



COST ACTION FA 0905 - Mineral improved crop production for healthy food and feed

Third Annual Workshop (All WGs + MC meeting) – 2nd Announcement / FCT, Universidade Nova de Lisboa, Portugal / 23-26 October 2012

http://www.cost.eu/domains_actions/fa/Actions/FA0905; <http://www.umb.no/costaction>

Enhanced Nutritional Value of Plant-Derived Food or Feed



Local Organizers

Fernando C. Lidon, Maria P. Duarte, Ana L. Fernando, Fernando H. Reboredo, Ana Lucia Leitão, Maria Fernanda Pessoa, Vânia S. Ribeiro - FCT, Universidade Nova de Lisboa, Portugal (www.fct.unl.pt)

Paula Scotti-Campos, Isabel P. Pais, José Semedo, Ana Sofia Almeida, Benvindo Maçãs, José P. Coutinho, Fernanda Simões, Ana R. Costa, José Matos - URGEMP, ENMP, INETI; Instituto Nacional de Investigação Agrária e Veterenária, Portugal. (<http://www.inrb.pt/lniv>)

José C. Ramalho, António E. Leitão, Luís F. Goulão, Ana I. Ribeiro - ECO-BIO, Instituto de Investigação Científica Tropical, Oeiras, Portugal (www.iict.pt)

M. Manuela Silva - ESE Almeida Garrett, Lisboa, Portugal (www.esaag.pt)

Marta Almeida, Catarina Galinha – IST/ITN, Instituto Superior Tecnico / Instituto de Tecnologia Nuclear, Lisboa, Portugal (www.itn.pt)

General Information - <http://www.umb.no/costaction/>

Chair of the Action - Prof. Dr. Bal Ram Singh, [Norwegian University of Life Sciences](http://www.umb.no) (balram.singh@umb.no)

Vice Chair of the Action - Prof. Dr. Peter Schröder, [Helmholtz-Zentrum Munchen, German, Research Center for Environmental Health](http://www.helmholtz-muenchen.de) (peter.schroeder@helmholtz-muenchen.de)

Scientific Committee

- Prof. Dr. **Bal Ram Singh**, [Norwegian University of Life Sciences, Norway](http://www.umb.no)
- Prof. Dr. **Peter Schröder**, [Helmholtz-Zentrum Munchen, German, Research Center for Environmental Health, Germany](http://www.helmholtz-muenchen.de)
- Prof. **Ismail Cakmak**, [Fac. of Engineering and Natural Sciences, Sabanci University, Istanbul, Turkey](http://www.sabanciuniv.edu)
- Prof. **Maria Greger**, Dep. of Botany, [Stockholm University, Stockholm, Sweden](http://www.stockholm.se)
- Prof. **Rainer Schulin**, [Institute of Terrestrial Ecosystems, ETH Zurich, Switzerland](http://www.ethz.ch)
- Prof. **Nathalie Verbruggen**, Lab. de Physiol. Et de Genetique Molecul. Des Plantes, [Univ. Libre de Bruxelles, Brussels, Belgium](http://www.ulb.ac.be)
- Prof. **Mark G. M. Aarts**, Lab of Genetics, [Wageningen University, Wageningen, Netherlands](http://www.wageningenur.nl)
- Prof. **Maria Antosiewicz**, [Institute of Experimental Plant Biology, University of Warsaw, Poland](http://www.igib.pl)
- Prof. **Avi Golan Goldhirsh**, Albert Katz Department of Dryland Biotechnologies, [Balustein Institutes for Desert Research, Bem-Gurion University of Negev, Israel](http://www.balustein.ac.il)
- Prof. **Richard Hurrell**, [Inst.f.Lebensmittel-u.Ernährungswissens, Rüschiikon, Switzerland](http://www.ilmh.ch)
- Prof. **Martin Broadley**, Plant and Crop Science Div. School of Biosciences, [University of Nottingham, Leicestershire, United Kingdom](http://www.nottingham.ac.uk)
- Prof. **Nelson Marmiroli**, [University of Parma, Parma, Italy](http://www.unipr.it)
- Prof. **Fernando C. Lidon**, [FCT, Universidade Nova de Lisboa, Portugal](http://www.fct.unl.pt)
- Dr. **Ana Sofia Almeida**, [Instituto Nacional de Investigação Agrária e Veterinária, Portugal](http://www.inrb.pt)



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MAIN OBJECTIVES

- Identify bottlenecks limiting the content of bioavailable minerals (Fe, Zn, Mg, Se) in the consumable crop part;
- Provide solutions for 3-fold increase in bioavailable food/feed mineral content;
- Assess ways to limit the entry of Cd and As into the food chain;
- Disseminate this knowledge to stakeholders and the public. European dimension and added values COST.

