

AN INVESTIGATION ON THE ANTIOXIDATIVE PROPERTIES OF GLYCINE AMIDE DERIVATIVE OF 2,2,6,6-TETRAMETHYL-4-AMINOPIPERIDINE-1-OXYL AFFECTING PANCREAS PROTECTION

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ABSTRACT

A new class of *ex vivo* nitroxyl-labeled, glycine amide derivative of 2,2,6,6-tetramethyl-4-aminopiperidine-1-oxyl (SLCNUgly) has been recently discovered. The previous investigations demonstrate that chloroethylnitrosourea containig glycine - SLCNUgly permeates easily the cell membranes, crosses the blood brain barrier (BBB) and exhibits *ex vivo* a high anticancer activity and a low general toxicity in a number of organs. The *in vivo* experiments described in the present communication are carried out to study the oxidative protective abilities of pancreas after treatment with SLCNUgly alone or in combination with natural antioxidants using *ex vivo* electron paramagnetic resonance (EPR) and spectrophotometrical methods. Statistically significant decreased levels of ascorbate radicals, ROS products, or results close to those of the control samples are registered after a treatment by SLCNUgly, natural agents and respective combinations. Slightly lower lipid peroxidation and antioxidant enzyme activities are recorded in pancreatic homogenates after treatment with SLCNUgly and the combinations used. The present experimental results provide the assumption that further *ex vivo* investigations will help to develop new pharmaceutical schemes including the new synthetic antioxidant SLCNgly and its combinations as oxidative modulatory protective agents in respect to pancreas disabilities.

Keywords: SLCNUgly, antioxidants, ascorbate radicals, ROS.

INTRODUCTION

The pancreas regulates the digestion and the homeostasis in the body by releasing various digestive enzymes and pancreatic hormones. It secretes a pancreatic juice neutralizing the stomach acidity. It provides the digestive enzymes required to decompose carbohydrates, proteins and lipids in the small intestine [1]. As an endocrine gland it produces the important hormones insulin, glucagon, somatostatin and pancreatic polypeptide circulating in the blood [1]. The pancreas maintains glucose homeostasis within a narrow range through the glucagon and insulin balance. In addition, glucagon drives hepatic and renal gluconeogenesis to prolonged fasting [1, 2]. The etiology of pancreatic pathogenesis and multiple complications is multifactorial [3], but the major factor for permanent inflammation refers to the excessive formation of reactive oxygen and reac-

tive nitrogen (ROS/ RNS) species leading to oxidative stress [3, 4]. Considering the role of ROS overproduction and oxidative stress in respect to the structural and functional cellular damages, the basic biomolecules attack, and the modulation of the signal transduction pathways, many scientific efforts are directed towards the search of effective agents [3, 5] participating in the antioxidant therapy.

The newly synthesized chloroethylnitrosourea (N-[N'-(2-chloroethyl)-N']nitrosocarbamoyl- glycine amide of 2,2,6,6-tetramethyl-4-aminopiperidine-1-oxyl) (SLCNUgly) is a possible antioxidant with a therapeutic pancreatic protective potential. It is a spin-labeled analog of the anticancer drug Lomustine (CCNU, 1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea) clinically used [6]. The *in vitro* chemical properties of SLCNUgly reported previously refer to a higher alkylating activity, a short half-life (29 min), and a carbamoylating

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Comparative Clinical Pathology
Volume 28, Issue 4, 1 August 2019, Pages 1101-1106

Real-time oxidative stress biomarkers measured in patients with Hashimoto's thyroiditis—an electron paramagnetic resonance study (Article)

Gerenova, J.^{a,b} , Nikollova, G.^c, Karamalakova, Y.^c, Gadjeva, V.^c 

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^bDepartment of Propeudetics of Internal Diseases, Trakia University, Stara Zagora, Bulgaria

^cDepartment Chemistry and Biochemistry, Medical Faculty, Trakia University, Stara Zagora, Bulgaria

Abstract

[View references \(28\)](#)

Although the role of presence of thyroid dysfunction for overproduction of free radicals has been elucidated, the data about the role of autoimmunity in Hashimoto's thyroiditis (HT) to sustain the presence of oxidative stress despite the normal serum thyroid hormone levels are scarce. The present study aimed by using electron paramagnetic resonance spectroscopy (EPR) methods to elucidate the radical mechanisms included in the pathogenesis of HT by following out the sera levels of some "real-time" oxidative stress biomarkers. We investigated 14 newly diagnosed patients with euthyroid HT and 35 subjects with HT treated with levothyroxine. Twenty-three healthy subjects were included as controls. All samples were measured in triplicate and presented as arbitrary units. We found statistically significant elevated levels of ascorbate radical (Asc•) in euthyroid HT patients and in HT patients treated with levothyroxine compared to controls. Reactive oxygen species (ROS) products were statistically higher in both studied patient groups compared to controls. Our study showed also statistically significant increases in the levels of registered nitric oxide radical (NO•) in both groups of HT patients compared to controls. Oxidative stress is increased similarly in both euthyroid HT and HT patients under treatment with LT₄ and these data reinforce the idea that this is consequence of autoimmunity per se. Our results determine that the addition of antioxidants that includes vitamin C and vitamin E in the treatment plan of HT patients in all stages of disease will normalize the disbalance in oxidative stress biomarkers. © 2019, Springer-Verlag London Ltd., part of Springer Nature.

SciVal Topic Prominence

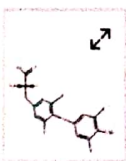
Topic: Hyperthyroidism | Propylthiouracil | Levothyroxine Sodium

Prominence percentile: 70.964



Chemistry database information

Substances



Author keywords

[Antioxidants](#)
[EPR spectroscopy](#)
[Hashimoto's thyroiditis](#)
[Oxidative stress](#)
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Gadjeva, V.G., Goycheva, P.,
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increased and their soluble
receptor (sRAGE) reduced in
Hashimoto's thyroiditis

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Cristani, M.T.
(2020) *Journal of
Endocrinological Investigation*

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against oxidative stress and cell
damage in human thyrocytes and
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(2020) *Endocrine*

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Dlamini, L.M., Tata, C.M., Djuidje, M.C.F., Ikhile, M.I., Nikolova, G.D., Karamalakova, Y.D., Gadjeva, V.G., Zheleva, A.M., Njobeh, P.B., Ndinteh, D.T.

Antioxidant and prooxidant effects of Piptadeniastrum africanum as the possible rationale behind its broad scale application in African ethnomedicine

(2019) *Journal of Ethnopharmacology*, 231, pp. 429-437.

