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PL1
Flavonoid nanotechnology in the protection of human physiology

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Flavonoids are a family of naturally encountered compounds, amply abundant in plants throughout the planet. Their role in the maintenance of plant physiology and handling of oxidative stress reflects efforts of the various plant species to survive under environmental conditions [1] imposed by seasonal changes on location (temperature, pressure, nutrient bioavailability). Undoubtedly, the arising properties of flavonoids, as distinctly identified by the multitude of plants organisms over a wide spectrum of environmentally diverse habitats, involve important factors intimately associated with the human nutrition and influence of health. The inherent structures of flavonoids, known to date, testify to their multifaceted ability to counteract oxidative stress, thereby maintaining homeostatic mechanisms linked to organismal integrity. In that respect, the flavonoid profile of each plant species is characteristic of its own evolutionary biology and history, concurrently providing valuable information on its potential use in human nutrition. In view of the fact that the compositional profile of flavonoids in each plant reflects commensurably the antioxidant potential of its constituents and thus its collective ability to withstand and counteract oxidative stress [2], due attention should be given to their potential to effect cellular protection at the molecular level through habitual consumption and dietetic incorporation. Driven by the need to investigate the potential use of such flavonoids in human nutrition and furthermore introduce preventive measures against a multitude of pathological aberrations [3], research was launched in our lab targeting incorporation of various flavonoids in nanoparticles, followed by detailed investigation of their transport and delivery (release profiles and kinetics thereof) on target so that cellular protection can be pursued at the molecular level. Prominent among such flavonoids are catechin, naringin, and quercetin, all known antioxidants in plant species [4], with various concentrations present in a diverse spectrum of plants species. The host chosen to pursue such a feat was silica, the surface of which was modified by PEG and CTAB so as to bestow specific solubility and thus bioavailability of the particles approaching the cellular targets selected. The synthesized nanoparticles (empty and loaded with flavonoids) were characterized by a multitude of techniques, including porosimetry, zeta-potential, DLS, FT-IR, SEM, TEM and NMR, with electronic spectroscopy contributing to both identification and exploration of the release profile under physiological conditions. The ensuing ex vivo studies employing neuronal cells showed that the generated nanoparticle preparations are capable of protecting neurons [5] from oxidative stress conditions induced through redox active metal ions, such as Cu(II), thereby standing as credible contenders in

the prevention of oxidative stress damage and future development of a well-defined nanotechnological platform linked to nutrition and maintenance of human health.

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IL2
Cyclodextrin – edible oil complexes: Synthesis and characterization

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Cyclodextrins are cyclic oligosaccharides having specific chemical architecture. They have structures like truncated cones with hydrophobic inner cavities and highly hydrophilic exterior. Natural cyclodextrins contain six to eight α-D-glucopyranose moieties corresponding to α-, β- and γ-cyclodextrin. They are FDA approved and GRAS recognized. Consequently, cyclodextrins are largely used in food, cosmetic and pharmaceutical fields for stabilizing and protection of bioactive compounds against thermal and oxidative degradation as well as for obtaining complexes having controlled release properties.

The present study reveals the nanoencapsulation capacity of natural or semi-synthetically modified cyclodextrins for highly hydrophobic natural compound mixtures such as vegetable and fish oils. The proper method for complexation was kneading at moderate temperature of 40-60 °C and alcohol-water solvent mixture. Various cyclodextrin : oil molar ratios of 1:1 to 3:1 have been considered, taking into account that triglycerides are the main compounds from edible oils. After drying and grinding, the cyclodextrin/edible oil complexes were analyzed by thermal (thermogravimetry-differential thermogravimetry, differential scanning calorimetry), spectroscopic and diffractometric (Fourier transform infrared spectroscopy, X-ray diffractometry) methods, as well as electron microscopy. The formation of the host-guest inclusion compounds was discussed by the means of the "surface" and "strongly retained" hydration water, modification of the calorimetric effects of the starting compounds, crystallization-amorphous characteristics and influence of the molecular inclusion process for the infrared spectra.

The use of cyclodextrins for protecting and controlled release of omega-3 based bioactive fatty acid components from edible oils by complexation to powdery nanomaterials have been proposed for food and cosmetic applications.

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OC1
Assessing the bioactive compounds and antioxidant activity of blueberry and their processing byproducts

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The purpose of this study is to assess the antioxidant characteristics in terms of total phenolic content, antioxidant activity and phenolic compounds profile of fresh blueberry (*Vaccinium myrtillus* L.) and their processing fractions, juice and byproducts (husks and seeds). In this regard, blueberries from spontaneous flora were collected from two different site of Romania: Arieseni (Alba County) and Paltinis (Sibiu County). The impact of the origin area on the studied features was also tracked. Moreover, the effect of raw byproduct conditioning by convective drying on the antioxidant properties was evaluated. Our results showed that the total phenolic content was consistent with antioxidant activity, expressed as the stable radical 1,1-diphenyl-2-picrylhydrazyl scavenging capacity in the presence of antioxidants (DPPH). As a result, there were no significant differences in the investigated properties by the origin place. However, there is a slight decrease in the antioxidant potential in fruits from the region with a higher precipitation regime and lower temperatures, antioxidant properties being slightly higher in the fruits and fractions corresponding to the Arieseni site than those from the Paltinis site. The raw byproducts conditioning by convective drying at a moderate temperature of 60°C for 12 hours resulted in a loss of about 15-29% of the antioxidant properties. The recorded data are useful in selecting blueberries to obtain valuable bioactive compounds for designing of value-added food products. Thus, byproducts obtained from blueberries processing can be a stable source for the recovery of high-quality polyphenolic compounds.

Keywords: blueberry, processing byproducts, antioxidant properties, polyphenolic compounds profile, DPPH radical scavenging activity

P1

Evaluation of anthocyanin stability in red onion skin extract

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Onions (*Allium cepa* L.) are one of the oldest and most frequently cultivated vegetables worldwide. Onions contain high levels of flavonoids which are responsible for a great part of the health benefits of these vegetable, flavonols and anthocyanins being the main subclasses. The latter are concentraded mainly in the outher shell of red onions.

Easy incorporation of anthocyanins in aqueous media gives them a high potential for use as alternative to artificial colorants in food products. The main drawback in using anthocyanins as food colorants is their low stability.

In this study, the effect of temperature on anthocyanin stability in red onion extract was investigated. Anthocyanins extraction was carried out in ultrasonic conditions (59 kHz, 25°C, 30 min) with acidified methanol. The degradation of anthocyanin pigments from onion skin extract was followed during heating at 90°C for 5 hours and during storage in darkness at 25°C for one month. Anthocyanins content was quantified by using a pH differential method. Also, the total phenolic content and antioxidant activity were determined throughout the stability tests. Total phenolic content was assessed by the Folin-Ciocalteau assay, and the antioxidant activities were determined by the DPPH, ABTS and FRAP assays. Good correlations between the values determined by the three methods were obtained. The occurrence of some degradation products was followed by UV-Vis spectrophotometry and HPLC-DAD analysis. During heating at 90°C, a 20% decrease in the anthocyanin content was found. During storage at room temperature, the extract suffers a 47% decrease in anthocyanin content. At 90°C, total phenolic content and antioxidant activities shows an increasing trend, while a minor decrease was observed for samples stored at room temperature. Although the dry skin of red onions is non-edible, this accumulates high levels of anthocyanins which showed a fairly good stability to heat treatment thus demonstrating a good potential for their use as natural food colorants.