REGISTRATION FEE – 30 euro. The registration fee (in cash) will be paid to the organizer at the arrival to the conference



IMPORTANT REQUEST

To organize the bus transportation between the Hotels and the Workshop, at FCT-Universidade Nova de Lisboa, the guests and participants must inform, to fjl@fct.unl.pt, in which Hotel are staying and if they want to use that transportation.

FOR FURTHER CONTACTS

fjl@fct.unl.pt

HORST INSTITUTION (CONGRESS VENUE AND LOCATION)

The [Faculdade de Ciências e Tecnologia / Universidade Nova de Lisboa / Portugal \(FCT/UNL\)](#), was founded in 1977, being one of the most prestigious Portuguese public schools of science and engineering today, with a total enrolment of ca. 7500 students, of which nearly 1400 are postgraduate students (MSc and PhD). Since its foundation, FCT/UNL has given priority to the promotion of research in its areas of activity. Today FCT/UNL hosts 16 research centres acknowledged by Fundação para a Ciência e a Tecnologia.



HOW TO GET THE CONGRESS VENUE

Distance from the airport until the: (A) [Faculty /FCT-UNL -19 Km](#); (B) [Almada](#) - 20 Km; (C) [Costa da Caparica](#) – 22 km
By taxi (available at the airport) **all destinations about 20 minutes**

By public transportation to the Hotels:

(A) **Take the underground** ([between the stations of the “Airport” and “Entre Campos”](#)) – Take the red line from the “Airport” until the station of “Saldanha” and then the yellow line until the station of “Entrecampos” - about 20 + 4 minutes; [schedule between 6.30 h until 1.00 h](#)).

(B) **Take the Fertagus train** (line 4) ([In the “Entre Campos” station until the station of “Pragal”](#)) – about 15 minutes; [schedule between 5.45 h and 1.30 h](#)).

(C) **Take a taxi** (between the station of Pragal and the Hotel; for the recommended hotels about 10 minutes).

Transportation between the Hotels and the Congress

The local organizers are organizing a system of bus transportation for 24 and 25 October:

- (A) **Between the Hotels and the Workshop at the FCT/UNL (departure and return / morning and late afternoon)**
- (B) **Between the Hotels and the Social Dinner**

FOR BOOKING ACCOMODATION - SUGGESTIONS OF THE ORGANIZERS – COSTA DA CAPARICA / ALMADA

[Hotel Costa da Caparica](#)



[Meliá Aldeia dos Capuchos](#)



[Almada Business Hotel](#)



[Residencial Mar e Sol](#)



[Real Caparica Hotel](#)





Enhanced Nutritional Value of Plant-Derived Food or Feed

FRAMEWORK OF PROGRAM

24 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT– Universidade Nova de Lisboa

8:00-9:00 - *Check-in and Registration*

9:00-10:00 – *Opening Ceremony*

Fernando Cebola Lidon, [FCT– Universidade Nova de Lisboa](#), Portugal - *Local Organizers member*

Bal Ram Singh, [Norwegian University of Life Sciences](#), Norway – *Chair of the COST Action*

Fernando J. Pires Santana, Universidade Nova de Lisboa, Portugal – [Director of FCT/UNL](#)

Maria da Assunção Cristas, [Portuguese minister for Agriculture, Sea, Environment and Spatial Planning](#)

10:00-11:10 – First Session

Chair: Ismail Cakmak, [Sabanci University](#), Istanbul, **Turkey**

Rapporteur: Benvindo Maçãs, [Instituto Nacional de Investigação Agrária e Veterinária](#), **Portugal**

10:00-10:30 – Keynote Lecture by *Fangjie Zhao*

[Nanjing Agricultural University](#), **China**

“Physiology and agronomy of trace element accumulation in food crops”

10:30-11:10 – Short Communications

10.30-10.50 – *Shahin Noeparvar*, *Søren Borg*, *Inger B. Holme* and *Preben B. Holm*

[Aarhus University](#), **Denmark**

”Zinc Transport and Deposition in Barley Grain”