Abstract

Ethnopharmacological relevance: Piptadeniastrum africanum is widely used in treating oxidative stress related diseases. Oxidative stress, defined as the disturbance in the balance between the production of free radicals and antioxidant defenses, is the root cause of many pathophysiological conditions. Based on the dual properties of prooxidants as toxic and beneficial compounds, both prooxidants and antioxidants may be effective in the treatment of these conditions when the right dose is given to the right subject at the right time for the right duration. Aim of the study: This study was aimed at investigating the in vitro and ex vivo anti- and pro-oxidative effects of P. africanum. Materials and methods: Total phenolic and flavonoid contents of methanol and aqueous extracts of P. africanum stem bark were quantified spectrophotometrically. The methanol extract, ascorbate radicals and reactive oxygen species in brain and liver homogenates of mice treated with the methanol stem bark extract were analyzed by electron paramagnetic resonance (EPR) spectroscopy. Free radical scavenging of DPPH was determined by spectrophotometric and EPR assays. Results: The methanol extract was richer in both phenolic and flavonoid contents compared to the aqueous extracts and also showed better DPPH radical scavenging capacity. The EPR spectroscopy in vitro analysis exhibited high DPPH scavenging capacity before and after UV irradiation (99.5% and 98.76%) at 40 µg/ml extract. The ex vivo EPR spectroscopy studies demonstrated increased levels of ascorbate radicals ($\cdot\text{Asc}$) in liver and brain homogenates of healthy mice treated with P. africanum in comparison with those of the non treated controls (0.6141 ± 0.026 vs 0.1800 ± 0.0073 arb. units for liver homogenates and 0.9605 ± 0.0492 vs 0.3375 ± 0.0062 arb. units for brain homogenates, correspondingly). Considerably, higher levels of reactive oxygen species (ROS) were measured in mice liver and brain homogenates after treatment with P. africanum extract compared to the control group, as well (1.9402 ± 0.1200 vs 0.6699 ± 0.062 arb. units for liver homogenates and 1.7325 ± 0.1503 vs 0.3167 ± 0.0403 arb. units, respectively). Conclusion: Therefore, P. africanum exhibited antioxidant and pro-oxidant properties which may explain its broad spectrum use in a wide variety of ailments. © 2018 Elsevier B.V.

Author Keywords

Antioxidant; Electron paramagnetic resonance; Oxidative stress; Piptadeniastrum africanum

Index Keywords

alcohol, antioxidant, ascorbic acid, flavonoid, phenol derivative, Piptadeniastrum africanum extract, plant extract, reactive oxygen metabolite, superoxide, superoxide dismutase, unclassified drug, antioxidant, flavonoid, oxidizing agent, phenol derivative, plant extract; animal experiment, animal model, animal tissue, antioxidant activity, Article, brain homogenate, controlled study, DPPH radical scavenging assay, electron spin resonance, ex vivo study, in vitro study, liver homogenate, male, mouse, nonhuman, oxidative stress, Piptadeniastrum africanum, spectrofluorometry, traditional medicine, ultraviolet irradiation, African medicine, animal, bark, brain, chemistry, drug effect, Fabaceae, liver, metabolism; Animals, Antioxidants, Brain, Fabaceae, Flavonoids, Liver, Male, Medicine, African Traditional, Mice, Oxidants, Phenols, Plant Bark, Plant Extracts, Reactive Oxygen Species

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Toxicology Reports

Volume 6, 2019, Pages 267-271

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Reducing oxidative toxicity of L-dopa in combination with two different antioxidants: an essential oil isolated from Rosa Damascena Mill., and vitamin C

Galina Nikolova  , Yanka Karamalakova, Veselina Gadjeva Show more<https://doi.org/10.1016/j.toxrep.2019.03.006>

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Highlights

- To avoid L-dopa side effects it's administration is delayed.
- Natural antioxidants have wide range of medicinal properties.
- The natural antioxidants might inhibit oxidation and toxin formation.
- The L-dopa use with antioxidants, may be a necessary approach in modern PD therapy.

Abstract

Parkinson disease (PD) is a multifactorial disease that takes a leading place among contemporary frequent diseases of the central nervous system (CNS) with not well-established mechanism. One of the most popular and effective therapy for patients with PD is Levodopa (L-dopa), but clinical effect of the drug diminished by motor complications resulting from prolonged treatment. Due to the L-dopa neurotoxic effect in the disease treatment, the L-dopa administration is delayed as long as possible in order to avoid side effects. In addition,

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Bulgarian Chemical Communications [Open Access](#)
Volume 51, 2019, Pages 41-46

Nitric oxide radical production increase during normal pregnancy and pregnancy complicated by preterm labor in a Bulgarian women population (Article)

Koleva, I.M.^a, Karamalakova, Y.D.^b, Nikolova, G.D.^b, Gadjeva, V.G.^b

^aClinic of "Obstetrics and Gynaecology", UMHAT, Prof. St. Kirkovich, Stara Zagora, 6000, Bulgaria

^bDepartment of Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria

Abstract

[View references \(42\)](#)

The physiological normal pregnancy (NP) and pathophysiologic pregnancy, complicated by preterm labor (PTL), were associated with redox imbalances in reactive oxygen/nitrogen species (ROS/RNS) and with increased oxidative/nitrosative stress damages. The aim of the study was to investigate and compare oxidative stress processes and nitric oxide ($\cdot\text{NO}$) radical production during normal pregnancy (NP) and in pregnancies complicated by preterm labor (PTL) in a Bulgarian women population. In the current study, 140 patients were included into 3 groups: 1) n=40 non-pregnant volunteers (control group, CG); 2) n=40 healthy normotensive pregnant women (NP); and 3) n=60 women with pregnancies complicated by preterm labor (PTL). The healthy NP and PTL groups were divided into 3 sub-groups by different gestational age. Age, social class, and gestational age were recorded for each group. By using for the first time Electron Paramagnetic Resonance (EPR) spin-trapping technique, real-time changes in $\cdot\text{NO}$ levels were investigated in blood isolated from non-pregnant, NP and PTL pregnant women. Plasmatic $\cdot\text{NO}$ levels were determined using the spin-adduct formation between Carboxy-Ptio.K and generated $\cdot\text{NO}$ radicals in real time. It is important to emphasize that $\cdot\text{NO}$ radical production and oxidative/nitrosative stress increases with advancing gestation during NP and PTL groups, compared to CG. Moreover, a positive correlation was found between the NP and PTL patients indicating ongoing pathological oxidative/nitrosative stress processes during pregnancy. © 2019 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria

SciVal Topic Prominence

Topic: Pre-Eclampsia | Pregnancy | Tyrosine kinase-1

Prominence percentile: 98.482

Chemistry database information

Substances



Author keywords

[EPR](#) [NP](#) [Pathogenesis](#) [PTL](#)

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Volume 51, 2019, Pages 35-40

Endogenous enzymatic antioxidants and oxidative damages predetermine in intracellular redox defense in normotensive pregnant women (Article)

Karamalakova, Y.D. [✉](#) Koleva, I.M., Nikolova, G.D., Gadjeva, V.G. [👤](#)

Department of Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria

Abstract

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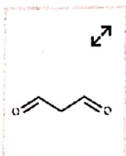
Normotensive pregnancy is a high-energy physiological state punctuated by increased necessity of oxygen. The increased oxygen intake would lead to the formation of residual reactive oxygen species and increased oxidative stress damages. Sixty-five women from Stara Zagora, Bulgaria were carefully clinically selected to determine the plasma levels of superoxide dismutase (SOD), catalase (CAT), glutathione (GSH), glutathione peroxidase (GPx), and malondialdehyde (MDA) changes during the 1st, 2nd, 3rd trimesters of pregnancy and separated into two groups: 1. The control group (CG) consisted of total n=25 non-pregnant, 17-36 years old, non-pregnant, healthy volunteers, normotensive, nulliparous, non-smokers and had similar weights; and 2. The normotensive pregnancy (NP) group consisted of 40 pregnant women with a singlet pregnancy, healthy, nulliparous, non-smokers, with similar weights and normal diastolic and systolic blood pressure (mmHg), and ages ranging from 17-36 years. The NP woman had uncomplicated singleton pregnancies and delivered vaginally without anesthesia between 38 and 40 weeks of pregnancy. SOD, CAT, GSH, GPx activities ($p > 0.05$) were higher in the third trimester than in the first trimester. MDA level ($p > 0.05$) was lower in the third trimester of pregnancy. These results suggest the importance of the balance between the generation of toxic ROS, compensation mechanism of antioxidant systems, and reduction of intracellular oxidative stress in NP group. © 2019 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria 35

SciVal Topic Prominence [ⓘ](#)