Keywords: anthocyanins, red onion, stability, thermal degradation, antioxidant activity

P2
Graphene/$CuGaO_2$ based aerogel synthesis

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Inorganic aerogels [1] are most frequently produced from silica, undergoing multiple phases of cooling and heating under high pressure (supercritical drying) or vacuum (lyophilization). Nowadays, low-cost organic aerogels such as graphene/metal oxide hydrogels are broadly used in numerous applications and fields (electronics, aerospace engineering and material science) [2]. Hybrid materials like $CuGaO_2$/graphene aerogels could be efficient for advanced electrodes and dye-sensitized solar cells.

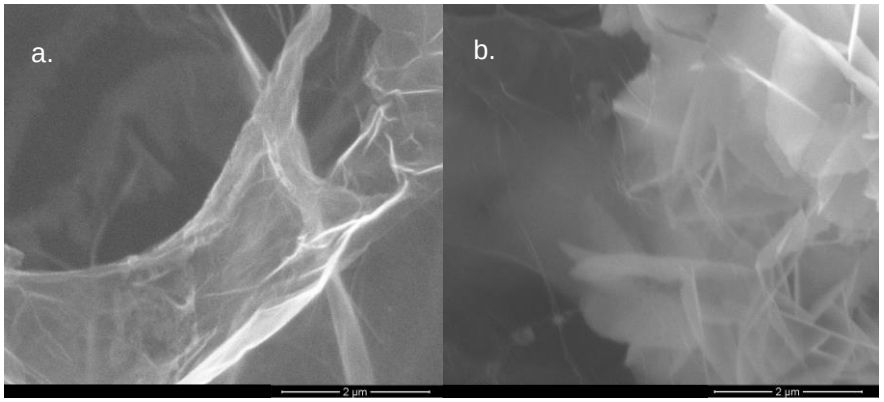

Figure 1: *SEM images of graphene (a) and $CuGaO_2$/graphene aerogel (b)*

Graphene and graphene/$CuGaO_2$ based aerogels, with various possible nanotechnology applications, were synthetized by lyophilization followed by thermal treatment in vacuum. The samples were characterized by X-Ray diffraction (XRD), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM).
An aerogel with a homogenous distribution of the semiconductor inside was obtained by mixing the aqueous suspension containing reduced graphene and graphene oxide with the $CuGaO_2$ compound, before freezing.

Keywords: graphene, aerogel, lyophilization, $CuGaO_2$.

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P3

Novel hydrazone/β-cyclodextrin complex. Synthesis and characterization

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Considering that hydrazones with hydroxybenzamide structure are water-insoluble substances exhibiting some toxicity (adverse reactions) and that the solid form in which a drug can exist may determine the type of pharmaceutical form in which it can be conditioned, and also modify properties like bioavailability and stability, the goal of this study was to obtain and characterize a new inclusion complex, formed between 2-(5-bromo-2-hydroxy-benzylidene-hydrazinocarbonylmethoxy)-N-(2-bromo-phenyl)-benzamide and β-cyclodextrin.

The inclusion complex was prepared by kneading method with aliquot addition of ethanol and characterized by ^{1}H-NMR, TG/DSC, X-ray diffraction and SEM-Edax analysis. Molecular modelling was also employed to determine the inclusion compound geometry.

^{1}H-NMR spectra proved the formation of the inclusion complex, where the benzamide part of the hydrazone has been encapsulated in the hydrophobic cavity of β-cyclodextrin. Molecular modelling data are in agreement with the ^{1}H-NMR results.

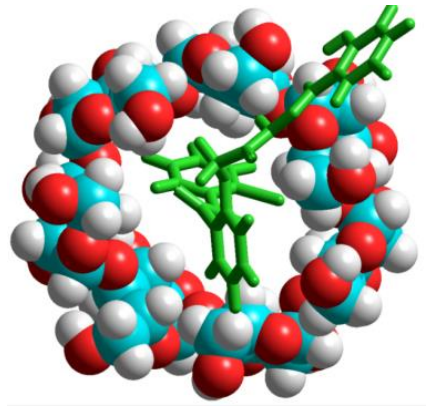

Figure 1. Molecular modelling of hydrazone/β-CYD complex

Sem-Edax images and X-ray diffraction spectra showed changes in the degree of crystallinity of the hydrazone/β-cyclodextrin complex due to the formation of intermolecular bonds between the two components of the complex.

The thermoanalytic data showed the modification of the thermal phenomena and enthalpy values characteristic of the two components, and the reduction of the peak area in the binary compound compared to the pure substances.

The evaluation of the inclusion complex using abovementioned techniques unequivocally demonstrates its formation.

***Keywords**:* hydrazone/β-cyclodextrin inclusion complex, molecular modelling, ^{1}H-NMR, TG/DSC, X-ray diffraction, SEM-Edax

P4

Some fungicide residues determination in food products by a chromatographic method

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High productivities and economic benefits in modern agriculture have been realised only by the use of pesticides. The introduction of these compounds in the food chain can be considered a risk for human health due to their toxicity [1,2]. In order to increase and ensure the security in people nutrition, we proposed a chromatographic method using an HPLC-DAD apparatus Dionex Ultimate 3000 (Dionex Corp., USA) with a quaternary pump LPG 3400A, thermostat of columns TCC-3000 and a reversed-phase column C-18 Acclaim® 120, for some fungicide residues detection and monitoring in some foods like: vegetables (eggplants, cucumbers, red potatoes, white potatoes, red peppers) and fruits (plums, apples, lemons, grapes, clementines). A mixture acetonitrile-water at 30˚C was the mobile phase.

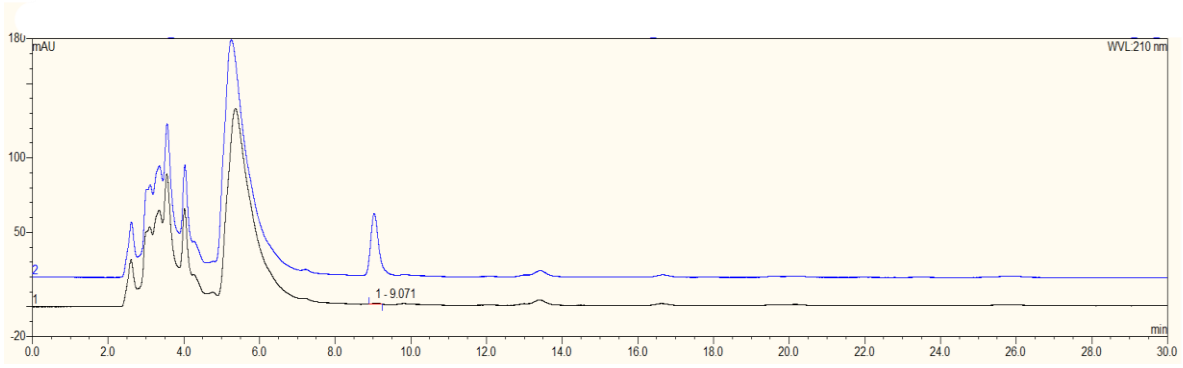

Figure 1. HPLC – DAD chromatogram of iprodione in white potatoes: 1- white potatoes; 2- white potatoes contaminated with iprodione

Key words: pesticides, fungicides, extraction, HPLC-DAD method

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P14
Benefits of the traditional liqueur

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According to the traditional definition, the liqueur is the drink made from alcohol, syrup and various aromatic essences. If, initially, the liqueur was prepared only using fruits or plants, making it a 100 % natural drink, over time, according to scientific discoveries and technology development, many recipes have begun to develop into a true industry. Many of these recipes have been legislated and accepted by the laws of different times. Consumers have adapted to market supply, being attracted to the sensorial properties of new prescriptions, often forgetting the benefits that can bring to the body a low-fat and natural alcoholic beverage.

