



"ANGEL KANCHEV" UNIVERSITY OF RUSE
UNION OF SCIENTISTS - RUSE

РУСЕНСКИ УНИВЕРСИТЕТ "АНГЕЛ КЪНЧЕВ"
СЪЮЗ НА УЧЕНИТЕ - РУСЕ



58th Annual Science Conference
of Ruse University and Union of Scientists - Ruse
**NEW INDUSTRIES, DIGITAL ECONOMY,
SOCIETY - PROJECTIONS OF THE FUTURE II**

58-ма годишна научна конференция
на Русенски университет и Съюз на учените – Русе
**НОВИ ИНДУСТРИИ, ДИГИТАЛНА ИКОНОМИКА,
ОБЩЕСТВО – ПРОЕКЦИИ НА БЪДЕЩЕТО II**



**SESSIONS SCHEDULE & ABSTRACTS
ПРОГРАМА & РЕЗЮМЕТА**

Silistra, Ruse, Razgrad
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2019

BINDING EXPEDIENT OF PHENOLIC ACIDS FROM THE PLANT *GRAPTOPETALUM PARAGUAYENSE* E. WALTHER TO VIRAL DNA POLYMERASE AMINO ACIDS: A THEORETICAL INSIGHT

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Abstract: Among the most common infections are those caused by human herpes viruses, including Herpes Simplex virus type 1 and type 2 (HSV-1 and HSV-2) spread worldwide. Common therapies for herpes infections employ nucleoside analogs, such as Acyclovir, and target the viral DNA polymerase, essential for viral DNA replication. Systemic application of these agents is often limited by the development of drug-resistance or toxicity, especially in immunosuppressed patients. A better understanding of the herpes virus replication will help the development of new safe and effective broad-spectrum anti-herpetic drugs that fill an unmet need. Recently we found that the total methanol extract from succulent plant *Graptopetalum paraguayense* E. Walther (GP) demonstrates a significant inhibitory effect on HSV-1 as well as the GP phenolic fraction. Since virus-encoded DNA polymerase appears to be a key feature in the replication of large DNA viruses such as HSV, we present theoretical investigations on the binding expedient of phenolic acids from this fraction to viral DNA polymerase amino acids. Twelve different phenolic acids such as gallic acid, trans-ferulic acid, syringic acid, and others were found by GS/MS analyses.

MOE 2016 software package was used to dock selected structures in the active site defined in published XRD (X-ray diffraction) structures of the Herpes Simplex Virus 1 DNA Polymerase. The structure was protonated according to implemented Protonate3D algorithm and was scored according to implemented GBVI/WSA dG scoring function. According to this scoring function, trans-ferulic acid and gentisic acid have optimal interactions with the receptor.

From the results based on the molecular docking methods, we have modeled some hydrogen-bonded complexes between phenolic and amino acids. The received data from our quantum-chemical calculations suggest that all phenolic acids could form stable complexes with amino acids from the DNA polymerase active site. The calculations were performed at B3LYP/6-31+G (d,p) level of theory using GAUSSIAN 09 software package.

Keywords: *Graptopetalum paraguayense* E. Walther, DNA polymerase, Herpes Simplex virus, docking, quantum-chemical calculations, hydrogen-bonding

A SURVEY OF THE PLANT *GRAPTOPETALUM PARAGUAYENSE* E. WALTHER FOR ANTI-INFLUENZA VIRUS ACTIVITY

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Abstract: Among different kinds of viruses, one of the most common human respiratory tract pathogens that have high level of morbidity and death rate is influenza virus. Influenza viruses belong to the Orthomyxoviridae family and contain a segmented, negative-strand RNA genome (virion RNA, vRNA). Although different classes of antiviral drugs are currently being offered or are still being developed, there are increasing reports of drug resistance to influenza virus due to mutations of surface proteins. Therefore, the development of novel anti-influenza pharmaceuticals to prevent and control future influenza epidemics is necessary. Medicinal plant extracts have proved to be a rich source of candidate compounds for the development of new therapeutically agents with anti-influenza virus activity. Traditional herbal medicines in Far Eastern countries have played an important role in health care of this area, especially in Japan, China, and Korea. The aim of the present study was to evaluate in vitro the anti-influenza virus activity of the succulent plant *Graptopetalum paraguayense* E. Walther (GP), an edible plant in Taiwan.