Topic: Placenta Growth Factor | Pregnancy Toxemia | Endoglin

Prominence percentile: 98.906 [ⓘ](#)Chemistry database information [ⓘ](#)

Substances



Author keywords

Endogenous-enzymatic antioxidants NP Redox defense

Funding details

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Volume 51, 2019, Pages 47-52

Generation of plasmatic oxidative damages in patients with chronic venous insufficiency (Article)

Karamalakova, Y.D.^a [✉](#) Abrashev, H.M.^b, Nikolova, G.D.^a, Kavrakov, T.T.^b, Gadjeva, V.G.^b [👤](#)^aDepartment Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria^bClinic of "Vascular Surgery", University Hospital "Prof. Dr. St. Kirkovich" 6000, Stara Zagora, Bulgaria

Abstract

[View references \(37\)](#)

Chronic venous insufficiency (CVI) is a chronic human disease, represents an important social and health problem. The aim of the present study is to investigate and compare: 1) the plasmatic levels of endogenous antioxidants (superoxide dismutase (SOD), catalase (CAT), glutathione (GSH), glutathione peroxidase (GPx)); 2) lipid peroxidation (malondialdehyde (MDA)) levels; and 3) ongoing oxidative stress damages in patients at different stages of Chronic Venous Insufficiency (CVI) (clinical classification as CEAP, C2- C4 stage) and in CEAP-C2 patients, complicated by Type 2 diabetes mellitus (Type-2 DM), compared to healthy volunteers. The investigation was conducted in Medical Faculty in collaboration with University Hospital of Stara Zagora, Bulgaria. In the current study were included 25 healthy volunteers (as control group, CG) and 52 diagnosed CVI patients, divided into two groups: 1) CVI group- n=32 (clinical classification as CEAP, C2- C4 stage); 2) CVI+ Type-2 DM group – n= 5 with Type 2 diabetes mellitus. Written informed consent was obtained from all the subjects. All patients were investigated for plasmatic GSH and GPx levels, SOD, CAT and MDA profile. Plasmatic GSH and GPx activity was no statistically significantly decreased in CVI patients and statistically significantly decreased in CVI+Type 2 DM compared to CG ($p<0.05$), indicating induced OS. Lipid peroxidation levels were statistically significantly increased in CVI+Type 2 DM patients ($p<0.05$). SOD and CAT activities were statistically significantly decreased in CVI ($p<0.05$) and CVI+Type 2 DM ($p<0.05$), compared to the non-diabetic CG. Increased MDA levels and decreased GSH, Gpx, SOD and CAT activities observed in CVI and CVI+ Type-2 DM patients suggest that OS plays an important role in the pathogenesis of varicose vein damages. © 2019 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria

SciVal Topic Prominence [①](#)

Topic: Varicosis | Vein Insufficiency | Lipodermatosclerosis

Prominence percentile: 88.236 [①](#)

Author keywords

[CVI](#) [CVI+Type-2-DM](#) [OS](#) [Pathogenesis](#)[Metrics](#) [View all metrics](#) >PlumX Metrics [v](#)

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Effects of the oxidative stress and genetic changes in varicose vein patients

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Bulgarian Chemical Communications [Open Access](#)
Volume 51, 2019, Pages 53-57

Therapeutic use of *Curcuma longa* L. Extract against Bleomycin- induced chronic oxidative stress (Article)

Karamalakova, Y.D.^a ✉, Nikolova, G.D.^a, Georgiev, T.Z.K.^b, Gadjeva, V.G.^a, Tolekova, A.N.^b 👤

^aDepartment of Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria

^bDepartment of Physiology, Pathophysiology and Pharmacology, Medical Faculty, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria

Abstract

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The elaborate of Bleomycin- induced pulmonary fibrosis (BIPF) has been associated with inflammation and necrosis of the alveolocytes, production of free- radicals and induction of chronic oxidative stress. The aim of the study was to establish the radical- scavenging capacity and antioxidant activity of *Curcuma longa* extract, in Bleomycin models in mice and to determine the therapeutic potential and action against similar oxidative stress induced conditions. BIPF was induced with a single (injection in every two days) of Bleomycin in dose 0.34 U/kg body weight. Till the end of the experimental period (twenty-eight days) after Bleomycin administration, the mortality rate was not observed in ICR mice. Lipid peroxidation and total cholesterol levels were significantly reduced in *C. longa* extract+ Bleomycin group, compared to Bleomycin treated group ($p < 0.05$). SOD and CAT plasma antioxidant enzymes expression were increased in *C. longa* + Bleomycin group, compared to Bleomycin -treated group ($p < 0.05$). In the other hand, nitric oxide scavenging expression increased in Bleomycin ($p < 0.05$) compared to the other groups ($p < 0.05$). In conclusion, the treatment with *C. longa* extract stimulates endogenous antioxidant activity, reduction of lipid peroxidation and scavenging of nitric oxide (NO•). These results make it appropriate to propose the use of this plant extract as a possible addition to the treatment of acute and chronic pulmonary diseases associate with oxidative stress. © 2019 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria

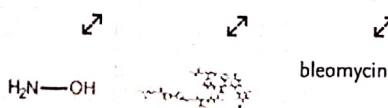
SciVal Topic Prominence ⓘ

Topic: Curcumin | Curcuma | Wound healing

Prominence percentile: 99.830 ⓘ

Chemistry database information ⓘ

Substances



Author keywords

CAT NO• Pulmonary fibrosis; oxidative- scavenging imbalance; SOD

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Bulgarian Chemical Communications Open Access
Volume 51, 2019, Pages 101-107

Study of the radical-scavenging activities and radioprotective properties of Bulgarian essential rose oil from Rosa Damascena Mill (Article)

Karamalakova, Y.D.^a, Nikolova, G.D.^a, Kovacheva, N.^b, Zheleva, A.M.^a, Gadjeva, V.G.^a ✉

^aDepartment of Chemistry and Biochemistry, Medical Faculty, Trakia University, Stara Zagora, Bulgaria
^bAgricultural Academy, Institute of Roses and Aromatic Plants, Kazanluk, Bulgaria

Abstract

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The present study for the first time reported radical-scavenging activities and radioprotective properties of Bulgarian essential rose oil from Rosa Damascena Mill. The chemically pure rose oil (100 %) with GC- established oil composition was tested non-irradiated and after UV-B, gamma (γ) radiation at doses 2.5, 5, 10, 20 and 30 Gy. By direct EPR spectroscopy method, the presence of stable free radical structures was established either in non-irradiated oil and in UV-B and γ- irradiated samples. It should be pointed out that stable free radical structures were registered in the same oil samples 2 months after the irradiation. Furthermore, as before and after UV-B/γ irradiation oil showed well expressed radical-scavenging activity and radioprotective properties against reactive oxygen such as superoxide radicals (•O₂), hydroxyl radicals (•OH) and against DPPH stable radical. Current results characterize the rose oil as a promising source of natural substances that have radical-scavenging activity and radiation protective properties, and in future could be suitable for the development of new medications and dietary supplements. © 2019 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria.