The main goal of this paper is to revert to the traditional recipes, which are based on the fruits liquer consumption with significant benefits. Nowadays, many nutritionists highlight the importance of the foods consumption according to their color. Hence, we developed a rainbow liqueur, which is consumed in small quantities and focuses all active principles together, being reproduced by various colors. Thus, this beverage could lead to the supply of various vitamins, minerals and other active compounds to the body. The fruits used to obtain the liqueur contain both vitamins and minerals, as well as many antioxidants or phytonutrients, which are in the pigment composition.

Following the colors of the rainbow, it has been experimentally observed that to form ROGVAIV, the liqueur must be obtained from red, yellow, orange, green and purple fruits. So, this paper is a preliminary study having the main objective to select the right fruits to obtain three colors of the rainbow liqueur.

***Keywords**:* rainbow liquer, alcoholic beverages, traditional recipes

P15
Advanced catechin nanomaterials exert protective effects against amyloid segregation

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A severe, age-associated neurodegenerative disorder, Alzheimer disease (AD), affects many people age 65 years or older, contributing to 60-70% of dementia cases [1]. Amyloid peptide (Aβ)-mediated oxidative stress plays a pivotal role in the development of AD [2]. Prominent among agents, inducing oxidative stress in AD brain, are a) $A\beta_{40}$, which represents the most abundant form of Aβ in the brain, and b) $A\beta_{42}$, which shows a significant increase with certain AD forms [3]. However, there are natural polyphenol agents, which may be exploited for their antioxidant activity against amyloidogenic reactivity. For instance, catechin (CAT) can act as an effective anti-oxidant agent, able to improve learning and memory ability [4]. Developing and using advanced CAT antioxidant forms, exemplified through encapsulation in silica nanoparticles, offers a) advantages of mechanical stability and low toxicity for the encapsulated flavonoid, b) prevents CAT degradation, and c) improves the pharmacokinetic optimization and controls its biodistribution in the body, collectively leading to the efficient permeation of more effective antioxidants through the blood brain barrier toward sensitive brain loci. Consequently, a) the synthesis of the base-catalyzed silica gel matrices modified with PEG 3000 was pursued and achieved, b) evaluation of the suitability of these matrices, as potential host-carrier materials for CAT controlled release, was made, and c) an investigation of the cytotoxicity and potential protective effects of the CAT-loaded nanoparticles was launched under oxidative stress conditions in the presence of $A\beta_{40}$, notable for its influence on neurodegeneration, in *in vitro* primary hippocampal cultures. The findings suggest that the new hybrid nanomaterials contribute to the improvement of therapeutic activity, better protection against degradation, optimization in pharmacokinetics, better control of biodistribution, and decrease of cytotoxicity, as a consequence of a slower, more stable CAT release rate, thereby counteracting in a dose-dependent manner amyloid segregation and neurodegeneration.

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P16

Insulin mimetic/adipogenic activity of binary-ternary Cr(III)-hydroxycarboxylic acid-aromatic chelator systems.

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Diabetes mellitus comprises a host of metabolic disorders characterized by lack of insulin, defective insulin secretion and/or insulin resistance. In an interplay of cause and effect relationships, obesity, Diabetes mellitus, and insulin resistance emerge prominently as partners in disease onset and progression. The enhancement of insulin action and\or its complete replacement by insulin-enhancing or insulin-mimetic agents seems to improve the treatment of metabolic diseases. Over the past decades, intensive research has focused on the investigation of such agents [1-4]. Chromium, in its trivalent form, has been shown to play a crucial role in carbohydrate metabolism by enhancing insulin signal and action and thus the sensitivity of the insulin-sensitive tissues. In an attempt to understand the aqueous interactions of Cr(III) with the low molecular mass physiological ligands and examine the role of chromium as a metallodrug against Diabetes mellitus II, the pH-specific synthesis in the binary and ternary Cr(III)-hydroxycarboxylic acid-(N,N)-aromatic chelator systems was pursued, leading to new complexes $Na[Cr\{HOCH_2CH_2N(CH_2COO)_2\}_2]\bullet H_2O$ (**1**), $(NeoH)_2[Cr\{HOCH_2CH_2N(CH_2COO)_2\}_2]\bullet(OH)\bullet(H_2O)$ (**2**), $[Cr\{HOCH_2CH_2N(CH_2COO)_2\}(phen)(H_2O)](NO_3)\bullet 3H_2O$ (**3**) and $(NeoH)_3[Cr(oxalate)_3]\bullet 3H_2O$ (**4**). All complexes were characterized by elemental analysis, UV-Visible, FT-IR, NMR, ESI-MS spectroscopy, cyclic voltammetry, and X-Ray crystallography. The aim of the present study was to evaluate the effect of the title chromium compounds on the a) survival of pre- and mature adipocytes (3T3-L1), b) endogenous cell motility, c) the insulin-enhancing adipogenic capacity. The overall results suggest that chromium in its well-defined complex trivalent form a) is (a)toxic in a dose- and time- depend manner, b) has no influence on cell motility and, c) can induce 3T3-L1 pre-adipocytes differentiation into mature adipocytes through elevation of tissue specific biomarkers (PPAR-γ, GLUT 4, and GYK) in a structure-specific manner. The merit of this research in health and pathophysiological therapeutics through natural and pharmaceutical interventions is ostensible.

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P17
Magnetic chrysin silica nanomaterial behavior in an amyloidogenesis environment

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During amyloidogenesis, certain amyloids aggregate with a specific β-pleated sheet structure in the brain of an organism. In progressive neurodegenerative disease, brain damage occurs along with β-amyloid and tau accumulation, affecting neuroconnectivity [1,2,3]. Flavonoids are known as the commonest chemical class of phytochemicals, which possess a multiple range of health promoting effects. Chrysin (ChR) is a flavonoid, belonging to the flavone class, which possesses potent neuroprotective activities and suppresses neuroinflammation. In addition, ChR improves cognitive decline and possesses a potent anti-amyloidogenic and neurotrophic effects [4]. Its neuroprotective activity has been proven against other neurodegenerative pathologies [5,6]. Magnetic nanoparticles allow binding of drugs by entrapment on the particles, adsorption, or covalent attachment[7]. Despite the intensive research on AD field, no cure and no early diagnosis are available. Recently, greater attention has focused on the advancement of the naturally occurring antioxidant compounds, including ChR. In our study, scientific efforts have been made to synthesize ChR-loaded magnetic PEGylated silica nanospheres (MChRPNPs) aiming at enhanced protective characteristics against amyloid. MChRPNPs have been fully physically characterized through elemental analysis, particle size, z-potential, FT-IR, thermogravimetric analysis, relaxivity measurements, TEM and SEM. Additional drug release investigation has been implemented using UV-visible spectroscopy. Furthermore, magnetic resonance imaging properties and interactions of MChRPNPs with β-amyloid were demonstrated in rat hippocampal cell cultures. Overall, the findings suggested that the a) solubility and polydispersity improvement affected relaxivity indicators, which are directly connected to MRI properties, b) magnetic physical properties were in line with MChRPNP differential magnetic efficacy profiles, as their observed magnetic core remained with the same size, and c) biological activity profile of MChRPNPs in a cellular neurodegenerative environment denotes the improved specificity of antioxidant reactivity counteracting oxidative stress reactivity.