10.50-11.10 – *Daniel Pergament Persson*, *Thomas H. Hansen*, *Søren Husted* and *Jan K. Schjoerring*

[University of Copenhagen](#), **Denmark**

“Zinc and iron speciation in the cereal endosperm”

11:10-11:30 – *Information update* by local organizers (*Fernando Cebola Lidon*)

Coffee Break / **Visit to the technological stand** – UNINOVA Building / [FCT– Universidade Nova de Lisboa](#)



Enhanced Nutritional Value of Plant-Derived Food or Feed

FRAMEWORK OF PROGRAM

24 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT– Universidade Nova de Lisboa

11:30-13:00 – Second Session

Chair: Michel Mench, [UMR BIOGECO INRA, France](#)

Rapporteur: Ana Sofia Almeida, [Instituto Nacional de Investigação Agrária e Veterinária, Portugal](#)

11:30-12:00 - Keynote Lecture by **Brett Robinson**

[Lincoln University, New Zealand](#)

“Carbonaceous soil amendments for healthy food and feed”

12:00-13:00 - Short Communications

12:00-12:20 – **Ismail Cakmak**

[Sabanci University, Istanbul, Turkey](#)

“Nitrogen nutrition represents an important factor in biofortification of cereal grains with zinc and iron”

12:20-12:40 - **Denise Portmann, Susan Tandy, Emmanuel Frossard and Rainer Schulin**

[ITES, ETH Zürich, Switzerland](#)

“Cadmium and zinc uptake in wheat as affected by nitrogen fertilization and agricultural management”

12:40-13:00 - **L. Lyubenova, H. Bipuah, A. Höltkemeier, E. Belford, A. Kuhn, and P. Schröder**

[Helmholtz Zentrum München, Neuherberg, Germany](#)

“Exsudate excretion and stress response in *T. latifolia* upon exposure to copper”

13:00-14:00- **Lunch** at “**Ágora Room**” / [FCT– Universidade Nova de Lisboa](#)

14:00-14:30 - First Poster Session - Cinemat Room / FCT– Universidade Nova de Lisboa

Chair: Peter Schröder, [Helmholtz Zentrum Muenchen, Germany](#)

Rapporteurs: Ana Sofia Almeida, [Instituto Nacional de Investigação Agrária e Veterinária, Portugal](#)

Paula Scotti-Campos, [Instituto Nacional de Investigação Agrária e Veterinária, Portugal](#)



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24 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT– Universidade Nova de Lisboa

14:30-16:00 – Third Session

Chair: Nathalie Verbruggen, [Université libre de Bruxelles, Belgium](#)

Rapporteur: José António Matos, [Instituto Nacional de Investigação Agrária e Veterinária, Portugal](#)

14:30-15:00 - Keynote Lecture by ***Shimpei Uraguchi***

[University of Tokyo, Japan](#)

"Rice cadmium transporters and perspectives for reducing grain cadmium accumulation"

15:00-16:00 - Short Communications

15:00 – 15:20 - ***Oskar Siemianowski and Danuta Maria Antosiewicz***

[University of Warsaw, Poland](#)

"Expression of Zn/Cd root to shoot transporter AtHMA4 leads to significant inhibition of Cd uptake"

15:20 – 15:40 - ***Claire-Lise Meyer, Piétro Salis, Cécile Godé, Pierre Saumitou-Laprade, Nathalie Verbruggen***

[Université Libre de Bruxelles, Brussels, Belgium](#)

"Genetic architecture of cadmium tolerance in the hyperaccumulator Arabidopsis halleri"

15:40 – 16:00 - ***Navreet K. Bhullar, Meng Wang, Kulaporn Boonyaves, Wilhelm Gruissem***

[Institute of Agricultural Sciences, Zurich, Switzerland](#)

"Iron biofortification of staple cereals and gene expression profiling to study the involved molecular mechanisms"

16:00-16:20 – Coffee Break / **Visit to the technological stand – UNINOVA Building** / [FCT– Universidade Nova de Lisboa](#)



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FRAMEWORK OF PROGRAM

24 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT– Universidade Nova de Lisboa

16:20-17:30 – Fourth Session

Chair: Mark Aarts, [Wageningen University](#), **Netherlands**

Rapporteur: José Cochicho Ramalho, [Instituto de Investigação Científica Tropical](#), **Portugal**

