gratefully acknowledges Junta de Andalucía for her predoctoral grant associated to the AGR7252 project.

http://dx.doi.org/10.1016/j.toxlet.2015.08.243

**P02-018**

**Use of single cell gel electrophoresis assessing DNA damage caused by chemopreventive agents in human leukaemia cells. A model for nutraceutical in vitro screening**


*University of Cordoba, Genetics, Cordoba, Argentina*

Cancer is one of the leading causes of death world-wide. One of its major pathological pathways is the silencing of the apoptotic mechanism, producing uncontrolled cellular growth. Therefore, agents that can trigger apoptosis in tumour cells can be potentially considered as chemopreventives. In this study we determined the ability to induce DNA single/double-strand breaks, a pro-apoptotic major marker, of several nutritional compounds using the Single Cell Gel Electrophoresis (SCGE – comet assay) and the internucleosomal fragmentation assay (IF), as well their cytotoxic activity in order to compare the sensibility of both methodologies as nutraceutical screening tools. In total, six worldwide highly consumed nutritional products (two beverages: ale stout beer and cola drink; two food additives: glutamate and citric acid; and two vegetables: garlic and onion) were assessed to ascertain on their ability to induce DNA single/double-strand breaks, a pro-apoptotic way. In conclusion, our data suggest that garlic could be proposed as a nutraceutical substance but a concentration effect is observed in all the assays being the higher doses not advisable.

http://dx.doi.org/10.1016/j.toxlet.2015.08.245

**P02-019**

**Toxicological, genotoxicological, cytotoxic and lifespan induced activities of different types of garlic (white, purple and black)**


*University of Cordoba, Genetics, Cordoba, Spain*

*Allium sativum* has been used throughout history for medicinal purposes and takes part in the healthy components used in the Mediterranean diet as well. There is a wide range of researches which are focused on the health promoting properties of garlic. White, purple and three types of black garlic (OC1, 1C2 and 2C1, with different fermenting times) were selected in order to check some possible differences in their nutraceutical potential. For this purpose, in vivo (toxicity, genotoxicity and longevity assays in *Drosophila melanogaster* model) and in vitro (cytotoxicity and proapoptotic DNA internucleosomal fragmentation in HL-60 human leukaemia cell line) assays were carried out. These studies have shown that all types of garlic were safe without showing toxicity, although they did not exert protective effects against the oxidative agent hydrogen peroxide, with the exception of 0C1 black garlic that showed a slight protection against the oxidative toxin. With respect to the genotoxic potential, all raw and processed garlic material were not genotoxic with the exception of the higher concentration of white garlic. On the other hand, the highest concentrations of white and 2C1 garlic and the lowest concentration of 0C1 and purple garlic did not exhibit antigenotoxic effects when the imaginal discs were treated with the genotoxic hydrogen peroxide. The longevity assays in *Drosophila* yielded significant extension of lifespan results only in some of the tested concentrations of white and 0C1 and 1C2 black garlic; and contrarily, purple garlic decreased the lifespan extension at the higher concentration. Finally, the results achieved in the in vitro experiments for garlic cytotoxicity were hopeful. All studied garlic induced a decrease in leukaemia cells growth, being the purple and white ones the healthiest with an IC50 lower than 0.003 mg/ml and 0.02 mg/ml respectively, whereas the other sorts of garlic had an IC50 near 1 mg/ml concentration. However, the purple garlic breed was the only inductor of cellular death by the DNA proapoptotic way. In conclusion, our data suggest that garlic could be proposed as a nutraceutical substance but a concentration effect is observed in all the assays being the higher doses not advisable.

http://dx.doi.org/10.1016/j.toxlet.2015.08.244

**P02-020**

**The toxic effects of Cacti-Nea™ on germination of A. cepa**

F. Flores Navarro 1,2 *, B. Scia Oliveira 1, F. Dani Campos Pereira 2, G. Dias de Campos Severi Aguiar 1, M.A. Marin Morales 2

1 Centro Universitário Hermínio Ometto – UNIARARAS, Araras, Brazil
2 Instituto de Biociencias, Universidade Estadual Paulista (UNESP), Biologia, Rio Claro, Brazil

*Opuntia ficus indica* L., a species in the cactus family Cactaceae, is a plant growing in dry and hot climates: northern Mexico, south-western United States, Africa, Mediterranean countries and Europe. The fruits are used in the traditional medicine. NEXIRA Health develops Cacti-Nea™, a cactus fruit extract with natural diuretic properties, it is a dehydrated water extract of the fruits of the prickly pear cactus *Opuntia ficus indica*, obtained by a process designed to preserve the nutritional and functional properties of the fruit. Nutraceutical can be defined as, “a food (or part of a food) that provides medical or health benefits, including the prevention and/or treatment of a disease”. However, the term nutraceutical, as commonly used, in marketing has no regulatory definition. Nutraceuticals and food supplements frequently contain huge dosages of antioxidants. It is not generally recognized that high intake of antioxidants may also have adverse effects. This study proposes the evaluation of Cacti-Nea on...
P02-022
In vivo genotoxicity evaluation by standard and modified comet assay in PTSO (propyl thiosulphonate oxide) a garlic oil compound