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P18
Flavonoid derivatives in the enhancement of antioxidant properties

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Flavonoids are natural products encountered plentifully in the plant kingdom. Their diversity goes along with their physiological roles in the specific species of their origin. Their appearance is related to the ability of the organism developed through biological evolution and exemplifies efforts to counteract oxidative stress originating in exogenous environmental pressure [1] or endogenous anomalies linked to functional disturbance of homeostatic mechanisms. In view of their role in the plant organism of the origin, their qualitative as well as quantitative properties vary, thus projecting the a) influence of factors acting upon the plant organism over a diverse spectrum of conditions (throughout the year), and b) genetic activation of their biosynthesis triggered so as to quell the arising oxidative stress and its dire implications in the integrity and function of the host. The diversity of climatic conditions and a multitude of factors emerging from their influence on plant evolution [2] and life cycle suggest that a commensurably diverse spectrum of flavonoids exists, with each plant species generating its own flavonoid compositional profile, easily exemplified in the various parts of the plant as well as its products, with a significant number of which being edible. Cognizant of the fact that the antioxidant properties of flavonoids are distinct in their nature and application(s) in each plant (parts and products), thereby affecting human nutrition, dietetic habits and cellular protection at the molecular level, the possibility was explored that appropriate derivatization of a select group of such molecules could be modified in vitro so as to exhibit potential new properties or enhanced properties of their antioxidant-therapeutic potential [3] in averting deleterious cellular chemical reactions from taking place. The repercussions of such reactivity are known to develop in humans in the form of disease (cancer, diabetes, neurodegeneration, etc.) [4] with often precarious outcome. To that end, a select group of such flavonoids was chosen for experimentation, essentially targeting improvement of antioxidant potential through derivatization. The chosen flavonoids were the following: quercetin, naringin, chrysin and naringenin [5]. The specific polyphenolic compounds underwent chemical modifications in their substituents peripheral to the A and C rings, thereby inducing new functional modalities capable of exerting influence over the function of bacterial physiology. The derived products, mainly involving ether and oxime moieties, were subsequently employed in microbiological studies seeking to evaluate their antimicrobial properties and evaluate the extent of their antioxidant potential. The result of the study set the stage for the development of new hybrid flavonoids and derivatives thereof, so as to enhance the antimicrobial arsenal of options when

bacterial insurgents find their way into a) nutritional resources, traditionally used in human diet or products destined for human consumption, and b) humans, thereby affecting their health.

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P19
Improvement of flavonoid nano-technology against alzheimer-type neurodegeneration

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Alzheimer's disease (AD) is directly linked to neurodegenerative processes triggered by a variety of genetic and environmental factors, including oxidative stress [1]. The treatment of the latter pathology is a long-time problem for early prevention of neurodegeneration initiation. Furthermore, it constitutes a research challenge for the diagnosis and potential treatment of AD. The research into the field of oxidative stress has so far attracted attention to the emergence of new antioxidants for potential treatments in Alzheimer's neurodegeneration, aiming at the ability of these substances to (a) cross the blood-brain barrier (BBB), and thus b) provide neuroprotection, the antioxidant shield against histological lesions. Hence, the research challenge of addressing oxidative stress in the neurodegeneration process with natural antioxidants, emerges as a dominant research topic, with flavonoids (natural polyphenol compounds) being the starting point for new approaches. To promote effective antioxidants through BBB toward sensitive brain loci, new technological advancements in materials are needed at the molecular level. Herein, the synthesis of base-catalyzed silica gel matrices modified with PEG 3000, comparison and evaluation of the suitability of matrices as potential carrier materials for the controlled release of the antioxidant flavonoids were achieved [2,3]. The new hybrid nanomaterials have contributed to a) the achievement of improved therapeutic activity, protection against flavonoid degradation, pharmacokinetic optimization, and control of its biodistribution, and b) decreased cytotoxicity as a result of a slower yet efficient flavonoid release, counteracting oxidative stress in AD. Collectively, the current study draws in and expands knowledge from bio-inorganic approaches applied into neuroscience, thereby exemplifying multidisciplinary strategies of therapeutic significance in AD.

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P20
Encapsulated naringin in pegylated nanoparticles against neurodegenerative processes

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It is well-known that during Alzheimer's disease (AD) onset and progression, gradual yet extensive neurodegenerative lesions occur in the human brain, subsequently affecting cognition and memory functions in patients [1]. Among a multitude of causative factors, oxidative stress induces changes that are eventually accompanied by a gradual irreversible loss of synaptic connectivity, leading to the death of neurons [2]. However, with increasing age and oxidative stress, the blood brain barrier (BBB) becomes progressively compromised, to the degree that undesirable substances are more easily transported in and out of brain sensitive loci [3]. Until today, no therapy has been available for Alzheimer's disease patients. Lately, mounting scientific efforts have focused and led to research experimentation taking advantage of the beneficial antioxidant properties of natural products, thereby retarding progression of the disease. Such substances include natural polyphenol agents involving flavonoids, which inherently could stand against processes leading to neurodegenerative (bio)chemical activity [4,5,6]. For that reason, in the current investigation, molecular approaches were brought up in order to enhance the antioxidant capacity of flavonoids against neurodegeneration. To that end, efforts were made to develop more effective flavonoid agents by encapsulating naringin into modified PEG 3000 silica nanoparticles. Overall, our findings revealed rising protective effects of naringin encapsulated in pegylated silica nanoparticles. The latter were employed to counteract copper-linked oxidative stress mediating neurodegeneration in primary rat neuronal and glial hippocampal cultures. The functional biological reactivities of the novel flavonoid nanoparticles were in line with their physicochemical features, reflecting the a) differential nature of the structural assemblies of the new nanoparticles, thereby distinguishing them from other polymeric and liposomal drug carriers, and b) significance and impact of PEG-associated surface modifying chemistry in the synthetic assembly of the nanocarriers. The encapsulated flavonoid nanoparticles deserve further inquiry into applications, including *in vivo* work, as they may be useful in the pursuit of encapsulation of (pro)drugs with a relatively high therapeutic dose and release rate at specific sensitive loci, thereby delivering therapeutic efficacy linked to locus-specificity.

