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Personal Influence on the Spreading of Information: A Network Based Study

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Abstract - Understanding the ability of nodes in spreading information in complex networks is an important area of research in the study of social network. Usually, a node with higher number of connections and greater interaction weights becomes more important in a network. But, the spreading ability of a node not only depends on degree of the node and weights of its interactions but also on the interest of the person who handle the information. In this paper we propose a new method to determine the nodes importance giving emphasis the mood or interest of the spreaders.

Keywords - Complex networks, Influential nodes, m-Ranking, Personal variations in spreading.

I. INTRODUCTION

For the last several years, there has been intense research activity in studying the system of complex systems. Complex systems in various fields can be modeled as complex networks of interacting elements and their interactions. Such networks are modeled using graphs in which nodes denote interacting elements and their interactions denote links. These types of modeling are used in Social, Economical, Psychological, Financial and Biological systems. If we want to study a network, we should know its topology. A specific area of interest in the study of social network is the analysis of spreading of information. In this process the nodes play an important role and the degree of its ability to spread information is calculated in terms of the number of connections each node has to its neighbors. Various studies have been conducted to rank the nodes according to their importance in the dynamics of information spreading system. After finding these influential nodes, we can design methods either for boosting spreading of valuable information or to hinder propagation of negative information. For finding important nodes in unweighted networks various centrality measures such as Degree, Closeness, Betweenness, k-shell, Neighborhood Coreness, Extended Neighborhood Coreness etc. are being widely used. These measures are proved to be effective only in certain context. In 1978, Freeman[2] proposed the Degree, Closeness and Betweenness centralities.

In 2010, Kitsak et. al. put forward a fast node ranking method called k-shell (k-core) decomposition[4, 5, 6] for large networks. This method assigns an index k_i to each node, that is representative of the location of the node in the network, according to its importance. Nodes with high values of the k_i are located in the center or core of the network and nodes with low values of k_i lies in the periphery of the network. This way, the network is described by a layered structure, giving the hierarchy of its nodes.

In 2013 k-shell decomposition method was improved by An Zeng et. al. by proposing a new method named Mixed Degree Decomposition[1]. In 2014, Joonhyun et. al. proposed two methods, namely Neighborhood Coreness(C_m) [3] and extended neighborhood coreness(C_m)[3]. The basic idea of neighborhood coreness is that a spreader node with more connections to nodes located in the core of the network is more powerful.

Closeness centrality of anode i is defined as the inverse of sum of all geodesic distance multiplied by

$$(n - 1)$$
. This can be expressed as $CC(i) = \frac{1}{(n-1)\sum_{i=1}^{n-1} d_{ij}}$, where d_{ij} is the geodesic distance between

nodes i and j and n is the total number of nodes in the network. Clearly, the larger the closeness is, the more central the node is.

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Intraband absorption of D⁻ center in CdSe/CdS/CdSe/CdS multilayer quantum dot

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Abstract



Materials Research Bulletin

Volume 85, January 2017, Pages 131-139



Enhanced photocatalytic performance of ZnO nanostructures produced via a quick microwave assisted route for the degradation of rhodamine in aqueous solution

<u>Rahul Mundiyaniyil Thankachan</u> ª, <u>Nidhin Joy</u> ^b, Jiji Abraham ª, <u>Nandakumar Kalarikkal</u> ª °, <u>Sabu Thomas</u> ª ^b, <u>Oluwatobi Samuel Oluwafemi ^d ª ♀</u> ⊠

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Biomass yield, oil productivity and fatty acid profile of Chlorella lobophora cultivated in diverse eutrophic wastewaters



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ARTICLE INFO

Enveronic Algae Westewater Biofuels Phycoremodiation Eutrophication Water quality Chierella Iobaphora

ABSTRACT

Experimental trial of biomass yield, oil productivity and fatty acid profile of Chlorella lobophora in natural eutrophic wastewaters from three different sources was carried out using Bold's Basal Medium as the control. Eutrophication of water is a serious environment issue in agricultural as well as in many industrial zones in the world. But algal biomass production remains the most cost-effective and sustainable means to deal with eutrophic wastewater. Algal culture is the potential method of combining wastewater treatment, nutrient removal, resource recovery and simultaneous yield of biomass and bio-oils. Algal biomass has nutraceutical and biofuel applications. The major objective of the present experimentation was to test the suitability of different eutrophic wastewaters towards understanding the optimum requirements of microalgae for best biomass and oil yield. Influence of variations in nutrient composition of the wastewaters on chemical profile of the oil are also analyzed. Different water quality parameters were found significantly correlated to biomass characteristics of the alga. Oil productivity as well as chemical profile of the oil also exhibited interrelationships to water quality parameters. The oil of algal biomass taken from all kinds of wastewaters sources is found suitable for biodiesel through transectrification. Overall, the method stands as model for preliminary screening of algae for economic utilization of wastewaters towards attaining high biomass yield with desired oil quality, especially for biodiesel production.