16.20-16:50 – Keynote Lecture by ***David Salt***

[University of Aberdeen](#), **Scotland**

“Functional genomics of plant mineral nutrient and trace element homeostasis “

16:50-17:30- Short Communications

16:50 – 17:10 - ***Gábor Feigl, Devanand Kumar, Andrea Pető, Nóra Lehotai, Attila Ördög, Árpád Molnár, Zsuzsanna Kolbert, László Erdei***

[University of Szeged](#), Szeged, **Hungary**

“The effect of zinc on the microelement homeostasis and the metabolism of reactive signal molecules in Brassica juncea and Brassica napus”

17:10 – 17:30 - ***Jean-Yves Cornu, Ulrich Deinlein, Stephan Clemens***

[University of Bayreuth](#), Germany/ [INRA, Bordeaux](#), **France**

“Contrasting effects of nicotianamine synthase knockdown on Zn and Ni homeostasis in Arabidopsis halleri”

17:30 – 18:15 – General Discussions

Chair: Bal Ram Singh, [Norwegian University of Life Sciences](#), **Norway**



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FRAMEWORK OF PROGRAM

24 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT- Universidade Nova de Lisboa

18:15-18:55 - Fifth Session - Companies presentations of Technological research equipment

Chair: Maria Manuela Abreu Silva, [Escola Superior de Educação Almeida Garrett](#), COFAC, **Portugal**

Rapporteur: Fernando Henrique Reboredo, [FCT- Universidade Nova de Lisboa](#), **Portugal**

18:15 - 18:25 – ***Erhard Pfündel***

Heinz Walz GmbH, Germany

“Evaluating photosynthesis through measurements of PAM fluorescence and CO₂ gas exchange “

18:25 – 18:35 – ***Jörg Vandenhirtz***

LemnaTec GmbH, Germany

“High-throughput phenotyping – a boost for genomics in the 21st century”

18:35 – 18:45 – ***Alberto Araújo***

Aralab, Portugal

“Creating solutions for climatic and environmental simulation”

18:45 – 18:55 – ***Luis Valente***

ITISE, Portugal

“The importance of water activity in the food industry”



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8:30-10:30 - MC Meeting - **Chair:** *Bal Ram Singh*, [Norwegian University of Life Sciences](#), **Norway**

10:30-10:50 – Coffee Break / **Visit to the technological stand – UNINOVA Building / FCT– Universidade Nova de Lisboa**

10:50 – 13:00 - Sixth Session

Chair: *Satish Gupta*, **Switzerland**

Rapporteur: *Maria Paula Silva Duarte*, [FCT-Universidade Nova de Lisboa](#), **Portugal**

10:50-11:20 – Keynote Lecture by *Ann-Sophie Sandberg*

[Chalmers University](#), **Sweden**

“Influence of plant composition on iron and zinc absorption”

11:20-13:00 – Short Communications

11:20 – 11:40 – *Tristan Eagling*, *Anna Wawer*, *Fangjie Zhao*, *Andy Neal*, *Steve McGrath*, *Peter R Shewry*,
Susan Fairweather-Tait

[Rothamsted Research Hertfordshire](#) AL5 2JQ, **United Kingdom**

“Comparison of the speciation, digestibility and bioavailability of iron in unleavened white wholemeal breads”

11:40 – 12:00 – *Nathalie Scheers* and *Ann-Sofie Sandberg*

[Chalmers University of Technology](#), Gothenburg, **Sweden**

“The iron transporter ferroportin and iron regulatory protein IRP2 are regulated by ascorbate in human caco-2 cells”



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10:50 – 13:00 - Sixth Session

Chair: Satish Gupta, ***Switzerland***

Rapporteur: Maria Paula Silva Duarte, ***FCT-Universidade Nova de Lisboa, Portugal***

11:20-13:00 – Short Communications

12:00 – 12:20 – ***Gijs Du Laing, Pradeep Alava, Moses Odhiambo Abonga, Filip M.G. Tack, Tom Van de Wiele***
Ghent University, Ghent, Slovakia

“Effect of Ph, bile salt concentration and presence of fat on gastrointestinal bioaccessibility of arsenic in rice”

12:20 – 12:40 – ***László Erdei and Sorina Popescu***

Banat University of Agricultural Sciences, Romania

“Integrated interdisciplinary approach for safe food and feed in east-central Europe”