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P21
Quercetin in magnetic silica nanoparticles. application against Cu(II)-mediated neurodegenerative processes

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Neuronal connectivity, which promotes learning and memory functions, deteriorates progressively during brain neurodegenerative pathological conditions, such as Alzheimer's disease (AD) [1,2]. Cu(II)-mediated oxidative stress has been shown to play a pivotal role in regulating redox reactions, leading to the formation of RNS/ROS, major culprits in AD [3,4]. The antioxidant properties of flavonoid quercetin in neurodegenerative processes have been well-documented [5,6]. However, quercetin magnetic encapsulation in nanoparticles (MQNPs) may further protect neuronal survival and morphological connectivity, all properties that have been poorly demonstrated. To investigate potential effects of nano-encapsulated quercetin on neuronal survival and synaptic morphology in primary rat hippocampal neurons, PEGylated silica nanoparticles were synthesized. Quercetin was loaded on silica nanoparticles in a concentration-dependent fashion, and release studies were carried out using UV-Visible spectroscopy. Further physicochemical characterization of the novel MQNPs included elemental analysis, particle size, z-potential, FT-IR, BET, TGA, and SEM analysis in order to optimize material composition linked to the delivery of loaded quercetin in the hippocampal cellular milieu. The findings reveal that, under Cu(II)-induced oxidative stress, the loading ability of the MQNPs was concentration-dependent, based on their quercetin release profile. The overall bio-activity profile of the new hybrid nanoparticles a) denoted their enhanced protective activity against oxidative stress as well as hippocampal cell survival in comparison to previous results on quercetin, b) revealed that the emerging synaptic loss cannot be effectively counterbalanced at high copper concentrations, and c) established the basis for in-depth perusal of molecular events in synaptic processes, thus promoting preventive medical nanotechnology in neurodegeneration.

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P22

Structural investigation and physicochemical properties of binary materials of Thallium with organic substrates.

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Thallium is a heavy p-block metal. It is a toxic element and especially interesting because of its uncommon chemical reactivity properties [1]. This metal forms compounds in the monovalent and trivalent state, with Tl(I) emerging as the most stable one. So, it has been used in the synthesis of organometallic compounds [2] and semiconductor materials, superlattices, and quantum dots [3]. The stability of monovalent thallium is based on the stereo-chemically active lone pair of electrons [1]. Thallium exists in the earth's crust in the form of salts and minerals or usually combined with other elements. It is used in a plethora of manufacturing processes, such as electronic devices, smelting plants, cement factories and in common medical applications [4]. As a consequence, thallium could be released to the atmosphere and can affect several tissues and systems (epidermal, cardiovascular, reproductive etc.) [4]. Despite the aforementioned, thallium has been used as a radiopharmaceutical for myocardial imaging [5], in scintigraphy, in peripheral and intrathoracic lymphoma (Hodgkin and non-Hodgkin) [6], and myocardial perfusion tomography in clinical cardiology, taking into consideration its toxicological profile [7]. Moreover, ignoring the fact that it is a toxic metal, a number of investigations demonstrate that both Tl(I) and Tl(III) can interact with membrane phospholipids, thereby changing their physical properties [8]. Related to these and the few studies that have been carried out around this field, we were prompted to investigate the structural speciation of binary thallium(I)-hydroxycarboxylic acid systems in aqueous media. The organic ligands employed in this study include a) mandelic acid, with a bulky and hydrophobic phenyl group on one side and a hydrogen atom on the other side of the central α-hydroxycarboxylic acid moiety, b) citric acid with two $–CH_2COOH$ groups, c) glycolic acid with two hydrogens, and d) lactic acid with a $–CH_3$ and a hydrogen atom attached to the central α-hydroxycarboxylic acid moiety. The arising and isolated crystalline materials were characterized physicochemically by elemental analysis, FT-IR and X-ray crystallography, NMR (in the solid state and in solution) and Mass Spectroscopy. The overall results suggest that thallium, in its stable Tl(I) oxidation state, forms binary interacting polymeric systems in the presence of α-hydroxycarboxylic acids, thus promoting further investigation of its toxicity profile at low concentrations (1-100nM) and the possible interaction with potassium-dependent processes, such as the ones developing entirely through gap junction proteins (potassium channels). The arising interactions of Tl(I) with selective physiological organic ligands and

the Tl-induced interactions with distinct biological targets emerge as significant contributors of its diverse biological profile.

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P23

Biological activity of novel well-defined Ti(IV)-(α-hydroxycarboxylic acid) complexes in metabolic (patho)physiology.

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Over the past decades, extensive research has focused on the discovery of novel metal elements, complexes of which with organic substrates could potentially provide an alternative choice in the treatment of certain diseases. Platinum (cisplatin and oxaliplatin), was the first metal used in platinum-based complexes, with remarkable anticancer properties used in the treatment of many types of tumors until now. After that tremendous discovery, efforts were made in the design and synthesis of novel metal-based complexes with anticancer, antimicrobial properties, etc [1-3]. Pt(II,IV), Ru(II,III), Au(I,III) and Ti(IV) are the metals that have been studied mostly due to their special physicochemical characteristics and their favorable biological response. Following the success of platinum-based chemotherapy, titanium (IV) complexes were among the first non-platinum compounds to be tested for cancer treatment. The advantage of titanium compounds lies in their high efficacy and low toxicity. In a cellular milieu, hydrolysis leads to the safe and inert titanium dioxide [1-3]. Despite these advantages the first candidate compounds failed clinical trials. Further research resulted in the creation of potentially effective, selective, and stable titanium-based drugs. Unfortunately, their mode of action is not yet well-understood. More specifically, budotitane $(bzac)_2Ti(OEt)_2$ and titanocene dichloride (Cp_2TiCl_2) have been the first most promising titanium complexes that were led into clinical trials. However, formulation issues, i.e. the fast hydrolysis of titanium compounds to the irreversible formation of the inert TiO_2 and the loss of their labile groups in aqueous solution under physiological conditions resulted in the obstruction of the clinical trials. Based on the similarities that Ti(IV) and V(V) ions exhibit (similar electronic configuration, structural similarities on titanium and vanadium complexes, etc.) prompted us to investigate/improve the biological profile of novel soluble Ti(IV) complexes with low molecular mass α-hydroxycarboxylic acids, which were isolated and fully physicochemically characterized in our lab. Experiments in representative in vitro models of metabolism (3T3-L1, C2C12 and Saos-2) were run with respect to cell viability, cell migration, cell morphology, and apoptosis/necrosis. The obtained results signify the importance of the substrate, to which the metal ion is ligated (bioavailability, solubility), with the biological profile of the titanium biobehavior being concentration-, time- and tissue-dependent. The overall results suggest that titanium complexes can be further used in metallodrugs research (anticancer, antidiabetic, antimicrobial).