SciVal Topic Prominence

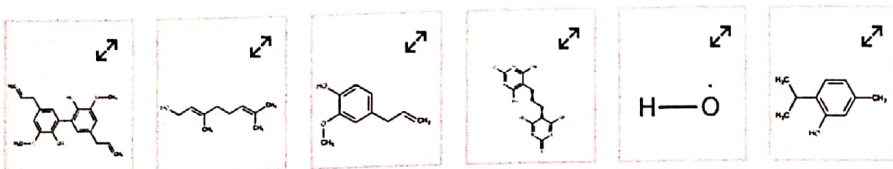
Topic: Rosa Damascenum | Citronellol | Nonadecane

Prominence percentile: 74.485

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Author keywords

EPR spectroscopy Radical-scavenging activity Radioprotection Rosa Damascena Mill

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Karamalakova, Y.D., Adhikari, M.K., Kovacheva, N.D. (2018) Bulgarian Chemical Communications

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**IN VITRO ELECTRON PARAMAGNETIC RESONANCE (EPR) SPECTROSCOPY
STUDY ON RADICAL SCAVENGING ABILITIES OF AN EXTRACT ISOLATED
FROM STEM BARK OF *PIPTADENIASTRUM AFRICANUM* TREE**

*Antoaneta M.Zheleva, Galina D.Nikolova, Yanka D.Karamalakova, Derek T.Ndinteh,
Veselina G.Gadjeva*

ABSTRACT

The purpose of this study was to evaluate free radical scavenging abilities of an extract isolated from stem bark of *Piptadeniastrum africanum* (*P. africanum*) tree by high sensitive Electron Paramagnetic Resonance (EPR) spectroscopy. The extract depending on concentrations exhibited in vitro high scavenging ability against the stable radical 2,2-diphenyl-1-picrylhydrazyl (DPPH). Moreover, in vitro high scavenging activity towards superoxide ($\cdot\text{O}_2^-$) and alkyl radicals was also found. Only in the Fenton system generating hydroxyl radicals studied extract showed pro-oxidant activity. Since in the studied in vitro systems *P. africanum* extract showed antioxidant and pro-oxidant properties as well, we believe that thorough and detailed studies should be carried out to clarify which components are involved in its pro-oxidant activity demonstrated in this study.

Key words: radical scavenging abilities, electron paramagnetic resonance, *Piptadeniastrum africanum* , antioxidant activity

DOI: 10.7546/CRABS.2019.02.07

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Bulgarian Chemical Communications Open Access
Volume 51, 2019, Pages 58-62

Oxidative modifications caused by free radicals in hypertension (Article)

Hristova, M.^a, Nikolova, G.D.^b, Karamalakova, Y.D.^b, Komsliiska, D.Y.^c, Penev, M.^a, Gadjeva, V.G.^b

^aDepartment of Internal Medicine, Medical Faculty, Trakia University, Stara Zagora, Bulgaria

^bDepartment of Chemistry and Biochemistry, Medical Faculty, Trakia University, Stara Zagora, Bulgaria

^cDepartment of Neurology and Psychiatry, Medical Faculty, Trakia University Hospital, Armeiska Street, 11, Stara Zagora, 6000, Bulgaria

Abstract

View references (28)

ACE inhibitors are among the main groups of antihypertensive medications. Lisinopril is a synthetic peptide that competitively binds and inhibits the angiotensin converting enzyme. Oxidative stress (OS) is a key factor in the molecular mechanisms associated with cardiovascular and renal diseases associated with hypertension. Moreover, the hypertension, by itself, can also contribute to oxidative stress increasing. The aim of the study is to evaluate the role of OS in vascular pathology and its effect on the antihypertensive effect of ACE inhibitors in moderate-grade AH patients. For this purpose we investigated the ascorbic radicals, ROS products and ·NO radicals as oxidative stress biomarkers. Oxidative stress was determined in 82 people with arterial hypertension receiving regular antihypertensive therapy and 20 healthy volunteers. Patients treated with Lisinopril (n=41) were compared with a combined treatment group (Lisinopril and Bisoprolol, n=21) and group treated with a Valsartan (n=20). For this purpose were Electron Paramagnetic Resonance (EPR) methods. Oxidative stress is increased in patients with essential hypertension and its role in the pathophysiology of the disease is possible. Regarding the real time biomarkers of OS, the therapeutic advantage in essential hypertension is use of ACE inhibitor in front of angiotensin-receptor blocker. © 2019 Bulgarian Academy of Sciences. All rights reserved.

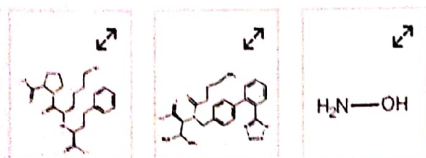
SciVal Topic Prominence

Topic: Renalase | NAD(P)H Oxidase (h2o2-forming) | Apocynin

Prominence percentile: 98.513

Chemistry database information

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Author keywords

Arterial hypertension Asc radicals NO radicals Oxidative stress ROS products

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Nikolova, G., Karamalakova, Y., Zheleva, A. (2018) *Bulgarian Chemical Communications*

Serum Oxidative Stress Markers are not Associated with Renal and Common Carotid Arteries Arteriosclerotic Vascular Changes in Patients with Gout

Gancheva, R., Kundurdjiev, A., Nikolova, G. (2019) *Acta Medica Bulgarica*

Comparative study of oxidative status in blood of asthmatic patients

Nikolova, G., Ilieva, V., Karamalakova, Y. (2018) *Comparative Clinical Pathology*

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Bulgarian Chemical Communications [Open Access](#)
Volume 51, 2019, Pages 276-282High-level gamma radiation effects on radical-scavenging activity of black chokeberry (*Aronia melanocarpa*) ethanol extract (Article)Karamalakova, Y.D.^a ✉️, Nikolova, G.D.^a, Denev, P.N.^b, Momchilova, Sv.^c, Slavova-Kazakova, A.K.^c, Kancheva, V.D.^c, Zheleva, A.M.^a, Gadjeva, V.G.^a 👤^aDepartment Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria^bLaboratory of Biologically active Substances, Institute of Organic Chemistry, Centre of Phytochemistry, Bulgarian Academy of Sciences, 139 Ruski Blvd., Plovdiv, 4000, Bulgaria^cDepartment of Lipid Chemistry, Institute of Organic Chemistry, Centre of Phytochemistry, Bulgarian Academy of Sciences, Acad. G. Bonchev Str., 9, Sofia, 1113, Bulgaria

Abstract

View references (24)

Black chokeberry (*Aronia melanocarpa*, *A. melanocarpa*), belongs to the Rosaceae family, and originates from the North America eastern parts. In *A. melanocarpa* berries the polyphenolic compounds are characterized by stronger radical-scavenging activity than polyphenols, which are presented in other berries. In recent years, food irradiation has been used to protect against microorganisms, oxidative processes and radiation-induced toxicity, and this methodology is internationally recognized for effective long-term storage. The Electron Paramagnetic Resonance (EPR) is the most promising methods for identification of gamma (γ)-irradiated food. In the current study by using in vitro EPR spectroscopy and spectrophotometrical methods were evaluated and compared free radical-scavenging abilities and radio-protective properties of Black Chokeberry (*A. melanocarpa*) ethanol extract before and after exposure to 10 kGy and 25 kGy irradiation. It was found that when irradiation dose was increased scavenging abilities of the *A. melanocarpa* extract against DPPH significantly decreased ($68.612 \pm 4.18\%$, $p < 0.005$ for 10 kGy and $35.09 \pm 3.87\%$, $p < 0.005$, for 25 kGy). 10 kGy irradiation exhibited 4 times higher SOD-like activity than L-ascorbic acid, while 25 kGy radiation extract showed slightly decrease versus standard. Chain-breaking antioxidant activity of lipid soluble components decreases with increasing the irradiation dose. Based on the EPR singlet signals with equal values of $g = 2.00455$ after alkalization were assume that the semiquinone radical originates from the polyphenol substances presented in high concentration in *A. melanocarpa* extract. © 2019 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria

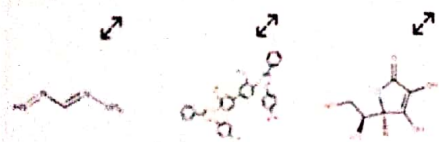
SciVal Topic Prominence ⓘ

Topic: Photinia | *Aronia melanocarpa* | Chokeberry juice

Prominence percentile: 84.530 ⓘ

Chemistry database information ⓘ

Substances



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Antioxidant Potential of Fruit
Juice with Added Chokeberry
Powder (*Aronia melanocarpa*)Labur, J.I., Dobričević, N.,
Pliestic, S.
(2017) *Molecules*The influence of natural
sweetener (*Stevia rebaudiana*
Bertoni) on bioactive compounds
content in chokeberry juiceŠic Žlabur, J., Dobričević, N.,
Galić, A.
(2018) *Journal of Food Processing
and Preservation*Black chokeberry (*Aronia
melanocarpa* (Michx.) Elliot) fruits
and functional drinks differ
significantly in their chemical
composition and antioxidant
activityDenev, P., Kratchanova, M.,
Petrova, I.
(2018) *Journal of Chemistry*View all related documents based
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Karamalakova, Y., Nikolova, G., Adhikari, M., Stoev, S., Agarwal, P., Gadjeva, V., Zhelev, Z.