1. Introduction

Eutrophication is a common effect of excess nutrients in water (Lapointe et al., 2015; Wallace et al., 2015; Smith, 2016). Eutrophic waste waters are notorious for high amount of algal biomass with characteristic water blooming. Green algae are one of the common water blooming species, which are highly specialized microalgae adapted to various ecological habitats (Ramanan et al., 2016). Among the green algae. Chlorophytes is one of the largest phyla with many species and wide geographical distribution (Study et al., 2015; Tesson et al., 2016). Certain kinds of green algae are always common in many different kinds of eutrophic waters. Few species of green algae exhibit high photosynthetic efficiency and its lipid production magnitude is greater than that of terrestrial crops (Hu et al., 2008; Brownbridge et al., 2014). Many of them have the ability to produce substantial amounts of triacylglycerol as storage lipids (Selvarajan et al., 2015). These lipids have various applications in industry as renewable source of energy and fuel. The high yield and high deg

widely exploited in the production of biofuels Kenny and Flynn, 2014). Algal biomass protein

Page 1 /

energy demands (Ullah et al., 2014, 2015), and at the same time, algal cultivation is considered a fast process of carbon sequestration (Aresta et al., 2005; Wang et al., 2010; Barry et al., 2015), quite important in controlling the climate change.

Algae as aquatic species, don't need arable land for cultivation and grow abundantly in polluted freshwater systems (Pittman et al., 2011) so that space for agricultural crops will not be affected, if they are cultivated excessively. Cultivation of algae in polluted water is the best of tertiary treatment to clean the same, and the biomass and biofuel yield will be an additional economic benefit (Park et al., 2011; Makareviciene et al., 2014). Tertiary treatment of water aims at removal of non oxidizable dissolved materials in waste waters to the desired quality level. Variety of methods such as sedimentation, other physical and chemical removal, pH regulations as well as biological means of removal of nutrients are utilized in the process. Tertiary treatment is essential in the reuse of water for drinking and certain agriculture, industrial, recreational uses and water recharge purposes. Chinemahaticamenangere specially Chlorella species are already in use

Q .

wastewaters and are reported very efficient in Makareviciene et al., 2011; Mahapatra et al., Volume 2 No. 4 April - June 2017 155N 2454-5768

A STUDY ON THE EFFECTIVENESS OF TRAINING AND DEVELOPMENT OF EMPLOYEES PERFORMANCE IN KMML, CHAVARA, KOLLAM

Sebin Sebastian

Assistant Professor in contract St Dominic's College

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DISCERN

Savina Mary Antony Junior Accountant KMML

ABSTRACT

Training and Development refers to the imparting of specific skills, abilities and knowledge to an employee. This project is meant to have a proper outlook in the process of effectiveness of training and development in KMML. The study aims at identifying the current status of Training and Development process in KMML. Moreover it attempts to analyze the nature and importance of Training and Development and identify the various inputs that should go into the programme. The present study also attempts to find the different stages in Training and Development and to describe each step and also this study is intended to know whether there is any need for further improvement after detailed analysis. Exploratory research has been made with employee of KMML.

Strategies for Tourism Promotion and Marketing in Global Perspective - ISTPM 2K17 ROLE OF HUMAN RESOURCE IN PROMOTING A DESTINATION BRAND

Abyson Kurian, Assistant Professor, St. Dominic's College, Kanjirapally Sebin Sebastian, Assistant Professor, St. Dominic's College, Kanjirapally Sneha Emmanuel, Assistant Professor, Holycross College of Management & Technology, Idukki

Abstract

Tourism is now one of the world's largest industries and one of its fastest growing economic sectors. For many countries tourism is seen as a main instrument for regional development, as it stimulates new economic activities. As marketing is one of the key ingredients for any economic activity it plays an important role in tourism sector. In case of tourism or destination marketing the market offering is the entire travel experience. Through this study the researchers tries to analyze the role of human resource an important element in service marketing mix in promoting a destination brand, the unique image a destination creates in the mind of visitors. The study also aims to understand the importance of training and development activities to be undertaken among employees working in tourism sector and various problems faced by tourism service providers in managing the human resources. Keywords: Marketing mix, Destination brand, Destination marketing.