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P24

The development of a new functional polynuclear Ti(IV)-carboxylic acid complex. Synthesis, characterization and in depth structure-properties investigation

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The discovery of novel metal compounds with special lattice architectures and functional properties has always been at the center of the scientific interest. Titanium is a versatile transition metal with tremendous merit in the field of biomaterials. It is a metal element known for its attractive biological and more importantly biomedical properties. High corrosion and mechanical resistance, lightness, excellent biocompatibility, favorable biological response with live tissues and low toxic profile are among some of titanium's unique characteristics [1]. Titanium is considered as a material of choice for many industrial applications, with a prominent role in the manufacture of medical and dentistry artificial implants [2,3,4]. Besides, it is a promising metal element in medicinal chemistry as well, offering a new choice for chemotherapy etc [5,6]. The most representative titanium compound is Cp_2TiCl_2, exhibiting strong antiproliferative activity in initial studies against many types of cancer. Moreover, other titanium compounds with antiproliferative activity were synthesized as halides and pseudo halides of titanocene Cp_2TiX_2, X=F, Br, I, etc [6].

The synthesis and isolation of novel titanium coordination complexes with favorable structural characteristics and special potential properties is our major scientific target. In this study, we report the synthesis and isolation of a new polynuclear Ti(IV)/citrate/2,2'-bipyridine compound in aqueous media. The compound was fully physicochemically characterized. It is worth pointing out the fact that addition of the aromatic chelator 2,2'-bipiridine leads to the synthesis of lattice matrices with potential applications (luminescence, porosity, etc.).

The study of the link between the structure of the compound, and thus its lattice, with its special features and the potential biological as well as other functional (luminescent) properties currently ongoing reveals structure-chemical reactivity attributes that formulate the basis for the establishment of a new class of poly(functional) water soluble Ti(IV)-compounds.

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P25

Structure-specific adipogenic activity of binary/ternary V(V)-Schiff base materials. Structure-function correlations toward insulinmimesis at the molecular level

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Although vanadium is not an endogenous metal ion for humans, it exerts significant biological activity in certain (patho)physiologies [**1**]. Among its roles in the regulation of intracellular signalling, energy metabolism, and insulin mimesis, its exogenous activity stands as a contemporary challenge currently under investigation and a goal to pursue as a metallodrug against Diabetes mellitus II. In this regard, the adipogenic activity of vanadium linked to the development of well-defined insulin mimetic vanadodrugs has been investigated through: a) specifically designing and synthesizing Schiff base organic ligands L, bearing a variable number of tethered terminal alcohols and, b) a series of well-defined soluble binary/ternary V(V)-L compounds synthesized and physicochemically characterized, c) a study of their cytotoxic effect and establishment of adipogenic activity in 3T3-L1 fibroblasts differentiating into mature adipocytes, and d) biomarker examination (PPAR-γ, GLUT 1,3,4, ADIPOQ) of closely-linked molecular targets involving or influenced by the specific V(V) forms, cumulatively delineating factors involved in potential pathways linked to V(V)-induced insulin-like activity. The overall results a) project the importance of specific structural features in Schiff ligands bound to V(V), thereby influencing the emergence of its (a)toxicity and for the first time its insulin-like activity in pre-adipocyte differentiation, b) contribute to the discovery of molecular targets influenced by the specific vanadoforms seeking to induce glucose uptake and thus metabolism, and c) indicate an interplay of V(V) structural speciation and cell-differentiation biological activity, thereby gaining insight into vanadium's potential as a future metallodrug in Diabetes mellitus [**2**].

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P26

Vanadium downregulates autophagic flux and inhibits metastatic Niche by induction of trail-induced apoptosis in cancer cells.

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The antitumor characteristics of vanadium and its ability to inhibit cancer cell growth and metastasis is known [1]. However, the molecular mechanism by which vanadium inhibits carcinogenesis is still unknown. The present study shows that a newly synthesized and characterized well-defined ternary vanadium-peroxido-betaine form down-regulates autophagy and EMT transition through augmentation of TRAIL-induced apoptosis in breast epithelial MCF-7 and lung adenocarcinoma A549 cells. Inhibition of autophagy by siRNA or 3-MA increases TRAIL-mediated apoptosis and inhibits the invasive phenotype of cancer cells. Moreover, vanadium reduces NF-κB binding to *Becn1* promoter, thereby preventing initiation of autophagy and abnormal proliferation. In search of a mechanistic insight into the above observations, it is demonstrated that vanadium directly targets autophagosome formation and reduces LC3-I and II expression, both of them important molecules involved in autophagy. The accruing results suggest that inhibition of autophagy by vanadium allows cancer cells to undergo apoptosis, thereby contributing to reduction in cancer cell invasion and metastasis [2,3]. Collectively, the work a) identifies a biologically active antitumor novel vanadoform containing peroxido and betaine moieties, and b) reveals a crucial role for vanadium in autophagy inhibition, thereby providing new molecular perspective(s) into finely configuring vanadoforms for cancer drug research and therapy.

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P27

Hybrid peroxido vanadate complexes as advanced materials in biological systems

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Nowadays, cancer is the second most common cause of death after heart disease. It is a multifunctional disease and its development takes place in many stages. During those stages, cells differentiate from their initial form, ultimately being led to uncontrolled cell division, abnormal cell differentiation, avoiding cell death. Metal compounds have shown, over the past decades, that they are an important source of therapeutic agents for effective cancer treatment.

However, hybrid metal-containing agents, capable of providing high selectivity and inhibition of defined cancer mechanisms, remain a subject of intense research. For the development of such materials targeting carcinogenicity processes, vanadium metalloforms, which are characterized by specificity in the inhibition of tumorigenesis, metastases, and immune system activation in tumor tissue samples are proposed [1-5].

Vanadium is known for its anticancer properties. It plays an important role in cellular processes and affects specific biomolecules involved in tumor cell physiology. The peroxido-vanadate materials are nowadays an intensely investigated subject mainly due to the importance of their activity in biological systems. The need for well-defined such binary-ternary material enhances the use of vanadium in biological systems, thus providing a fertile field of research with concrete applications. The new hydrolytically stable and highly effective complexes were characterized by elemental analysis, FT-IR, Raman, NMR spectroscopy in solution and the solid state, UV-Visible, cyclic voltammetry, thermal gravimetric analysis (TGA) and X-ray crystallography, gas chromatography–mass spectrometry total ion chromatogram (GC-MS-TIC) and gas chromatography–flame ionization detection (GC-FID) [6,7]. The physicochemically characterized materials possess properties that render them competent candidates for further experimental work at the in vitro and in vivo level against cancer initiation and propagation processes.

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P28
Optimizing peroxido-vanadate chemotherapeutics

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The use of V(V)-peroxido species in binary as well as ternary complex formulations with zwitterions substrates emerged as a promising idea into the development of vanadium-based metallodrugs against various malignancies and especially diabetes type 1 and 2 (Diabetes mellitus I and II) and cancer. To this end, several V(V)-peroxido compounds have been designed and synthesized as potential insulin mimetic and anticancer agents. From these interactions, those of low molecular mass ligands are a challenging case of biomolecules, perhaps of comparable biological significance to those resulting from high molecular mass biomolecules, such as peptides and proteins. Understanding the interactions between such hybrid vanadium-peroxido molecules and cellular biotargets was one of the major goals of research in the past, with specific objectives aspiring to the bioavailability and solubility of vanadium complexes with organic ligands in biological fluids.