Oxidative-protective effects of *Tinospora cordifolia* extract on plasma and spleen cells after experimental ochratoxicosis

(2018) *Comparative Clinical Pathology*, 27 (6), pp. 1487-1495.

Abstract

The importance of *Tinospora cordifolia* extract was investigated for its possible protective effect in spleen and blood in male ICR albino mice against ochratoxin A-induced toxicity (OTA). OTA instigates oxidative changes and results in the overproduction of free radicals, changes in body/organ weight, and the food consumption and is considered as a risk factor for animals and humans. Reactive oxygen species (ROS), reactive nitrogen species (RNS), and consequent lipid-peroxidative damages caused by OTA are considered to be the main mechanisms leading to oxidative stress disorders in organs and blood. TC oral administrations prevent the physiological status of animals and improve the biochemical parameters of the urine and plasma. Moreover, EPR analysis show that TC administration decreased Asc• and NO• radicals and ROS productions in the spleen and serum, even in OTA-treated group. The significant decrease in MDA formation in the spleen and serum and the increased expression of SOD activity in TC and TC + OTA groups confirm the positive modulatory effect of TC extract on the cellular antioxidant system. TC and TC + OTA treatment caused significant reduction of genotoxic potential (8-OHdG) of OTA, followed by a decreased oxidative activity and gradual recovery of ROS-induced DNA damage. The results suggested that TC extract protect against OTA-induced oxidative disorders and other abnormalities. As typical antioxidant TC could protect splenic macrophages and regain intracellular antioxidant capacity. © 2018, Springer-Verlag London Ltd., part of Springer Nature.

Author Keywords

8-OHdG; Ochratoxicosis; ROS/RNS; *Tinospora cordifolia*

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Document Type: Article

Publication Stage: Final

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Comparative Clinical Pathology
Volume 27, Issue 4, 1 July 2018, Pages 1057-1063

Comparative study of oxidative status in blood of asthmatic patients (Article)

Nikolova, G.^a ✉️, Ilieva, V.^b, Karamalakova, Y.^a, Zheleva, A.^a, Gadjeva, V.^a 📧

^aDepartment Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska str, Stara Zagora, 6000, Bulgaria

^bDepartment of Internal Medicine, Medical Faculty, University Hospital, Trakia University, Stara Zagora, Bulgaria

Abstract

View references (33)

Bronchial asthma (BA) is a chronic inflammatory lungs disease, resulting in an airflow restriction, hyperactivity, and airway remodeling. The aim of present study is to investigate and compare the oxidative stress levels in blood of asthmatic patients differ in the disease control degree. In the current study were included 30 patients with bronchial asthma and 24 healthy volunteers. Patients were diagnosed with BA with allergic component longer than 1 year. For this purpose were explored the reactive oxygen species (ROS) and reactive nitrogen species (RNS), final products of lipids and proteins. Also, were studied the relationship between oxidative stress parameters and C-reactive protein (CRP) as a marker of inflammation degree. By using the electron paramagnetic resonance (EPR) spin trapping technique, ongoing the real-time oxidative processes were confirmed in blood samples isolated from asthmatic patients differing in the disease control degree. Moreover, positive correlation was found between the levels of studied oxidative stress (OS) biomarkers and CRP as a marker of inflammation degree. The oxidative processes in real time were demonstrated in BA patients. The correlation analysis results confirm the development and maintenance of inflammatory processes in respiratory tract is associated with the oxidative and nitrosative stress. © 2018, Springer-Verlag London Ltd., part of Springer Nature.

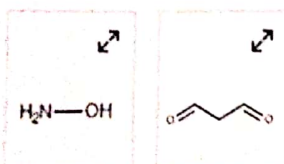
SciVal Topic Prominence ⓘ

Topic: Condensate | 8-Epi-Prostaglandin F2Alpha | Asthma

Prominence percentile: 88.147 ⓘ

Chemistry database information ⓘ

Substances



Author keywords

Bronchial asthma CRP RNS ROS

Funding details

Funding sponsor

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Acronym

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Komsijska, D.Y., Petkov, Y.C.
(2019) *Bulgarian Chemical Communications*

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Oxidative stress and related diseases. Part I: Bronchial asthma

Nikolova, G.D., Ilieva, V., Karamalakova, Y.D.
(2018) *Bulgarian Chemical Communications*

Comparative analysis of real-time oxidative stress biomarkers measured in mussels (*Mytilus galloprovincialis*) and veined rapa whelks (*Rapana venosa*) in relation to two seasons - An electron paramagnetic resonance study

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Zheleva, A., Nikolova, G., Karamalakova, Y., Hristakieva, E., Lavcheva, R., Gadjeva, V.

Comparative study on some oxidative stress parameters in blood of vitiligo patients before and after combined therapy

(2018) *Regulatory Toxicology and Pharmacology*, 94, pp. 234-239.

Abstract

Currently accepted that oxidative stress is a triggering event in the melanocytic destruction and is probably involved in the etiopathogenesis of vitiligo disease. Despite numerous investigations, contradictory results were reported about the levels of oxidative stress biomarkers measured in the skin and blood of vitiligo patients. By Electron Paramagnetic Resonance spectroscopy (EPR) and spectrophotometry, we have investigated and compared some oxidative stress biomarkers in the blood of vitiligo patients' before and after UVB Narrow Band 311 nm phototherapy combined with the antioxidant nutritional supplement containing - Vitamin C, Vitamin B1, L -Cysteine, Lipoic Acid, and polyunsaturated fatty acids. Before therapy was found significantly higher levels of CAT activity and MDA compared to the patients after therapy and control group ($p < 0.05$). Moreover, levels of Asc[•] radicals in patients before therapy were significantly lower than those measured in controls and patients undergoing therapy ($p < 0.05$). Our finding, the combined therapy applied to vitiligo patients provoked an increase in the Asc[•] levels and a decrease in MDA products and also initial repigmentation in the vitiligo spots, made us believe that a combined antioxidant therapy, enriched with vitamin C could lead to improvement of the oxidant-antioxidant balance in vitiligo patients treated with UVB 311 phototherapy. © 2018 Elsevier Inc.