12:40 – 13:00 - ***Lidiya Moklyachuk, Orest Furdycko, Volodymyr Strelko, Sergey Melnichuk, Yaroslav Chabanyuk, Viktor Shynkarenko, Victoria Lokhanska, Valerii Tsvilikhovskiy, Andriy Vdovychenko, Yuriy Ternoviy, Volodymyr Trychlib, Irina Maletina, Bogdana Nikitina***
Institute of Agroecology and Environmental Management, Ukraine

“Practical approaches to implementation of quality baby food”

13:00-14:10- ***Lunch*** at “***Ágora Room***”/ ***FCT– Universidade Nova de Lisboa***

14:10-15:00 - First Poster Session - Cinemat Room / FCT– Universidade Nova de Lisboa

Chair: Peter Schröder, ***Helmholtz Zentrum Muenchen, Germany***

Rapporteurs: Ana Sofia Almeida, ***Instituto Nacional de Investigação Agrária e Veterinária, Portugal***

Paula Scotti-Campos, Instituto Nacional de Investigação Agrária e Veterinária, Portugal



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FRAMEWORK OF PROGRAM

25 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT– Universidade Nova de Lisboa

15:00-16:10 – Seventh Session

Chair: Maria Greger, [Hedmark University, Norway](#)

Rapporteur: Ana Lucia Leitão, FCT, [Universidade Nova de Lisboa, Portugal](#)

15:00-15:30 – Keynote Lecture by ***Margaret Rayman***

[University of Surrey, Guildford, United Kingdom](#)

"Selenium and human health"

15:30-16:10- Short Communications

15:30 - 15:50 - ***María J. Poblaciones, Sara M. Rodrigo, Santiago Lledó, Oscar Santamaría, Nuno Pinheiro, Francisco J. López-Bellido, Teodoro García-White, Leopoldo Olea***

[University of Extremadura, Spain](#)

"Evaluation of the potential of peas (*Pisum sativum* L.) and chickpeas (*Cicer arietinum* L.) to be used in selenium biofortification programs under Mediterranean conditions"

15:50 - 16:10 - ***Iwona Kowalska, Sylwester Smoleń, Włodzimierz Sady***

[University of Agriculture in Kraków, Poland](#)

"Assessment of double biofortification with iodine and selenium of lettuce cultivated in the NFT hydroponic system"

16:10-16:30 – ***Information update*** by local organizers (***Fernando Cebola Lidon***)

Coffee Break / ***Visit to the technological stand – UNINOVA Building / FCT– Universidade Nova de Lisboa***



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FRAMEWORK OF PROGRAM

25 October – Cinemat / Amphitheater Leopoldo Guimarães / FCT– Universidade Nova de Lisboa

16:30-17:30 – *Eighth Session*

Chair: Maria Antosiewicz, [University of Warsaw, Poland](#)

Rapporteur: António Eduardo Leitão, [Instituto de Investigação Científica Tropical, Portugal](#)

16:30-17:30 – Short Communications

16:30 – 16:50 – ***Daniel Berstein, Menahem Edelstein, Meni Ben-Hur, Moshe Shenker, and Hassan Azaizeh***
*Institute of Applied Research ([University of Haifa](#)), Shefa-Amr / [Tel Hai College](#), Upper Galilee - **Israel***

“Fortification of tomatoes and basil plants with selenium for food consumption”

16:50 – 17:10 – ***Andrijana Rebekić, Zdenko Lončarić, Zed Rengel***

[Faculty of Agriculture in Osijek, Croatia](#)

“Cadmium-zinc-iron relations in winter wheat grain”

17:10 – 17:30 – ***Arsim Ademi, Bal R. Singh, Espen Govasmark, Aksel Bernhoft, Tore Siversten, Hysen Bytyqi***

[Norwegian University of Life Sciences, Norway](#)

“Selenium concentration in sheep’s blood and animal feed in Kosovo”

17:30 – 18:15 – **General Discussions**

Chair: Bal Ram Singh, [Norwegian University of Life Sciences, Norway](#)

20:30 – 23:00 – **Social Dinner in [Hotel do Mar](#), Sesimbra, **Portugal****

26 October

Any other administrative leftovers and departure of guests and meeting participants



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FRAMEWORK OF PROGRAM

24-25 October – POSTERS / Cinemat / Room / [FCT- Universidade Nova de Lisboa](#)

Maximum dimension -116cm height and 80 cm width; Placing posters time – 24 October at 8:30-9:00 ; Posters removal time – 25 October at 18.15 – 18:30

