

1 JUDUL

1. Thaís C.C. Fernandes, Dânia Elisa C. Mazzeo, Maria A. Marin-Morales, Mechanism of micronuclei formation in polyploidized cells of *Allium cepa* exposed to trifluralin herbicide,

Pesticide Biochemistry and Physiology, Volume 88, Issue 3, July 2007, Pages 252-259,

ISSN 0048-3575, 10.1016/j.pestbp.2006.12.003.

(<http://www.sciencedirect.com/science/article/pii/S0048357506001945>)

Abstract: Summary

The trifluralin is an agent that promotes a cellular damage due to its direct action on the microtubules. This action leads to a decontrol in the cellular division, bringing about polyploid cells. In this work, we show the evidences that the exceeding genetical material of theses polyploidized cells tends to be eliminated from the nucleus in the form of micronucleus. Our analyses prove this fact, both by the presence of a number of cells carrying micronucleus, and by the evidences of the elimination of the exceeding material itself, after exposition of the *Allium cepa* root tips tested with several concentration of trifluralin herbicide. It was noticed that the residual concentration induced a number of polyploid cells, micronuclei and mini cells. Inferences about the implications of the elimination of genetic material from micronuclei, such as cell viability and apoptosis, are also presented.

Keywords: *Trifluralin; Allium cepa; Micronucleus; Nuclear buds; Mini cells; Aneugenic agent; Polyploid cell; Mutagenicity; Dinitroanilines; Chromosome losses*

2008

1. Eduvigis Roldán, Concepción Sánchez-Moreno, Begoña de Ancos, M. Pilar Cano,

Characterisation of onion (*Allium cepa* L.) by-products as food ingredients with antioxidant and antibrowning properties,

Food Chemistry, Volume 108, Issue 3, 1 June 2008, Pages 907-916

ISSN 0308-8146, 10.1016/j.foodchem.2007.11.058.

(<http://www.sciencedirect.com/science/article/pii/S0308814607012174>)

Abstract: Summary

Processing and stabilising onion wastes (residues and surpluses of onion) could solve the environmental problem derived from a great onion wastes disposal. Moreover, obtaining stabilised onion by-products as natural antioxidant food ingredients could be advantageous to food industry, not only to improve the

use of onion wastes but also to obtain new natural and functional ingredients. The aim of this study was to characterise onion by-products – juice, paste and bagasse – from two Spanish onion cultivars – ‘Figueres’ and ‘Recas’ – that have been stabilised by thermal treatments – freezing, pasteurisation and sterilisation in order to evaluate the effect of the processing and stabilisation treatment on the bioactive composition, antioxidant activity and polyphenol oxidase (PPO) enzyme inhibition capacity. The results obtained triggered to choose one onion by-product offering better characteristics for its potential development as a food ingredient: source of antioxidant and antibrowning bioactive compounds. In this study it was shown that processing of ‘Recas’ onion wastes to obtain a paste (mixture content) and applying a mild pasteurisation were the best alternatives to obtain an interesting stabilised onion by-product with good antioxidant properties that made useful its use as functional food ingredient.

Keywords: *Onion by-products; Stabilisation treatments; Freezing; Pasteurisation; Sterilisation; Bioactive compounds; Antioxidant; Enzymatic browning; Functional food ingredient*

2. Coşkuntuna, N. Özer

Biological control of onion basal rot disease using *Trichoderma harzianum* and induction of antifungal compounds in onion set following seed treatment

Crop Protection, Volume 27, Issues 3-5, March-May 2008, Pages 330-336, ISSN 0261-2194, 10.1016/j.cropro.2007.06.002.

(<http://www.sciencedirect.com/science/article/pii/S0261219407001627>)

Abstract: Summary

Trichoderma harzianum KUEN 1585 (commercial product, Sim®Derma) was tested to determine its effect on the mycelial growth of *Fusarium oxysporum* f. sp. *cepae* (FOC) in dual culture and its control of basal rot disease in pot- and field-grown onion sets. The abilities of *T. harzianum* to induce the production of antifungal compounds in sets and to increase onion set diameter were also studied. In pot experiments, where the soil was inoculated with a pathogenic isolate of FOC, seeds were coated with *T. harzianum* at the dosage of 10 g/kg seed. In field experiments, seeds coated with *T. harzianum* were sown in soil naturally infested with the pathogen. *T. harzianum* inhibited mycelial growth of the pathogen in vitro. Seed treatment with *T. harzianum* decreased disease incidence comparable to the imidazole fungicide, prochloraz in both pot and field experiments. It also enhanced bulb diameter of sets, especially in the pot experiment. Extracts from onion sets grown from treated seeds under both conditions were fractionated by thin-layer chromatography for their antifungal compounds. Most of the fractions obtained from the sets of *T. harzianum*-treated seeds showed high antifungal activity against the pathogen. This study suggests the possible role of *T. harzianum* in the induction of antifungal compounds against *F. oxysporum* f. sp. *cepae* in onion sets.

Keywords: Biological disease control; Trichoderma harzianum; Basal rot Fusarium oxysporum; f.sp. cepae; Onion style; Allium cepa L.; Antifungal ;compounds

2009

1. A.S. Rodrigues, M.R. Pérez-Gregorio, M.S. García-Falcón, J. Simal-Gándara,

Effect of curing and cooking on flavonols and anthocyanins in traditional varieties of onion bulbs,

Food Research International, Volume 42, Issue 9, November 2009, Pages 1331-1336,

ISSN 0963-9969, 10.1016/j.foodres.2009.04.005.