P. Mellado-García 1, M. Puerto 1, A. Prieto 1, S. Pichardo 1, A. Martin-Cameán 1,2, C. Nuñez 3, E. Guillamón 3, A.M. Cameán 1,∗

1 Area of Toxicology, University of Sevilla, Sevilla, Spain
2 School of Dentistry, University of Sevilla, Sevilla, Spain
3 DOMCA S.A., Alhendín, Granada, Spain

Essential oils (Eos) are a good source of several bioactive compounds, which possess antioxidative and antimicrobial properties. In addition, some EOs have been used in food industry and can be incorporated into packaging in which they can provide multifunctions termed “active or smart packaging.” The aim of this study was assess the possible genotoxic effects of PTSO (propyl propane thiosulfate), an oil sulfured compound from Allium species, developed and isolated chemically by DOMCA (Granada, Spain). For this reason, genotoxicity was determined in Wistar rats by the standard and modified comet assay according to the principles of OECD guideline 487. The animals were administrated by gavage with PTSO 5.5, 17.39 and 55 mg/kg b.w and treated at three intervals of 0, 24 and 45 h. 3 h after the last dose they were sacrificed and the liver and stomach were obtained. The standard comet assay was performed to detect DNA strand breaks. In addition, possible oxidative DNA damage was measured adding restriction enzymes to the isolated nucleus. In this sense, formamidopyrimidine DNA glycosylase (FPG) and endonuclease III (Endo III), allow the measurement of oxidised pyrimidines and purines bases, respectively. Preliminary results obtained for the standard comet assay indicate no significant increase DNA strand breakage in any concentration tested. However, it is necessary to evaluate the results in the FPG-End III-modified comet assay to explore the safety of this compound and its future use in food active packaging.

Acknowledgements: The authors wish to thank the Spanish Ministry of Science and Innovation (AGL2012-38357-C02-01) co-financed by FEDER Funds, and Junta de Andalucía (AGR-7252) for the financial support for this study; and the Cell Culture Service and Microscopy Service of CITIUS from the University of Seville for technical support.

http://dx.doi.org/10.1016/j.toxlet.2015.08.247

P02-023
Reduction of arsenic bioavailability using dietary strategies

M. Clemente Peiró 1, V. Devesa i Perez, D. Vélez Pacios

Instituto de Agroquímica y Tecnología de los Alimentos (IATA-CSIC), Conservación y Calidad de los Alimentos, Elementos Traza, Paterna, Valencia, Spain

The main route of exposure to arsenic (As) is the consumption of water and certain foods, where the forms with greater toxicity are inorganic [As(V), As(III)] and dimethylarsinic acid, DMA(V). It has been shown that the chemical form of As influences its intestinal absorption, and therefore the amount of element that reaches the systemic circulation and exerts its toxic effect. Some studies show that inorganic As is fully absorbed while the DMA(V) has a lower degree of absorption. It has also been reported that presence of food reduces the bioaccessibility (fraction solubilized during gastrointestinal digestion). It is therefore plausible that some food components diminish the As absorption and therefore its toxicity. The objective of this study is the search for food components or dietary supplements that reduce the bioaccessibility of As(III), As(V) and DMA(V) from food, in order to reduce the amount of As available for absorption. For this purpose, 37 components or dietary supplements have been assayed using a static in vitro model of gastrointestinal digestion. Initially we have evaluated the effect of the compounds on the solubility of aqueous standards solutions of arsenic species submitted to the conditions of the gastrointestinal digestion. Those components that have reduced the solubility of aqueous standards have been tested in three food matrices (white and brown rice and seaweed) to determine the effect of their presence in the bioaccessibility of As. The results show that sulfates of Fe(II) and Fe(III), Ca with phytates, certain types of cellulose, xylans, N-aceticilisteine and saponins are those compounds which reduce further the solubility of the three forms of As in aqueous solution. We must highlight the significant reduction observed with Fe, which annihilates the solubility of inorganic forms and reduces more than 50% that of DMA(V). This significant reduction is also observed in rice (100%) and seaweed (60%). The remaining components are not as effective in food, possibly due to their interaction with other matrix components that hinder the binding of arsenic forms. The use of dietary supplements of Fe confirms the capacity of Fe to reduce the bioaccessibility of As, showing that the use of Fe may be a good strategy to reduce the entrance of As into the systemic circulation.

http://dx.doi.org/10.1016/j.toxlet.2015.08.248

P02-024
Hydroxyphosphonoacetic acid – An accidental contamination in drinking water

M. Bundschuh 1, N. Safari 2, J. Schulze 1,∗

1 Goethe-University Frankfurt/Main, Inst. Industrial, Social and Environmental Medicine, Frankfurt/Main, Germany
2 Medical Airport Services, Mörfelden-Walldorf, Germany

Hydroxyphosphonoacetic acid (HPAA) is used in industrial water supplies to prevent corrosion of steel tubes; for corrosion inhibition a 1:1-mixture of HPAA with polyacrylic acid (PAA) is added to high mineral water at a concentration of 1:10,000. It is not intended to be used in drinking water and has not been evaluated toxicologically. In a large office building the industrial mixture