- P1-Aliaksandr Kolbas, Michel Mench, Natallia Kolbas, Lilian Marchand, Rolf Herzig
STRUCTURAL AND FUNCTIONAL RESPONSES OF A SUNFLOWER MUTANT LINE AND A TOBACCO MOTHERCLONE TO INCREASING SOIL Cu EXPOSURE
- P2-Ana Lúcia Leitão, Ana Luisa Fernando, Paula Scotti-Campos, Isabel P. Pais, António Eduardo Leitão, Catarina Galinha, Marta Almeida, Fernando Henrique Reboredo, Ana Sofia Almeida, Fernanda Pessoa, Benvindo Maçãs, José Prates Coutinho, José Cochicho Ramalho, Ana Isabel Ribeiro, Luis Filipe Goulão, Maria Manuela Silva, Maria Paula Duarte, Vânia Ribeiro, Fernanda Simões, Ana Rita Costa, José Semedo, José Matos, Fernando Cebola Lidon
CAN BIOFORTIFICATION OF TRITICUM AESTIVUM L. SEEDS PREVENT FUNGAL CONTAMINATION?
- P3-Ana Rita Costa, Ana Sofia Almeida, Nuno Pinheiro, Benvindo Maçãs, José Prates Coutinho, António Eduardo Leitão, Maria Paula Duarte, Maria Manuela Abreu da Silva, Ana Luísa Fernando, Paula Scotti-Campos, Isabel. P. Pais, José Semedo, José Cochicho Ramalho, Ana Isabel Ribeiro, Luis Filipe Goulão, Fernanda Simões, José Matos, Fernando Henrique Reboredo, Marta Almeida, Catarina Galinha, Vânia Ribeiro, Fernando Cebola Lidon
SIMULTANEOUS BIOFORTIFICATION OF ZN AND FE IN TRITICUM AESTIVUM L. CV NABÃO UNDER FIELD CONDITIONS
- P4-Andrea Nesler, Giovanni DalCorso, Antonella Furini
CONTROLLING HEAVY METAL ACCUMULATION IN PLANTS
- P5-Benvindo Maçãs, José Prates Coutinho, Ana Sofia Almeida, Ana Rita Costa, António Eduardo Leitão, Ana Lúcia Leitão, Maria Paula Duarte, Maria Manuela Abreu da Silva, Ana Luísa Fernando, Paula Scotti-Campos, José Semedo, Isabel. P. Pais, José Cochicho Ramalho, Ana Isabel Ribeiro, Luis Filipe Goulão, Fernanda Simões, José Matos, Fernando Henrique Reboredo, Marta Almeida, Catarina Galinha, Vânia Ribeiro, Fernando Cebola Lidon
WHEAT CROP IN PORTUGAL – BIOFORTIFICATION PROSPECTIVE
- P6- Szilvia Brunner, Ágnes Vashegyi, Andrea Pető, Ákos Mesterházy, László Erdei
EFFECTS OF FUSARIUM STRAINS OF DIFFERENT AGGRESSIVITY ON MACROELEMENT COMPOSITION IN KERNELS OF MAIZE
- P7-Campos A. C. A. L., Moreira C.N., Koolhaas I., Aarts M.G.M.
NATURAL VARIATION IN ARABIDOPSIS THALIANA REVEALS GENES UNDERLYING ZINC DEFICIENCY TOLERANCE



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P8-Catarina Galinha, Maria do Carmo Freitas, Adriano M.G. Pacheco, José Coutinho, Benvindo Maçãs, Ana Sofia Almeida
SELENIUM SUPPLEMENTATION OF WHEAT CULTIVARS -- A COMPARISON OF FIELD PROCEDURES

P9-Charlotte Poschenrieder, Catalina Arroyave, Thanh Thuy, Juan Barceló, Roser Tolrà
INFLUENCE OF ALUMINIUM ON MINERAL NUTRITION IN BRACHARIA AN IMPORTANT FODDER CROP ON TROPICAL ACID SOILS

P10-Cuyppers Ann, Vangronsveld Jaco
BIOMASS PRODUCTION ON CADMIUM CONTAMINATED SOILS: HOW TO OVERCOME THE OXIDATIVE CHALLENGE?