Author Keywords

Ascorbate radicals; EPR spectroscopy; Oxidative stress; ROS; Vitiligo

Index Keywords

ascorbic acid, catalase, cysteine, glutathione peroxidase, malonaldehyde, nitric oxide, polyunsaturated fatty acid, reactive oxygen metabolite, superoxide dismutase, thiamine, thiocetic acid, alpha tocopherol, antioxidant, ascorbic acid, biological marker, catalase, cysteine, edible oil, malonaldehyde, reactive oxygen metabolite, thiamine, thiocetic acid, vitamin; Article, blood analysis, blood sampling, comparative study, controlled study, diet supplementation, electron spin resonance, enzyme activity, human, oxidative stress, priority journal, ultraviolet B radiation, ultraviolet phototherapy, vitiligo, blood, female, male, oxidative stress, phototherapy, vitiligo; Antioxidants, Ascorbic Acid, Biomarkers, Catalase, Cysteine, Dietary Fats, Unsaturated, Female, Humans, Male, Malondialdehyde, Oxidative Stress, Phototherapy, Reactive Oxygen Species, Thiamine, Thiocetic Acid, Vitamin E, Vitamins, Vitiligo

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Karamalakova, Y.D., Zheleva, A.M., Kumar, R., Nikolova, G.D., Gadjeva, V.G.

A semiquinone glucoside derivative (SQGD) isolated from *Bacillus* sp. INM-1 as a provider of antioxidant protection to male mice against CCNU-induced oxidative toxicity
(2018) *Bulgarian Chemical Communications*, 50, pp. 69-73.

Abstract

Present investigation was focused on evaluation of a semiquinone glucoside derivative (SQGD) isolated from radioresistant bacterium *Bacillus* sp. INM-1 for its activity against CCNU-induced oxidative stress in healthy mice. Mice were divided into four groups, i.e., (I) untreated controls; (II) SQGD treated (40 mg/kg b. wt. i.p.) mice; (III) CCNU (40 mg/kg b.wt., i.p.); and (IV) SQGD (40 mg/kg b.wt., i.p.) administered 1 h prior to CCNU-administration (40 mg/kg b.wt., i.p.). Following treatment, liver homogenates and blood serum of the treated animals were subjected to ascorbate radical levels estimation and ROS production. Results indicated that SQGD+CCNU administration significantly ($p < 0.05$) reduced ascorbate radicals and ROS products in the liver and blood serum of mice as compared with CCNU-treated group. Reduction in oxidative disorders was observed in healthy mice which were treated with SQGD only, compared with controls. Further, the maximal concentration of free SQGD (a.u.) in the blood-flow was established at 30 min after i.p., and completely reduced after 240 min. The pharmacokinetic profile of free SQGD showed significant selective accumulation, mostly in liver and lungs (60 min), brain (90 min), followed by kidney, pancreas, spleen, blood and testicles. Thus, it can be concluded that SQGD treatment alone and in combination SQGD+CCNU neutralized oxidative toxicity caused by medicines not only by reducing lipid peroxidation but also by improving antioxidant status of organs and blood, and this effect may emphasize SQGD as a strong radical-scavenger and excellent natural protector. © 2018 Bulgarian Academy of Sciences.

Author Keywords

CCNU; Lipid peroxidation; Pharmacokinetic profile; Protection; SQGD

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Publication Stage: Final

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Karamalakova, Y.D., Adhikari, M.K., Kovacheva, N.D., Ivanov, V.A., Nikolova, G.D., Gadjeva, V.G.

Rose oil isolated from oil-bearing *Rosa damascena* Mill. As a protector against ionizing radiation-induced oxidative disorders

(2018) *Bulgarian Chemical Communications*, 50, pp. 14-19.

Abstract

Essential oils are derived from different natural plant materials such as leaves and flowers. They are commercially important and have been widely used in cosmetics, household products and medicines because of pharmacologically active components. Essential oil as antioxidant is able to prevent oxidative processes and to inhibit the oxidation reaction effect caused by radiation-induced oxygen/nitrogen free radicals. Ionizing radiation is a recognized method of maintaining the quality of aromatic herbs, spices and vegetables for a long time. The present study focused on identifying the radioprotective efficacy of rose oil against oxidative damage of molecules by ionizing radiation in in vitro models. © 2018 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria.

Author Keywords

DPPH scavenger; Radiomodulation; *Rosa damascena* mill

Publisher: Bulgarian Academy of Sciences

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Nikolova, G.D., Ivanova, D.G., Karamalakova, Y.D., Grigorov, B.G., Gadjeva, V.G., Zheleva, A.M.

In vitro electron paramagnetic resonance (EPR) spectroscopy studies on radical scavenging abilities of haberlea rhodopensis leaves extract

(2018) *Comptes Rendus de L'Academie Bulgare des Sciences*, 71 (6), pp. 780-786.

DOI: 10.7546/CRABS.2018.06.08

Department Chemistry and Biochemistry, Medical Faculty, Trakia University, 11 Armeiska St, Stara Zagora, 6000, Bulgaria

Abstract

In vitro antioxidant and radical scavenging abilities of an extract isolated from the leaves of *Haberlea rhodopensis* (*H. rhodopensis*) plant were evaluated for the first time. The extract showed in vitro high scavenging ability against the stable radical 2,2-diphenyl-1-picrylhydrazyl (DPPH). Moreover, high scavenging activity towards superoxide ($\cdot\text{O}^-_2$) was also found while in Fenton system generating hydroxyl radicals the extract showed pro-oxidant activity. Since, in studied in vitro systems *H. rhodopensis* extract exhibited as well as antioxidant and pro-oxidant properties, we consider that thorough and detailed research must be carried out to determine the extract constituents which are involved in the pro-oxidant activity demonstrated in the current study. © 2018, Academic Publishing House. All rights reserved.

Author Keywords

Antioxidant activity; Electron Paramagnetic Resonance; Radical scavenging abilities

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Volume 50, 2018, Pages 58-63Comparative analysis of real-time oxidative stress biomarkers measured in mussels (*Mytilus galloprovincialis*) and veined rapa whelks (*Rapana venosa*) in relation to two seasons - An electron paramagnetic resonance study (Article)Nikolova, G.^a Karamalakova, Y.^a, Zheleva, A.^a, Stratev, D.^b, Vashin, I.^b, Zhelyazkov, G.^c, Gadjeva, V.^a^aDepartment Chemistry and Biochemistry, Faculty of Medicine, Trakia University, 11 Armeiska Str., Stara Zagora, 6000, Bulgaria^bDepartment of Hygiene Technology and Control of Food Products of Animal Origin, Veterinary Legislation and Management, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, 6000, Bulgaria^cDepartment of Biology and Aquaculture, Faculty of Agriculture, Trakia University, Stara Zagora, 6000, Bulgaria

Abstract

[View references \(29\)](#)

The aim of this study was to elucidate the radical mechanisms for protection and survival of mussels (*Mytilus galloprovincialis*) and veined rapa whelks (*Rapana venosa*) during spring and summer season by following out levels of some real-time oxidative stress (OS) biomarkers. Thirty specimens of each species were analyzed by using electron paramagnetic resonance (EPR) spectroscopy. During spring, statistically higher levels of ROS products were found in *R. venosa* compared to *M. galloprovincialis*. During summer, statistically significant higher levels of ROS products were found in both *R. venosa* and *M. galloprovincialis*, compared to the same groups during spring. NO radicals in *R. venosa* were higher, although not statistically significant than those in *M. galloprovincialis* during both spring and summer periods. During summer, statistically significant higher levels of ascorbate radicals (Asc•) were found in both *R. venosa* and *M. galloprovincialis*, compared to the same groups during spring. However, during the summer the levels of ascorbate radicals measured in *R. venosa* were significantly higher compared to *M. galloprovincialis*. Our results showed that changes in oxidative/antioxidant status may reflect the gradient of contamination confirming the rational use of biomarkers of oxidative stress in biomonitoring of contamination. *R. venosa* has effective biochemical mechanisms of protection and survival, in particular a strong antioxidant system that provides this type of high adaptability and survival against oxidative stress. © 2018 Bulgarian Academy of Sciences, Union of Chemists in Bulgaria.