It is a well-known fact that the anticarcinogenic behavior of vanadium-peroxido complexes can be associated with the chemistry of the peroxido group bound to vanadium centers. In this research effort, the designed complexes have been examined for their anti-proliferative properties. The biological activity of these complexes, however, is not clear yet and further study of their biochemistry is needed. Formation of peroxido vanadates is very fast in acidic solutions and slower at higher pH. Simultaneous interactions of compounds containing both V(V) vanadate and hydrogen peroxide (H_2O_2) appear to enhance the biological effects of the metal in various cell lines, probably due to the well-defined peroxido-vanadate complex formation. Therefore, significant merit emerges toward further studies attempting to clarify the potential role of V(V)-peroxido species in interactions with immune system modulators as well as other transcription factors influencing immune signaling. Concurrently, vanadodrug regulation for reversing drug resistance and targeting immunosuppressive tumor networks emerges as a useful tool with (in)direct implication in immunotherapeutics [1-4]. The emerging species possess the chemical components-ingredients that could render vanadium, in its V(V) oxidation state, capable of promoting chemistries that inflict apoptotic damage to cancer cells in a structure-specific fashion.

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P29

The effects of hydrocoloids addition on the reological characteristics of the dough and gluten-free bread properties

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The aim of this study was to analyze the effects of including hydrocolloids and gums in a bread recipe gluten free flour rye and oats on the rheological properties of gluten-free dough on some quality characteristics of bread. Due to the structure-forming properties, gums and hydrocolloids are essential ingredients in gluten-free bread formulations to improve the dough consistency and gas retention capacity, texture and bread appearance and extend the freshness of the products. The sample preparation mixture was formed in the following variants of prescription: a. 100 g rye flour, 2.5 g salt, 2.5 g yeast and 1-2% sodium alginate; b. 100 g oat flour, 2.5 g salt, 2.5 g yeast and 1-2% xanthan gum. The amount of water was set for each mixture based on the hydration capacity. The rheological properties of the dough were determined, the viscoelastic module using the HAAKE MARS 40 rheometer. Bread samples were analyzed in terms of volume, porosity, color and humidity. The addition of hydrocolloids has generally produced positive effects on the texture of the bread by increasing the specific volume and core porosity. Many previous studies have shown that hydrocolloids can improve volume and texture of gluten-free bread. The largest increase in specific volume was observed for bread with oat alginate.

Keywords: gluten free, porosity, color, viscoelastic modules, texture.

P32

Effect of osmotic dehydration on the colour parameters and chemical characteristics of apple and pear

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Osmotic dehydration is the pre-treatment method of preservation the fruit and vegetable to increase its shelf-life in which these are immersed in concentrated salt or sugar solutions.

The effect of an osmotic dehydration was investigated on the colour and chemical characteristics of dehydrated fruits (apple and pear) in fructose osmotic solutions. Difference in CIE-LAB, chroma - C^* and hue angle H^* were performed with a Chroma Meter CR-400/410. Three aqueous solution of fructose (40, 60 and 80%) were used for dehydration, during 3 h of process at temperatures of 25 ^{0}C, with fruit/osmotic agent ratio of 2:1. Water loss and solids gain showed significant differences depending on the concentration of the osmotic agent and process time. The use of highly concentrated osmotic solutions induced losses of phenolic content (TPC) and ascorbic acid in sliced apple, pears and quince. Fructose concentration and osmosis time induce significant increase of a* and b* colorimetric parameters but did not affect the lightness (L*) of pear slices.

***Keywords**:* Osmotic dehydration, apple, pear, colour, polyphenols.

P33

Effect of drying techniques on the total phenolic contents and antioxidant activity of some vegetables byproducts

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Vegetables are considered a rich source of antioxidants (flavonoids, carotenoids, vitamins), which are frequently added to stop the process of oxidation in processed food systems. The solid waste generated in food industry was considered as a low cost raw material for the extraction of natural antioxidants. The effect of drying techniques (ambient-drying and oven-drying) on the total phenolic contents and antioxidant activity of selected vegetables byproducts (garlic (*Allium sativum* L.), tomato (*Lycopersicon esculentum* L.) and avocado (*Persea Americana* Mill.)) were studied. Tomato byproducts contained similar amount of total polyphenols and exhibited similar DPPH radical scavenging activity with tomatoes. Avocado seed is a byproduct that contains a large amount of extractable polyphenols, which have attracted the attention of food industry due to their high antioxidant capacity. The amounts of total phenolics (TP) were higher in avocado byproducts followed by tomato and garlic byproducts. The tested vegetables exhibited appreciable radical scavenging capacity ranging from 27.8% to 56%. The results of this study revealed that the amounts of total phenolics and antioxidant activity of all tested vegetables decreased after thermal treatment; more pronounced decline was observed for the ambient-dried samples as against oven-drying.

Keywords: Vegetables, Drying, DPPH scavenging, Phenolic acids

P34
Extraction of Antioxidants from Onion By-products using Eco-friendly Solvents

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Onion solid wastes (OSW) were used as raw material to produce polyphenol and extracts with antioxidant activity. In this study, the antioxidant property of 20% ethanol, 40% ethanol, 60% ethanol, 80% ethanol, 100% ethanol and aqueous extracts of onion (*Allium cepa* L.) byproducts were measured using *in vitro* assays. Among the onion byproducts extracts tested, the 80% ethanol extract showed the best DPPH radical scavenging power. The extracts in question exhibited total phenolic contents ranging from 171,9 to 453,2mg GAE/g of extract. The recovery of value-added substances from onion wastes is an issue with importance pertaining to both the reduction of the waste load released to the environment, and the development of novel, natural food additives with functional properties.

Keywords: Antioxidant activity, Onions, Total phenolic contents, Wastes

P35
Influence of enzymes action on chromatic characteristics and aromatic profile of pre fermented grape juice

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Was tested the limit of perception, the amplitude of the aromatic profile on nine flavor descriptors and the chromatic characteristics for the liquid obtained from white and black grapes, table varieties, which were processed by the action of the enzymes which acted as pectin lyase, pectin esterase, polygalacturonase, hemicellulase, in the form of enzymatic preparations of known action. The chromatic features were highlighted by means of the spectrophotometric technique with optical density measurements in the UV/Vis range and calculating color intensity and hue. The odorants were identified by sensory analysis with the development of the aromatic profile. Although only the Lallzyme EX-V enzymatic preparation has been recommended for the improvement of the chromatic properties, others such as Lallzyme HC (for clarification) and Rohavin Clear (for clarification) have contributed to changing the color perception of pre-fermented juices. They were highlighted the following flavor descriptors: a (fruit, apple, wax), b (citrus, floral, lemon, wax, magnolia), e (lilac, citrus, floral, woody); f (mint, cold, woody), h (sweetish, fruit tutti frutti). The highest values in the intensity of the perception of the flavor components were obtained in the Rohavin Clear variant and ranged between 2.4 and 2.5 out of maximum 3 points, thus proving a synergistic action of the pectinase and the polygalacturonase.