P11-Danica Kučerová, Ivan Zelko, Karin Kollárová, Zuzana Vatehová, Anna Kákošová, Desana Lišková
PROTECTIVE ROLE OF GALACTOGLUCOMANNAN OLIGOSACCHARIDES AND SILICON AGAINST CADMIUM STRESS

P12-Diego Almeida, Mark G.M. Aarts, Nelson J. M. Saibo, Ana G.L. Assunção
UNRAVELLING THE MOLECULAR NETWORK REGULATING ZINC CONTENT IN PLANTS: FROM ARABIDOPSIS TO RICE

P13-Edita Baltrėnaitė, Arvydas Lietuvninkas, Pranas Baltrėnas, Viktorija Krastinytė, Vaida Šerevičienė, Dainius Paliulis
METAL CONTAINING AEROSOLS AS ONE OF SOIL METAL SOURCES

P14-Elena Maestri, Mariolina Gullì, Giovanna Visioli, Marta Marmioli, Davide Imperiale, Daniel Campioli, Nelson Marmioli
METAL ACCUMULATION AND RESERVE PROTEINS IN CEREALS

P15-F. Gómez-Coronado, A.S. Almeida, M.J.Poblaciones
EFFECTS OF ZN FERTILITATION IN SOIL AND LEAVES IN SOUTHEAST OF PORTUGAL



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P16-José C. Ramalho, Fernanda Simões, José Matos, Ana I. Ribeiro, António E. Leitão, Luís F. Goulão, Benvindo Maçãs, Ana S. Almeida, P. Scotti-Campos, Isabel P. Pais, José Semedo, José P. Coutinho, Ana R. Costa, Ana L. Fernando, Fernando H. Reboredo, Maria P. Duarte, Ana Lúcia Leitão, Maria M.A. Silva, Marta Almeida, Catarina Galinha, Vânia Ribeiro, Fernando C. Lidon

Zn AND Fe BIOFORTIFICATION IN *Triticum aestivum* L. - IMPACT ON LEAF PHOTOSYNTHESIS AND GRAIN MOLECULAR FEATURES

P17-Juan P. Navarro-Aviñó, D. Mergel, M^AJ. Guinart, I Izarbe

PHYSIOLOGY OF SPECIES THAT INCREASE THE BIOAVAILABILITY OF NUTRIENTS

P18-Lyudmila Lyubenova, Nóra Lehotai, Zsuzsanna Kolbert, László Erdei and Peter Schröder

IN VIVO AND IN VITRO PERFORMANCE OF THE GLUTATHION REDUCTASE ACTIVITY IN SE AND ZN TREATED PISUM SATIVUM

P19-Maria Greger, Tommy Landberg

SILICON IN BIOFORTIFICATION OF CROP PLANTS

P20-María José Sierra, Rubén López-Nicolás, Carlos A. González-Bermúdez, Carmen Frontela-Saseta, Rocío Millán

TRACE ELEMENTS UPTAKE BY SWISS CHARD CULTIVATED ON HG POLLUTED SOIL AND IN VITRO MINERAL AVAILABILITY FROM THE CROP

P21-Maria Vassileva, Gilberto Mendez, Vanessa Martos, Nikolay Vassilev

ALTERNATIVE P-SOURCES CAN LIMIT HEAVY METALS ENTRY IN THE FOOD CHAIN

P22-Marta Pogrzeba, Aleksandra Sas-Nowosielska, Jacek Krzyżak

INFLUENCE OF SOIL AMENDMENTS ON CD AND ZN CONCENTRATIONS IN BARLEY GRAINS AND STRAW

P23-Miroslava Vrbová, Pavel Kotrba, Jiří Horáček, Petr Smýkal, Lenka Švábová, Martina Větrovcová, Iva Smýkalová, Magdalena Cvečková, Miroslav Griga

IMPROVED FLAX AND LINSEED (*LINUM USITATISSIMUM* L.) TRANSFORMATION EMPLOYED TO EXPRESS TRANSGENES ENHANCING TOLERANCE TO AND UPTAKE OF CD²⁺



Enhanced Nutritional Value of Plant-Derived Food or Feed

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Maximum dimension -116cm height and 80 cm width; Placing posters time – 24 October at 8:30-9:00 ; Posters removal time – 25 October at 18.15 – 18:30

P24-Nikolay Vassilev, Almudena Medina, María Vassileva

BIOLOGICAL P-FERTILIZATION AS A TOOL FOR LIMITING CD ENTRY IN THE FOOD CHAIN

P25-Nóra Lehotal, Lyudmila Lyubenova, Natascha Drews, Attila Ördög, Gábor Feigl, Zsuzsanna Kolbert, László Erdei, Peter Schröder