Methanol extract from leaves of GP was obtained by standard method. The composition of each fraction was determined by GC-MS analysis. The antiviral effect and cytotoxicity were investigated on MDCK SIAT cells, which were infected with two human influenza virus strains: A/Puerto Rico/8/34 (H1N1) and B/Yamagata/16/88. To evaluate the anti-influenza activity after virus infection in vitro we performed the following post treatment assays: MTT-test, virus-induced cytopathic effect (CPE) and hemagglutination inhibition test (HI). The results were expressed as 50% inhibitory concentration of the viral effect (IC₅₀). Oseltamivir phosphate (with trade name Tamiflu®) was used as positive control.

The three main fractions: A (lipids), B (amino and organic acids, carbohydrates) and C (phenolic acids) as well as the total GP extract exhibited low cytotoxic effect in vitro. The results were dose-dependent. The fraction C and methanol GP extract significantly inhibited H1N1 virus replication on MDCK SIAT cells in concentration range 0.001 - 1 mg/mL, when compared to the positive control. GP extract applied in maximal nontoxic concentration (0.01 mg/mL) reduced viral yield by $\Delta \log 10$ 1.3, where IC₅₀ was 10 times lower (0.1 mg/mL). Using representative strains of influenza virus it was shown that apparently, the inhibitory effect was strain-specific. The phenolic fraction C effectively suppressed the replication of influenza virus type A by 87.3%, compared with antiviral drug Tamiflu®, which protects infected MDCK SIAT cells almost 95%.

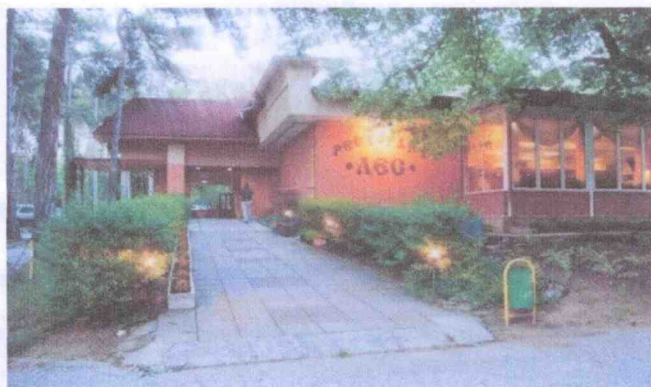
This is the first report on the anti-influenza virus activity of the total extract and fractions isolated from *Graptopetalum paraguayense* E. Walther. The results of this study shed light that fraction C and total GP extract could be promising inhibitors of influenza A virus. Therefore, a deeper characterization of the plant's active compounds and investigation of the mechanism of antiviral action should be carried out.

Keywords: *Graptopetalum paraguayense* E. Walther, phenolic fraction, influenza virus type A and type B, anti-influenza virus activity, cytotoxicity

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ФИЛИАЛ - РАЗГРАД
СЪЮЗ НА УЧЕНИТЕ В БЪЛГАРИЯ - КЛОН РАЗГРАД
ЕИЦ - ЕВРОПА ДИРЕКТНО - ВЕЛИКО ТЪРНОВО
РЕГИОНАЛЕН АКАДЕМИЧЕН ЦЕНТЪР НА БАН - РАЗГРАД
РОТАРИ КЛУБ - РАЗГРАД
ДОМ НА НАУКАТА И ТЕХНИКАТА - РАЗГРАД
ПОД ПАТРОНАЖА НА КМЕТА НА ОБЩИНА РАЗГРАД



58-ма ГОДИШНА НАУЧНА КОНФЕРЕНЦИЯ
НА РУСЕНСКИ УНИВЕРСИТЕТ – ФИЛИАЛ РАЗГРАД
Нови индустрии, дигитална икономика, общество –
проекции на бъдещето - II

01.11. - 02.11. 2019 г.
Хотел Лес, гр. Разград

ПРОГРАМА

01.11. 2019 г.