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63975	Abstract		Print This Page
7.95 impact factor calculated by Google scholar	This paper makes an attempt to evaluate the role of Mic empowerment of rural women. Hypotheses are developed to Micro Finance Institutions on empowerment of women for	cro Finance Institutions on the to evaluate the effectiveness of	
Unique Identifier	Microfinance has emerged as a powerful tool for women emp In India, micro finance distribution is mainly dominated by Se linkage programme through various Micro Einopee Institution	oowerment in the new economy. elf Help Groups (SHGs) – Bank	<u>Impact Factor:</u> 7.95

Role of Pradhanmanthri Jan Dhan Yojana as a Tool for Financial Inclusion

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Abstract

A large section of low income population is still reeling under the grip of informal financial system. For effective growth of economy it is necessary to involve those people in banking sector who are not having access to banking sector, so that they can avail benefits of banking services and facilities and can develop habits of small savings. Hon'ble Prime Minister Shri Narendra Modi announced a new scheme Pradhan Mantri Jan Dhan Yojana (PMJDY) on August 15, 2014 and launched it as a national mission for financial inclusion on August 28, 2014 as a land mark initiative that envisages universal access to banking facilities with at least one basic banking account for every household, financial literacy, access to credit, insurance and pension facility and thereby mitigating the ill effects of the earlier schemes, thus giving them dignity. financial freedom and financial stability that result in sustainable development and employment generation. This study makes an attempt to measure the effectiveness of PMJDY scheme in eliminating the financial inequalities in the economy and thereby pushing the growth of the Indian economy This paper depicts the status and progress report of PMJDY scheme, the extent to which it enables financial inclusion and the various challenges in the way of financial inclusion in India particularly in Kanjirappally Taluk as well as various steps taken by authorities to promote financial inclusion. Also this paper suggests the measures that should be taken to fill the gaps of inefficiencies. This study is based on both primary and secondary data. Primary data were collected from PMJDY account holders in Kanjirappally Taluk by using a well structured questionnaire and the secondary data were collected from books, journals, magazines and websites.100 respondents were selected as sample for this study using random sampling technique. Simple percentages, Friedman Test and Independent Sample t test were used for analyzing the data collected and testing of hypothesis.

Key words

Financial Inclusion, Financial literacy, Pradhan Mantri Jan-Dhan Yojana.

Summed of Applied Research 2018; 4(2): 218-219



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Effect of growth regulators on callus and multiple shoot formation of Datura metel L

Sallyknity Thomas

Abuman.

Effect of growth regulators on callus and multiple door formation was studied in Daniel moral L. The terretival had and avdal segments were cultured in MS basel medium assuming four different provels regulators such as 2.4-D. Kroete, 1AA and BA, MS mediate supplemented with constructions of 2mp2 kinetis and Imp? LAA showed perfase calks formation. Nodel segments also showed protore calks: formation when Mit rantical was supplemented with combinations of 1.5mg/l Kinetin and 2mg/l B.4. When combinations of Imp? Kinetic and Pagel BA wate given only nodel segments showed multiple shows throughout

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1. Introduction

Denses meter I. Socily called 'allo Unwarts' to an important made insi plant belongs to the family Solaraceae. This plan is disributed in India, common as a word, growing in water places and readvides. Indians have long been familiar with the sarrotic and interviousing properties of this drug plant. The entire plant is used as a revolution. Lances are simplealternate, dark green broadly evole, stationaly labed and glabroat. Flowers are large, unitary, and marper-shaped with a recent fragmater mostly appreciated in the mornings and evenings, with a wide range of colors, ranging from while to pellow and light to dark marrie-The flowers are heresaftrodie and are pollessed by inserts. The fast is in the form of a capault covered with short spines. A variety of phytochemicals have been found to occur in (3 matel, These shoto correct acres comprise alkalords, flavoreids, phenols, tamine, supervise and storols. The phyto-constituents of Danisa were analyzed from various parts of the plane Eko the leaf (Donatos and Epine in 2009) ^[4] sour (Jamehadel et al., 2010) and show (John De-Being at al., 2010 ¹⁰. The main points constituents of the pixet are the medicinally important suppose adultide hyperparates and supplement. The plant finds application in the assessment of clarifying and skin diseases. It is also used in the treatment of huma, Instatistical modules this is a reputed drug in the treatment of bigs from rabid drugs and in also used to care instrify. The drogs give good complexice, improves digestice and it is also auful is expiratory almenta, not allo, eye disease, theoretism and elephantaco. Room are also and for some in month, pain is chest, spilepty, consultives and small post Leason we used for dandroff, blinnes and bodyccile. Seeds are used for decaying tech, leaving and women's (Anomymous). The supermet formulations using the drug are kanadourous, that have i tailare, dear hampered extend of an instance out