***Keyword*:** grapes, pectinolytic enzymes, UV/Vis spectrophotometer, pre-fermented juices, ODE (odor description**)**

P36
Influence of enzymes action on primary quality indicators of the pre-fermented grape juice

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The synergistic effects of the combination of pectin lyase, pectinesterase, and polygalacturonase were studied to obtain pre-fermented grape juice. We investigated the production yield of the pressed juice, the density of the sample, the relative density of the sample and of the total extract, the concentration of alcohol, the total extract, the pH, the kinematic viscosity. The methods used were the results of instrumental determination, the Near-infrared spectroscopy (NIRs) combined with the DMA densitimeter and the mathematical calculation, for 2 grapes varieties, 3 enzymatic products and 4 work variants (enzyme dosage) for each preparation. Thus, at the minimum addition of enzyme to the recommended dose, the yield increases with: 0.92% (LallzymeEX-V); 13% (Lallzyme HC); 0.96% (Rohavin Clear). After the enzyme action period and the 3 day storage period, an increase in relative density of 0.21-0.25% is observed. For the studied work variants, the action of the enzyme does not influence the variation of the alcohol concentration, other factors of influence being identified. The substances which contribute to increasing the flow resistance of the liquid turn into really volatile compounds and therefore the correlation of the viscosity with the relative density of the sample is below 50%. The total extract increased by 3.5% when using ROHAVIN Clear; by 0.1-0.2% when using Lallzyme HC and by 23% for Lallzyme EX-V. It is modified by the specific action of the enzymes and the fermentation, the pH. For good results the following doses are recommended: LallzymeEX-V - 4 g/100 kg black grapes, Lallzyme EX-V -1g/hl (white grapes), Rohavin Clear -1g/hl.

***Keywords*:** pectinolytic enzymatic activity, NIR measurement, grape juice, production yield, density

P43
Evaluation of bioactive compounds from anew dietetic and functional sorbet

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The purpose of this paper was to identify the effect of the addition of blueberries in the finished dietary and functional product, sorbet with isomalt and maltitol, regarding the content in polyphenols and antioxidant activity.

Total polyphenols were determined by the Spectrophotometric method Folin-Ciocalteu using Spectrophotometer (UV-1700, Pharma Spec, Shimadzu).

Antioxidant capacity was determined by evaluating the Free Radical Scavenging effect on the 1,1-difenyl-2-picrylhydrazyl (DPPH) radical. The absorbance of the samples was measured at 515 nm (UV-1700, Pharma Spec, Shimadzu).

In the case of atomized blueberries, the content of polyphenols decreases significantly compared to whole blueberries fruit ("362,26/339,55 mg/100g; 575,00/636,01 mg/100g; 642,65/985,00 mg/100g") and the functional product ("222,54/310 mg/100g; 421,05/573,90 mg/100 g; 600,91/780,65 mg/100 g"), which means that by atomization the total surface of oxygen in the air increases, increasing the risk of oxidation of phenolic compounds, and it would be desirable for the blueberries to be added whole.

There are no significant differences in the determination of antioxidant activity between the blank samples (57.82%, 72.79%, 83.99%, 72.20%, 75.88%, 83.84) and dietary product variants (61.72%, 74.33%, 84.58%, 77.43%, 82.59%; 87.53%), also there are no significant differences between samples with the whole and atomized blueberries.

***Keywords**:* antioxidant capacity, polyphenols, dietary and functional sorbet, blueberries.

P45
Functional dependence of energy intake relative to the fat content of different types of cheeses

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Nowadays, on the market, consumers could find a large number of cheese types, whose diversity is based on differences in texture, functional properties, flavor and aroma. High energy intake provided by placing cheese in the diet is due to its high content of nutrients. The goal of this paper is to test if there are any functional dependencies between some nutritional characteristics (energy input relative to the fat content) in case of 20 different cheeses (including fresh, soft-ripened, semi-hard, hard, pasta filata, blue cheese and low fat varieties).

The samples were analyzed for their chemical composition (proteins, fat, and carbohydrates). The protein content of the samples was estimated by the Kjeldahl method; the fat was determined by Soxhlet extraction method; total carbohydrates were calculated by difference. The caloric values in case of analyzed cheese types were calculated by using the Atwater energy conversion factors.

The data were statistically processed using Statistica 10. The results look for the existence for statistically significant linear correlations and functional dependencies between some nutritional characteristics of the analyzed cheese types. From the obtained data we can observe a strong linear relationship between energy and fat values, aspects on which the linear dependence of energy relative to fat content is based.

Keywords: cheese, energy, fat, functional dependence

P46
The development of the Romanian food industry

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At the beginning of 2016, the local food industry is dominated by 50 large companies, accounting for less than 1% of the total of approximately 8,400 firms active in the field. The 50 companies make over 40% of the Romanian food production and earn a profit of over 4 billion euros. The food industry accounts for 27% of the total value of agricultural production. It provides over 180,000 jobs, ie 11.6% of the total number of employees in the Romanian industry and 2.1% of the total workforce in Romania. The food and beverage industry in Romania, a market of over 10 billion euros, registered a 6.1% increase in production in 2008, namely 8.1% of the turnover compared to the same period in 2017, figures that rank the country first in the European Union, according to Eurostat data quoted by Food Drink Europe.

Keywords: food industry, agricultural production, the romanian industry, fiscal value

P47
The evolution of the retail market in Romania

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Lately, the trend of large retailers has been reflected in the expansion of proximity and supermarket segments, a direction that will continue and will mainly affect the small grocery stores of local entrepreneurs.

According to a large census conducted in 2014 on the outlets of non-food food and non-food goods in Romania, the traditional trade is 86222 stores, followed by HoReCa - 34,526 units and modern retail - 1,353 stores. The total area of retail space was 6,857,514 square meters, of which 44.5% traditional retail, 30.5% HoReCa and 25% modern trade. Also, the 12 large retail networks cumulated at the end of 2013 half of the total turnover of the retail market (modern trade and traditional trade).

In 2009, the world economic crisis is making its presence felt in Romania, and as a result of falling consumption, most retailers opt to expand, either by opening smaller shops or by entering other segments, in order to maintain or increase sales market.

Keywords: retail, supermarket, hypermarket, traditional trade, modern trade

P48

Cluster analysis for some different types of vegetable oils by the physicochemical characteristics

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Vegetable oils are a class of natural products commonly used and appreciated due to their nutritional, sensorial, technological principles. Vegetable oils constitutes an important component of human diet often used in daily consumption with beneficial effects for the body balance. The aim of this study was to evaluate and compare some of the physicochemical characteristics (dynamic viscosity, refractive index, surface tension, relative density and acidity index) in case of six food consumption vegetable oils, cold pressed. The analysed oil assortments, in these work were soybean, rapeseed, corn oil, almond, sesame and pumpkin seed oil purchased from the speciality stores with natural products, having different origins. The refractive index was measured using the refractometry method, and the dynamic viscosity using the Ostwald-type viscometer. From the physicochemical analyzed characteristics, it was observed that the values differ from one category of oil to another. Oils density varies from species to species and at the same oil with the conservation conditions (conservation period, climatic conditions in which the plant has developed). Viscosity gives relevant indication of the degree of oil fluidity. The experimental results showed that the highest value for viscosity was registered in rapeseed oil (38,7088cP) and the smallest in soybean oil (34,0174cP). All the data was statistically analyzed using Statistica10. The results showed that there is statistically significant correlation between the physicochemical characteristics for the analyzed types of oils. The purpose of the statistical analysis was to highlight the analysed parameters expressed by cluster analysis.

Keywords: vegetable oils**,** physicochemical characteristics, statistical evaluation data

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