(<http://www.sciencedirect.com/science/article/pii/S0963996909001069>)

Abstract: The stability of the major flavonol glucosides and anthocyanins was studied in two regional varieties of Portuguese onion (a white variety “branca da Póvoa” and a red variety “vermelha da Póvoa”). White and red onions from 2007 and 2008 harvests were subjected to field curing with and without light, but the red cultivar from 2008 was also subjected to typical domestic processing, including chopping and different cooking treatments. Field curing resulted in increases in quercetin content compared to levels at lifting, especially important for all white bulbs (33–40% increase). Flavonol and anthocyanin levels in onions cured in the dark were similar to those obtained in bulbs cured in the light. The treatments chopping followed by refrigerated storage, oven roasting and frying, did practically not contribute to modify the total levels of flavonols. Moderate microwave cooking did not affect to the flavonol content, but intense microwave treatment cause flavonol losses of 16% and 18% for quercetin 3,4'-diglucoside (QdG) and quercetin 4'-glucoside (QmG), respectively. Boiling onions for 30 min led losses of quercetin glycosides, which leached to the boiling water without being degraded at 37% and 29% for QdG and QmG, respectively. Boiling for 60 min had more severe effects, since it caused the degradation of quercetin derivatives at 53% and 44% for QdG and QmG, respectively. For anthocyanins, the severity of the cooking treatments was in the following order: frying > boiling > roasting (microwave roasting > oven roasting).

Keywords: Allium cepa; Flavonols; Quercetin; Anthocyanins; Cyanidin; Curing; Cooking

2. P. Latha, T. Anand, N. Ragupathi, V. Prakasam, R. Samiyappan, Antimicrobial activity of plant extracts and induction of systemic resistance in tomato plants by mixtures of PGPR strains and Zimmu leaf extract against *Alternaria solani*,

Biological Control, Volume 50, Issue 2, August 2009, Pages 85-93, ISSN 1049-9644, 10.1016/j.biocontrol.2009.03.002.

<http://www.sciencedirect.com/science/article/pii/S1049964409000656>)

Abstract: Summary

Extracts from 20 non-host plant species were tested for their ability to inhibit the mycelial growth of *Alternaria solani*, the causal agent of early blight disease of tomato. In vitro studies indicated that leaf extract of Zimmu (*Allium cepa* L. x *Allium sativum* L.) demonstrated the highest inhibition of mycelial growth (87%) of *A. solani*. Known biocontrol agents *Pseudomonas fluorescens* (Pf1 and Py15) and *Bacillus subtilis* (Bs16) were also tested alone, together, and in conjunction with the most effective plant extract, Zimmu, in both in vitro and in vivo experiments for control of *A. solani*. All isolates were compatible with each other and with Zimmu leaf extract. Among the various bioformulations tested as seed treatment and foliar application, the talc-based formulation of Pf1 x Py15 x Bs16 x Zimmu was superior in reducing the early blight disease incidence when compared to other treatments. Further, induction of defense enzymes, such as peroxidase (PO) and polyphenol oxidase (PPO) phenylalanine ammonia-lyase (PAL), chitinase and β -1,3-glucanase and accumulation of phenolics were studied. The enzyme accumulation was greater in Pf1 x Py15 x Bs16 x Zimmu treated plants compared to control. The study revealed the probable influence of plant growth promotion and induced systemic resistance (ISR) in enhancing the disease resistance in tomato plants against early blight disease by Zimmu based PGPR mixture.

Keywords: *Bacillus subtilis*; *Early blight*; *Defense enzymes*; *Pseudomonas fluorescens*; *Zimmu*

2010

1. Muthukumar, A. Eswaran, S. Nakkeeran, G. Sangeetha, Efficacy of plant extracts and biocontrol agents against *Pythium aphanidermatum* inciting chilli damping-off,

Crop Protection, Volume 29, Issue 12, December 2010, Pages 1483-1488, ISSN 0261-2194, 10.1016/j.cropro.2010.08.009.

<http://www.sciencedirect.com/science/article/pii/S0261219410002449>)

Abstract: Summary

The fungitoxic effects of 66 medicinal plants belonging to different families were evaluated in vitro on *Pythium aphanidermatum*, the causal agent of chilli damping-off. Of these, Zimmu leaf extract (*Allium sativum* L. x *Allium cepa* L.) showed the highest inhibition of mycelial growth of *P. aphanidermatum* (13.7 mm). The antimicrobial compounds were isolated from Zimmu leaf extract and 22 compounds were identified through gas chromatography mass spectroscopy (GC-MS). Biocontrol agents *Trichoderma viride* and *Pseudomonas fluorescens* and Zimmu extract were also tested alone and together in vitro and in vivo experiments for control of *P. aphanidermatum*. The in vitro studies revealed that combination of *T. viride* + *P. fluorescens* + Zimmu leaf extract

showed the highest mycelial growth inhibition over the control. Both antagonists were compatible with each other and with Zimmu leaf extract. The pot culture studies revealed that seed treatment with combined application of *T. viride* + *P. fluorescens* + Zimmu leaf extract was superior in reducing the pre and post-emergence damping-off incidence (8.3 and 17.0%, respectively), and increased the plant growth and yield (shoot length and root length of 13.7 and 6.3 cm, 146 g/plant, respectively) of chilli when compared to control.

Keywords: *Allium sativum* L. ; *Allium cepa* L.; GC–MS analysis; *T richoderma viride*; *Pseudomonas fluorescens*; Disease management; Plant growth ;promotion