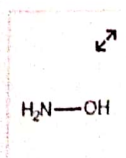
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Topic: Mytili Galloprovincialis | Bivalvia | Ruditape Philippinarum

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Comparative study on some oxidative stress parameters in blood of vitiligo patients before and after combined therapy

Zheleva, A., Nikolova, G., Karamalakova, Y.
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Tanchev, S., Dimitrov, S., Nikolova, G., Karamalakova, Y., Ivanova, D., Hristova, D., Georgieva, S., Zheleva, A., Petrov, V., Gadjeva, V.

Effect of antigen stimulation on the oxidative stress parameters in sperm of outbred and inbred rabbits
(2017) *Biotechnology and Biotechnological Equipment*, 31 (4), pp. 788-794.

DOI: 10.1080/13102818.2017.1323559

Abstract

The presence of an increased oxidative stress during antigen stimulation was established in the sperm of inbred rabbits by evaluation of the level of real-time free radical formation (ROS and Asc•), final products of oxidation of lipids (MDA) and the activities of antioxidant defence enzymes superoxide dismutase (SOD) and catalase (CAT). There was not a significant difference between levels of ROS, Asc• and MDA in inbred and outbred rabbits before immunization. The immune response, represented by levels of ROS and Asc• of inbred and outbred rabbits were statistically significantly higher compared to those before immunization ($p = 0.0001$ and $p = 0.00001$). Moreover, the levels of ROS in the sperm of inbred rabbits were statistically significantly higher compared to outbred rabbits ($p < 0.05$). Oxidative stress was accompanied by an adaptive increase of SOD and CAT activities during the immune response, compared to those before immunization. Furthermore, the increased SOD and CAT activities appeared to be sufficient to inactivate the oxidative stress. We measured reduced levels of ROS, Asc• and MDA 30 days after immunization. When immune response reduced, the observed SOD and CAT activities tended to return to the values before immunization. That might have been connected with the decreased oxidative burden. However, CAT activities remained about 1.5 times higher than that before immunization. In conclusion, our results indicate that the administered antigen stimulation induces oxidative stress in both groups inbred and outbred rabbits. © 2017 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Author Keywords

antioxidants; lipid peroxidation; Oxidative stress

Index Keywords

Antigens, Antioxidants, Enzymes, Free radicals, Immune system, Immunization, Lipids, Oxygen; Antigen stimulation, Antioxidant defence, Immune response, Lipid peroxidation, Radical formation, Real time, Stress parameter, Superoxide dismutases; Oxidative stress

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Georgiev, T.K., Hadzhibozheva, P.V., Georgieva, E.D., Karamalakova, Y.D., Nikolova, G.D., Gadjeva, V.G., Zheleva, A.M., Tolekova, A.N.

Effect of N-[N'-(2-chloroethyl)-N'-nitrosocarbamoyl-glycine amide of 2, 2, 6, 6-tetramethyl-4-aminopiperidine-1-oxyl (SLCNUgly) on Angiotensin II-mediated smooth muscle activity of organs in pelvic cavity
(2017) *Bulgarian Chemical Communications*, 49, pp. 191-198.

Abstract

Persistent hyperglycemia during diabetes mellitus impairs contractile responses of smooth muscles to pressor hormones like Angiotensin II (Ang II). The main etiological factor for this diabetic disturbance is the excessive formation of reactive oxygen radicals leading to oxidative stress and disrupted cell calcium signaling machinery. Therefore antioxidants have the potential to improve smooth muscle diabetic dysfunction. The purpose of this study was to assess the effects of administration of SLCNUgly on the oxidative and glycemic status and on Ang II - induced motility of organs from the pelvic cavity of rats. Mature female Wistar rats were divided into three groups: control group (intact animals); STZ-treated group (single injection of 60 mg/kg STZ); group, treated seven consecutive days after STZ injection with 10mg/kg SLCNUgly. In the end of experimental period, longitudinal strips from the urinary bladder, rectum and uterus were prepared and influenced by Ang II (1 μmol). The obtained contraction curves were analyzed by calculation of force and time-parameters of the contractile process. The concentrations of ascorbate radicals, ROS production and lipid peroxidation (malondialdehyde) were evaluated in tissue homogenates from the liver, kidney and pancreas. The seven-day administration of SLCNUgly improved significantly the glycemic status. It caused an additional reduction of Ang II-mediated response and greatly decreased the half relaxation phase of the myometrial response. Rectal preparations from SLCNUgly-treated diabetic rats responded to Ang II with reduced force parameters. The nitrosourea tends to normalize force and time-parameters of the urinary bladder. SLCNUgly has a small effect over amelioration of tissue oxidative damages. © Bulgarian Academy of Sciences, Union of Chemists in Bulgaria.

Author Keywords

Angiotensin II; Oxidative stress; SLCNUgly; Smooth muscle contraction; Streptozotocin

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Documents

Nikolova, G., Karamalakova, Y., Kovacheva, N., Stanov, S., Zheleva, A., Gadjeva, V.

Protective effect of two essential oils isolated from *Rosa damascena* Mill. and *Lavandula angustifolia* Mill, and two classic antioxidants against L-dopa oxidative toxicity induced in healthy mice
(2016) *Regulatory Toxicology and Pharmacology*, 81, pp. 1-7. Cited 3 times.

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Abstract

Levodopa (L-dopa) is a "gold standard" and most effective symptomatic agent in the Parkinson's disease (PD) treatment. The several treatments have been developed in an attempt to improve PD treatment, but most patients were still levodopa dependent. The issue of toxicity was raised in vitro studies, and suggests that L-dopa can be toxic to dopaminergic neurons, but it is not yet entirely proven. L-dopa prolonged treatment is associated with motor complications and some limitations. Combining the L-dopa therapy with antioxidants can reduce related sideeffects and provide symptomatic relief. The natural antioxidants can be isolated from any plant parts such as seeds, leaves, roots, bark, etc., and their extracts riched in phenols can retard the oxidative degradation of the lipids, proteins and DNA. Thus, study suggests that combination of essential oils (Rose oil and Lavender oil), Vitamin C and Trolox with Ldopa can reduce oxidative toxicity, and may play a key role in ROS/RNS disarm. © 2016 Elsevier Inc.

Author Keywords

Antioxidant; DNA damage; L-dopa; Lipids; Protein carbonyl content

Index Keywords

ascorbic acid, lavender oil, levodopa, reactive nitrogen species, reactive oxygen metabolite, rose oil, trolox C, antioxidant, antiparkinson agent, essential oil, levodopa, malonaldehyde, plant extract, reactive nitrogen species, reactive oxygen metabolite, vegetable oil; animal experiment, animal tissue, antioxidant activity, Article, brain homogenate, cell protection, controlled study, electron spin resonance, ex vivo study, Lavandula angustifolia, male, mouse, nonhuman, oxidative stress, priority journal, Rosa damascena, animal, blood, brain, chemistry, DNA damage, drug effects, isolation and purification, lavender, medicinal plant, metabolism, oxidative stress, phytotherapy, protein carbonylation, rose, spectrophotometry; Animals, Antioxidants, Antiparkinson Agents, Brain, DNA Damage, Lavandula, Levodopa, Male, Malondialdehyde, Mice, Oils, Volatile, Oxidative Stress, Phytotherapy, Plant Extracts, Plant Oils, Plants, Medicinal, Protein Carbonylation, Reactive Nitrogen Species, Reactive Oxygen Species, Rosa, Spectrophotometry