THE POSSIBILITIES AND ENZYMATIC BACKGROUND OF SE AND ZN BIOFORTIFICATION OF PEA PLANTS

P26-Paula Pongrac, Primož Pelicon, Primož Vavpetič, Luka Jeromel, Katarina Vogel-Mikuš, Marjana Regvar, Ivan Kreft

SPATIALLY RESOLVED LOCALIZATION OF MINERAL ELEMENTS IN TARTARY BUCKWHEAT GRAIN

P27-Paula Scotti, Isabel Pais, José Semedo, António Eduardo Leitão, Ana Luísa Fernando, Fernando Reboredo, Ana Rita Costa, Ana Sofia Almeida, Benvindo Maçãs, José Coutinho, José Ramalho, Ana Ribeiro, Luís Goulão, Maria Manuela Silva, Maria Paula Duarte, Fernanda Simões, José Matos, Ana Lúcia Leitão, Catarina Galinha, Marta Almeida, Vânia Ribeiro, Fernando Lidon

FATTY ACIDS PROFILE IN ZN AND FE BIOFORTIFIED WHEAT GROWN UNDER FIELD CONDITIONS

P28-R. Lăcătușu

ZINC DEFICIENCY IN MAISE AND ITS MODE OF ASSESSMENT IN ROMANIA

P29-Rabęda I., Napieralska A., Mellerowicz E. J., Woźny A., Krzyszowska M

IS PB ACCUMULATION IN POPLAR ROOT TIP CELL WALLS DEPENDENT ON LOW-METHYLESTERIFIED PECTINS LEVEL AND DISTRIBUTION?

P30-Rama V Srikanth Lavu, Azong Valery Funwie, Filip Tack, Gijs Du Laing

EFFECT OF SOIL PROPERTIES ON AVAILABILITY AND MOBILITY OF SELENIUM

P31-Saulius Marcinkonis

TRACE ELEMENTS IN AGRICULTURAL LITHUANIAN SOILS



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P32-Sylvain Legay, Cédric Guignard, Johanna Ziebel, Danièle Evers
IRON UPTAKE AND HOMEOSTASIS RELATED GENES IN POTATO UNDER IRON DEFICIENCY AND OVERLOAD

P33-Sylwester Smoleń, Anna Kołton, Alina Wiszniewska, Joanna Wierzbińska, Włodzimierz Sady
IODINE UPTAKE AND NITROGEN METABOLISM OF TOMATO PLANTS CULTIVATED IN A HYDROPONIC SYSTEM DEPENDING ON THE INTRODUCTION THROUGH THE NUTRIENT MEDIUM OF: I⁻, IO₃⁻ AND SALICYLIC ACID

P34-Thilo Dürr-Auster, Rainer Schulin, Emmanuel Frossard
TRACING THE TRANSFER OF ZINC ADDED TOGETHER WITH ORGANIC MANURE TO WHEAT GRAIN

P35-Victor Hermand, Emilie JULIO, François DORLHAC DE BORNE, Françoise GOSTI, Pierre Berthomieu
FUNCTIONAL ANALYSIS OF HMA GENES IN TOBACCO AND PRODUCTION OF LOW-CADMIUM TOBACCO LINES

P36-Zaigham Shahzad, Françoise Gosti, Hélène Frérot, Eric Lacombe, Nancy Roosens, Pierre Saumitou-Laprade, Pierre Berthomieu
THE METAL TOLERANCE PROTEIN 1 (MTP1) GENE FAMILY IN THE ZINC TOLERANT AND ZINC HYPER-ACCUMULATING SPECIES ARABIDOPSIS HALLERI: INFERENCE ON POTENTIAL USE AS MOLECULAR TARGET FOR CEREAL ZINC BIOFORTIFICATION

P37-Zdenko Lončarić, Maja Manojlović, Brigita Popović, Krunoslav Karalić, Ranko Čabilovski, Vladimir Ivazić, Bal Ram Singh
ZINC AND SELENIUM APPLICATION IMPACT ON THEIR CONCENTRATION IN WINTER WHEAT GRAIN

P38-Zuzana Vatehová, Danica Kučerová, Karin Kollárová, Ivan Zelko, Anna Kákošová, Anna Malovíková, Desana Lišková
THE EFFECT OF CADMIUM CATIONS ON THE COMPOSITION OF ROOT CELL WALLS IN ZEA MAYS L.