catalysis and Materials (LSRE-LCM), ESA, Instituto Politécnico de Bragança, Campus Santa Apolónia, 5300-253 Bragança, Portugal
peres@ipb.pt

Fructooligossacharides are present in plants and fruits at low concentrations and with varying individual relative proportions. So, for industrial application, fructooligossacharides extraction from natural sources may not be economically viable. Recently, several works have been published within this field of research usually aiming to establish the best experimental conditions to maximizing fructooligossacharides yield/synthesis [1-3]. However, although it is known that these compounds may have a great health impact, it is also reported that beneficial health effects may depend on the relative fructooligossacharides composition, seeming that nystose-rich diet is preferable compared to a kestose-rich preparation, exhibiting a higher anti-hydroxyl radical activity [4,5]. So, in this work it is reported the results regarding a screening study concerning the bioactivity activity of the fermentation broth extracts obtained using fungi with potential for producing fructooligossacharides. The potential use of five fungi (*i.e., A. aculeatus, A. japonicus, A. opinicosulum, P. thoumii and P. cornyphipum*) was evaluated. Batch fermentation were carried out during 96 hours, at constant temperature (27 ºC) and agitation (100 rpm), being the initial sucrose concentration fixed at 30 g/L. Samples were taken at 24-h intervals and the radical scavenging activity as well as the iron binding ability of chelators, of the different broth extracts, were determined using the DPPH and ferrozine. The overall results obtained showed that although the extracts possessed relatively low bioactive activity; it was possible to set some preliminary insights that allowed selecting the most promissory(s) mold(s), which could enable achieving, in a near future, a final fructooligossacharides formulation with the greatest antioxidant capacity.

Acknowledgments
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[1] N.S. Neta, A.M. Peres, J.A. Teixeira, L.R. Rodrigues, New Biotechnology, 28 (2011) 349.
[2] A. Dominguez, C. Nobre, L.R. Rodrigues, A.M. Peres, D. Torres, I. Rocha, N. Lima, J. Teixeira, Carbohydrate Polymers, 89 (2012) 1174.
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[4] B. Pejin, A.G. Savic, M. Petkovic, K. Radotic, M. Mojovic, International Journal of Food Science and Technology, 49 (2013) 1500.
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INFORMAÇÕES GERAIS

PROGRAMA CIENTÍFICO

9 a 11 novembro 2016

Instituto Politécnico de Bragança | BRAGANÇA - PORTUGAL

COMUNICAÇÕES EM PAINEL S1

(Química Agro-Mar-Alimentar)