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Biotechnology and Biotechnological Equipment [Open Access](#)
Volume 28, Issue 6, 2014, Pages 1172-1180

Biological evaluation of new potential anticancer agent for tumour imaging and radiotherapy by two methods: ^{99m}Tc-radiolabelling and EPR spectroscopy (Article) [\(Open Access\)](#)

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Abstract

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Recently, a new class of in vitro and ex vivo radiotracers/radioprotectors, the nitroxyl-labelled agent 1-ethyl-1-nitroso 3-[4-(2,2,6,6-tetramethylpiperidine-1-oxyl)]-urea (SLENU), has been discovered. Our previous investigations demonstrated that SLENU is a low-molecular-weight stable free radical which is freely membrane permeable, easily crosses the blood brain barrier and exhibited in/ex vivo the lowest general toxicity and higher anticancer activity against some experimental tumour models. Further investigation was aimed to develop a ^{99m}Tc-labelled SLENU (97%) as a chelator and evaluate its labelling efficiency and potential use as a tumour seeking agent and for early diagnosis. Tissue biodistribution of ^{99m}Tc- SLENU was determined in normal mice at 1, 2 and 24 h (n D 4/time interval, route of administration i.v.). The distribution data were compared using male albino non-inbred mice and electron paramagnetic resonance investigation. The imaging characteristics of ^{99m}Tc-SLENU conjugate examined in BALB/c mice grafted with Ehrlich Ascitis tumour in the thigh of hind leg demonstrated major accumulation of the radiotracer in the organs and tumour. Planar images and auto-radiograms confirmed that the tumours could be visualized clearly with ^{99m}Tc-SLENU. Blood kinetic study of radio-conjugate showed a bi-exponential pattern, as well as quick reduced duration in the blood circulation. This study establishes nitroxyls as a general class of new spin-labelled diagnostic markers that reduce the negative lateral effects of radiotherapy and drug damages, and are appropriate for tumour-localization. © 2014 The Author(s). Published by Taylor & Francis.

SciVal Topic Prominence

Topic: Hydrazines | Antineoplastic Agents | Tumor cells

Prominence percentile: 24.957

Author keywords

^{99m}Tc-conjugate Biodistribution EAT tumour Ex vivo EPR SLENU Tumour imaging

Indexed keywords

Engineering controlled terms:

Blood Brain Electron spin resonance spectroscopy Free radicals Mammals Paramagnetic resonance Radioactive tracers Radiotherapy Tumors Urea

Engineering uncontrolled terms

^{99m}Tc-conjugate Anticancer activities Biodistributions Biological evaluation Ex-vivo Imaging characteristics Potential anticancer agents SLENU

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Mitochondrial dysfunction and redox imbalance as a diagnostic marker of "free radical diseases"

Georgieva, E. , Ivanova, D. , Zhelev, Z. (2017) *Anticancer Research*

Effect of N-[N'-(2-chloroethyl)-N'-nitrosocarbamoyl-glycine amide of 2, 2, 6, 6-tetramethyl-4-aminopiperidine-1-oxyl (SLCNUgly) on Angiotensin II-mediated smooth muscle activity of organs in pelvic cavity

Georgiev, T.K. , Hadzhibozheva, P.V. , Georgieva, E.D. (2017) *Bulgarian Chemical Communications*

Interactions of the spin-labeled chloroethylnitrosourea SLCNUgly with electrode-supported lipid films

Tacheva, B. , Georgieva, R. , Karabaliyev, M. (2016) *Electrochimica Acta*

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Original Articles

Hepatoprotective properties of *Curcuma longa* L. extract in bleomycin-induced chronic hepatotoxicity

Yanka D. Karamalakova, Galina D. Nikolova, Tzvetelin K. Georgiev, Veselina G. Gadjeva, Anna N. Tolekova

著者情報

キーワード: *Curcuma longa* L., bleomycin, plasmatic protection, MDA, ROS, hepatic protection, oxidative stress

ジャーナル フリー

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詳細

抄録

Curcuma longa L. (CLL) extract has previously been reported to alleviate liver damage. The current study examined the antioxidant activity of CLL by which the extract protects the liver against bleomycin (BLM)-induced hepatotoxicity in mice. The hypothesis was that CLL extract would protect the liver by reducing oxidative stress (induced superoxide dismutase (SOD) and catalase (CAT) activity), inhibiting lipid peroxidation, lowering biochemical parameters, and decreasing ROS production. Hepatic toxicity was induced by intraperitoneal injection of mice once daily with BLM (0.069 U/mL; 0.29 U/kg bw.) for a period of 4 weeks. The CLL was administered once a day for 4 weeks, 2 h prior at dose (40 mg/mL; 0.187 mg/kg/day). CLL extract significantly protected the liver, it decreased plasma bilirubin (BL) and gamma glutamyl transpeptidase (GGT), and it reduced lipid peroxidation levels. BLM intoxication produced oxidative stress, in which the antioxidant system functioned incorrectly and ROS production significantly increased. The CLL extract provided significant hepatic protection against BLM toxicity by improving SOD, CAT ($p < 0.05$), and MDA levels and decreasing ROS in the group receiving BLM ($p < 0.05$), leading to reduced membrane lipid

Documents

Zheleva, A., Karamalakova, Y., Nikolova, G., Kumar, R., Sharma, R., Gadjeva, V.

A new antioxidant with natural origin characterized by electron paramagnetic resonance spectroscopy methods (2014) *Biotechnology and Biotechnological Equipment*, 26, pp. 146-150. Cited 5 times.

DOI: 10.5504/50YRTIMB.2011.0027

Abstract

Formerly, naturally isolated SQGD exhibited good in vitro radical scavenging capacity towards 1,1-diphenyl-2-picrylhydrazyl (DPPH). By the present research using EPR in vitro and ex vivo methods we report our further studies on the antioxidant and free radical properties of SQGD. SQGD in powder or in solution form was studied before and after 2 h of UV irradiation by direct EPR in vitro spectroscopy. A single almost symmetrical EPR signal with a g value of 2.0056 ± 0.0002 was registered for the powder form and $g = 2.0044 \pm 0.0002$ for the solution form. Based on the calculated g values and the strong EPR signal stability we accept that the radical recorded can be safely ascribed to a semiquinone radical. To study in vivo antioxidant properties of SQGD, white laboratory mice were inoculated i.p.: first group with SQGD (20mg/kg), second with anticancer drug N'-cyclohexyl-N-(2-chloroethyl)-N-nitrosourea (CCNU, 80 mg/kg), third with SQGD plus CCNU and the controls were inoculated with the solvent only. At the 3rd h after treatment mice livers were isolated and homogenates in DMSO solution of the spin trap n-tert-butyl-alpha-phenylnitron (PBN) were prepared and their EPR spectra were recorded. Statistical significant increased level of ROS production was found in liver homogenates of mice treated by CCNU comparing to those of the controls. ROS production in livers of mice treated by SQGD, or by the combination of SQGD plus CCNU was slightly decreased comparing to the controls. In conclusion, obviously SQGD does not cause oxidative stress in the livers of mice for the followed period and behaves in vivo as an excellent antioxidant and hepatoprotector. © 2012 Taylor and Francis Group, LLC.

Author Keywords

Anticancer drug; Antioxidants; EPR spin trapping technique; Semiquinone radical

Index Keywords

Antioxidants, Electron spectroscopy, Free radicals, Magnetic resonance, Mammals, Paramagnetic resonance, Spectroscopic analysis; After-treatment, Anticancer drug, Antioxidant properties, Electron paramagnetic resonance spectroscopy, Radical scavenging capacities, Semiquinone radicals, Spin-trapping technique, UV irradiation; Electron spin resonance spectroscopy

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