09:30 – 16:00 ч.

Хотел „Лес“ - до рецепция

Регистрация на участниците в конференцията

Откриване, Приветствия 11:00	КОНФЕРЕНТНА ЗАЛА LCR
ПЛЕНАРНИ ДОКЛАДИ 11.15-13.00	<p>Физикохимични основи на синтеза на керамични пигменти с различна структура и използване на алтернативни суровини</p> <p><i>Доц. д-н Александър Зайчук</i> Украински държавен химико-технологичен университет, Днепропетровск, Украйна</p> <p>Функционални бисквити с добавен пивоварен ечемичен малц и намалено количество захароза</p> <p><i>Проф. д-р Марко Юукич</i> Университет „Йосиф Шросмайер“ Осиек, Хърватия.</p> <p>Алтернативна енергия за хранителната индустрия</p> <p><i>Проф. д-н Олександр Серезин</i> Национален университет по хранителни технологии Киев, Украйна</p>
14.00-16.30	<p>Заседание на секция „Химични технологии“ - конферентна зала CR</p> <p>Заседание на секция „Биотехнологии и хранителни технологии“ - конферентна зала LCR</p>
19:00	Вечеря за участниците в конференцията Ресторант „Лес“ - вход с куверти
9.30-11.30	Постер сесия - секция „Химични технологии“ конферентна зала CR
9.30-11.30	Постер сесия - секция „Биотехнологии и хранителни технологии“ - конферентна зала LCR
11.30	Награждаване на авторите на най-добрите доклади от двете секции с кристален приз „THE BEST PAPER“ Закриване на конференцията – конферентна зала LCR

01. 11. 2019

Section "Chemical Technologies"

Sectional reports: 14.00-16.00 - conference room CR

Session Chair: Tsvetan Dimitrov

FRI-CR-1-CT(R)

01. Study of the formation of ceramic-metal coatings for special alloys

Victor Goleus, Olena Karasjuk, Tsvetan Dimitrov, Tatyana Kozureva, An Saley

02. Ionic silver zeolite, method of its production and its use for medical purposes

Todor Mihalev, Tsvetan Balkanski

03. Increasing the strength of quartz ceramics

Olena Khomenko, Tsvetan Dimitrov, Oлександра Makedonskaya

04. Ab initio study of mechanism of prebiotic reactions: from urea and glycinal hydroxanthine

Venelin Enchev, Sofia Slavova

Section "Biotechnologies and Food Technologies"

Sectional reports: 14.00-16.00 - conference room LCR

Session Chair: Nastia Ivanova

FRI-LCR-1-BFT(R)

01. Application of special method for treatment of water liquid systems

Iryna Dubovkina

02. Binding expedient of phenolic acids from the plant *Gartlopetalum paraguayana*

E. Walther to vital DNA polymerase amino acids: A theoretical insight

Nina Stoyanova, Miroslav Rangelov, Petia Genova-Kalju, Venelin Enchev

Nadezhda Markova

03. Assessment of energy expenditure on the kneading wheat dough process

Volodymyr Telushkin, Stanika Damyanova, Andrii Anisimov, Yuliya Telushkin

04. Role of food and nutrition in cancer

Cristina Porovic, Tatiana Munteanu

05. Review of the working bodies of vertical bead mills

Kateryna Hrinin, Oleksii Gubenia

06. Novel trends in meat packaging: Active packaging on microbiological attributes

different types of fresh meat and meat products

Davor Daniloski, Anka Petkoska

07. Application of ionizing radiation for treating of modern materials in food processing and packaging industry

Deljan Gosprodinov, Stefan Stefanov, Vilhelm Nadjiski, Mihail Beechev