9 de novembro, 17:00 – 17:45

SALA DE PAINEIS	
QAMA35	**Using lipid nanoparticles to bypass rumen digestion** João Albuquerque, Ingrid V. Dorpe, Ana R. J. Cabrita, Salette Reis, Ana R. Neves
QAMA36	**Antioxidant and chelating activities of fermentation broths containing fructooligossacharides** Aelina Lama, Teresa Dias, António M. Peres
QAMA37	**Comparison between FTIR-ATR and NIR spectroscopy for *Lavandula* honey characterization** Ofélia Anjos, Ana Paula Pereira, António J. A. Santos, Letícia M. Estevinho
QAMA38	**Efeito da adição de pólen na produção de hidromel** Adriana Machado, Ana P. Pereira, Letícia M. Estevinho
QAMA39	**Caracterização nutricional e propriedades bioativas de *Geranium robertianum* L .: da planta à fração mais bioativa** Vânia C. Graça, Lillian Barros, Ricardo C. Calhelha, Maria I. Dias, Ana M. Carvalho, Celestino S. Buelga, Paulo F. Santos, Isabel C. F. R. Ferreira
QAMA40	**Estudo do perfil carbonílico do café recorrendo à microextração por difusão gasosa (GDME)** João Rodrigo Santos, Inês M. Valente, José A. Rodrigues
QAMA41	**Recuperación de compuestos fenólicos de *Sargassum muticum* en resinas comerciales** Patricia Pérez-Larrán, Elena M. Balboa, Andrés Moure, Herminia Domínguez
QAMA42	**Volatile and polyphenolic characterization of Tinta Negra wines during Madeira wine ageing processes: *canteiro vs. estufagem*** Andreia Miranda, Maria J. Carvalho, Vanda Pereira, Ana C. Pereira, José C. Marques
QAMA43	**Solubility studies of trans-cinnamic acid in mixed solvents** Bruna P. Soares, Olga Ferreira, Simão P. Pinho
QAMA44	**Caracterização química de clones Verdelho usados na produção de vinho DOP "Madeira"** Anísia Martins, Vanda Pereira, Ana C. Pereira, José C. Marques
QAMA45	**Molecular level insights on the interaction between a celiac disease peptide and polyphenols by ^{1}H-NMR spectroscopy** Ricardo Dias, Maria-Rosa Pérez-Gregorio, Nuno Mateus, Victor de Freitas
QAMA46	**Glucosinolate metabolism and functionality: responses to elicitor's treatment** Alfredo Aires, Madeleine Neumann, Rosa Carvalho, Jutta Ludwig-Müller, Maria Schöpe, Karl-Heinz van Pée
QAMA47	**Pesquisa de histamina em patês e conservas de peixe** M. Corte-Real Maia, F. Bogalho, A. Almeida, S. Duarte, A. Falcão, L. Silva, A. Pereira, C. Lino, A. Pena
QAMA48	**Qual a quantidade de aspártamo em bebidas comercializadas?** M. Oliveira, C. Santos, A. Almeida, S. Duarte, A. Falcão, L. Silva, A. Pereira, C. Lino, A. Pena
QAMA49	**Composição química e propriedades bioativas de suplementos alimentares à base de cardo mariano** Carla Pereira, Lillian Barros, Maria José Alves, Ricardo C. Calhelha, Celestino Santos-Buelga, Isabel C.F.R. Ferreira
QAMA50	**Estudo de aldeídos e cetonas como marcadores voláteis para a avaliação da fermentação ruminal** Inês M. Valente, Hugo M. Oliveira, Margarida R. Maia, António J. M. Fonseca, Ana Rita J. B. Cabrita, José A. Rodrigues
QAMA51	**Identificação de aminas biogénicas em fluido ruminal de vacas alimentadas com diferentes dietas** Liliana Cordeiro, Inês M. Valente, Hugo M. Oliveira, Margarida R. Maia, António J. M. Fonseca, Ana Rita J. B. Cabrita, Paulo J. Almeida, José A. Rodrigues

ANTIOXIDANT AND CHELATING ACTIVITIES OF FERMENTATION BROTHS CONTAINING FRUCTOOLIGOSSACHARIDES

Aelina Lama[1], Teresa Dias[2], António M. Peres[3],*

1: ESA, Instituto Politécnico de Bragança, Bragança, Portugal
2: CIMO, ESA, Instituto Politécnico de Bragança, Bragança, Portugal
3: LSRE-LCM, ESA, Instituto Politécnico de Bragança, Bragança, Portugal
(*) peres@ipb.pt

OBJECTIVES

❖To select the most suitable fungi taking into account the highest antioxidant capacity of fermentation broths

❖ To carry out a screening study of 5 fungi reported as fructooligossacharides' producers

INTRODUCTION

✓Fructooligosaccharides (FOS) are dietary sugars quite used as food ingredients being incorporated as dietary fibers in food products.

✓FOS are present in plants and fruits at low concentrations and with varying individual relative proportions. So, for industrial application, FOS extraction from natural sources may not be economically viable.

✓Recently, several works aimed establishing the best experimental conditions to maximizing FOS yield/synthesis [1-3].

✓However, the beneficial health effects may depend on the relative FOS composition [4,5].

MATERIALS AND METHODS

➢Fungi *A. aculeatus, A. japonicus, P. corylophilum, P. Spinulosum and P. thomii* were grown PDA medium at 25˚C.

➢Czapek liquid medium was inoculated with 10^5 spores/mL of each fungi → Fermentations were carried out at 27˚C, during 96 h at 100 rpm

→ Each 24 h fermentation broth samples were withdraw and filtered (0.2 μm, Nylon filters)

→ Free radical scavenging activities (DPPH) and iron-chelating activities evaluated (Ferrozine).

➢Free radical scavenging activity of filtered fermentation broth samples:

DPPH scavenging effect (%) = $((A_0 - A_1)/ A_0) \times 100$, being A_0 the absorbance of the control and A_1 the samples absorbance.

Calibration curves were obtained using ascorbic acid (Vitamin C) as the chemical standard.

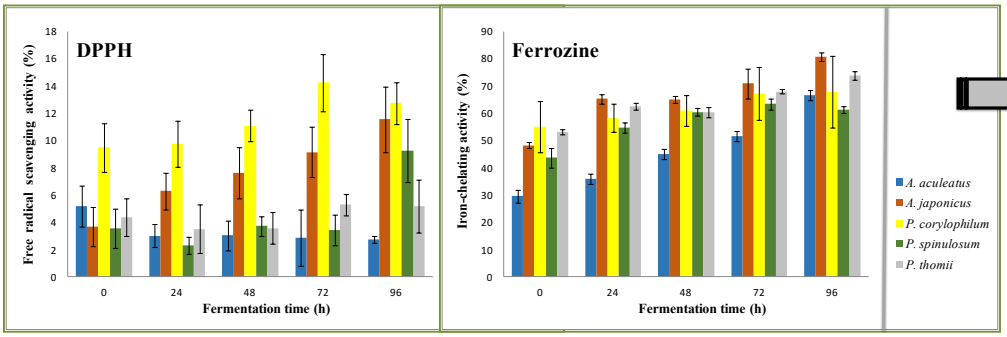
➢Iron-chelating activity of filtered fermentation broth samples (method of Dinis et al. [6] with minor changes):

Chelating activity (%) = $((A_0 - A_1)/ A_0) \times 100$, being A_0 the absorbance of the control and A_1 the samples absorbance.

Calibration curves were obtained using EDTA as the chemical standard.

RESULTS

Fungi screening assays:



i. All fungi (in general):

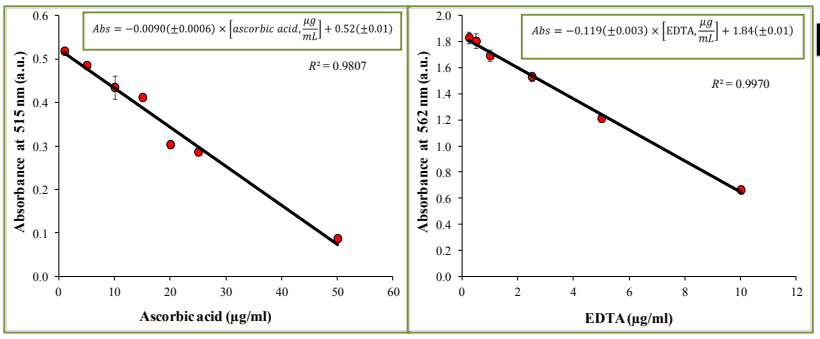
if fermentation time ↑

- **free radical scavenging activity** ↑
- **iron-chelating activity** ↑

ii. All fungi (in general):

{iron-chelating activity} > **{free radical scavenging activity}**

Calibration curves:



At the end of the fermentation (72 to 96 h), the broths exhibited an equivalent:

- **free radical scavenging activity → 1.0 to 15 μg/mL of ascorbic acid**
- **iron-chelating activity → 2.5 to 20 μg/mL of EDTA**

CONCLUSIONS

Most promising fungi (***greatest antioxidant activities***)

1st → ***A. japonicus***

2nd → ***A. aculeatus***

3rd → ***P. corylophilum***

Acknowledgements

This work was financially supported by Project POCI-01-0145-FEDER-006984 – Associate Laboratory LSRE-LCM funded by FEDER through COMPETE2020 - Programa Operacional Competitividade e Internacionalização (POCI) – and by national funds through FCT - Fundação para a Ciência e a Tecnologia.

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CERTIFICADO

Certifica-se que

Aelina Lama

apresentou a Comunicação em Painel intitulada

Antioxidant and chelating activities of fermentation broths containing fructooligossacharides

no XXII Encontro Luso-Galego de Química, realizado no Instituto Politécnico de Bragança, de 09/11/2016 a 11/11/2016.

Pel´A Comissão Organizadora

Instituto Politécnico de Bragança,

11 de Novembro de 2016