that to its made and use the plant has been used for various research studies. There are extreme reports of toxas curbon analias in different species of Dataro. Areckinsary at al. (1998 2007) ^{11 II} appoint grees and compact cells from intervedial captures of D wood ca his coolian applemented with different concentrations of RAP Spon both were problemsed from the calls when mandared to the same modium with DAP. Fast should elongation and not proven as MS containing BAP 2.0 mpl, OA3 1.0 mpl and IDA L0 mpl. (Wednessmar # al., 2004) ** cultured the captains on MS medium with EXP (0.1-1.0 mpt); and NAA (0.5 MgT). The solid explants included from in the scatter exhibited a preserve number of builty multiple shows than in more (Akharaiyi, 2011) 17 amaped the antitescentral efficiency of crude accesses and othered extracts lead, shan bark and note of fit material 20 mg/soil against english climical bacterial inclusion

Biomass and Bioenergy 119 (2018) 155-165



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Research paper

Biomass yield and biochemical profile of fourteen species of fast-growing green algae from eutrophic bloomed freshwaters of Kerala, South India



BIOMASS & BIOENERGY

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Laboratory of Plant Science and Ecology, School of Biosciences, Mahatma Gandhi University, Kottayam, 686560, Keralu, India

ARTICLE INFO

Esyword: Algal-biomass Algal-protein Algal-lipid Bioorned-waters Microalgae Omega farty acids

ABSTRACT

Eutrophic, bloomed waters are known for fast-growing microalgae of high biomass yield. The biochemical composition of algae may vary from species to species. Identification of fast-growing local algal species, their experimental culture for assessing biomass yield and biochemical screening of the same for desirable metabolites is crucial to the prospects of algal technology. The freshwater algal diversity of Kerals - one of the biodiversity hotspots of the world, remains poorly explored. In this context, we assessed the yield and biochemical profile of hitherto uninvestigated 14 fast-growing microalgae of eutrophic bloomed freshwaters of Kerala. The biomass yield, carbohydrate, protein, pigment and lipid content of these species were significantly different. The alga Pseudococcomyze simplex showed the highest biomass yield of 196.5 \pm 3.04% increase L⁻¹ day⁻¹. The alga Kirchnerialle hmaris with 58.95% protein was found superior to the other algae in this regard. The species Scenefesmus obligans was significantly higher in total lipids (32.05% of dry biomass) than the other algae. The alga Monorophidium griffithii with 42.92% of omega groups of firtty acids in its lipid appeared a highly valuable species. The algae, Radiococcus nimbatus (12.77 ± 2.31 mg g⁻¹ of chlorophyll e), Myrmecia bisecta (5.87 ± 0.01 mg g⁻¹ of chlorophyll b) and Monorsphidium griffith (7.50 ± 0.02 mg g⁻¹ carotenoid) appeared superior to the others in pigment content. Fourier-Transform-Infrared Spectroscopy of the biodiesel prepared from the lipids of all the algae confirmed the biodiesel feasibility of the same. The bioresource potentials of the 14 algal species revealed are new to science.

1. Introduction

Many species of algae are well-known bioresources, especially for nutraceutically valuable compounds, oil and minerals [1]. Since thousands of years, several algae have been used as a direct source of human food or for the preparation of various kinds of nutrient-rich functional foods in different parts of the world [2]. In general, the nutritional value of many species of microalgae is quite high, as they contain a high proportion of proteins, carbohydrates, lipids and vitamins [3]. Today, many algae are commercially cultivated for food [4], nutraceutical [5] and biofuel purposes [6]. Algae have now emerged as a stable economic crop [7].

Isolation of species and production of specific biomolecules from algal biomass for food and feed [S] is not new. Many species of polyunsaturated fatty acid yielding green algae are currently used for the feedstock preparations in the aquaculture industry [9]. Algae, rich in essential fatty acids are beneficial in the treatment of some illness and

metabolic disorders in vertebrates [10-12] icological evaluations of specific algal bio



microalgae as a valuable feed supplement, which can easily replace the conventional protein supplements in animal feeds [13]. Algal proteins and other energy supplements from algal biomass form a prebiotic for enhancing production and maintaining the health of livestock [14]. In general, algae can provide a high yield of nutrient-rich biomass, which is readily convertible to animal feed at a minimum cost of production [15,16]. In addition to these aspects, certain green algal species are rich sources of pigments, antioxidants, vitamins, immune-stimulants as well as specific plant hormones such as the Chlorella-Growth-Factor compounds [17] for various human purposes and medicinal applications. Many species of algae with high photosynthetic efficiency can produce oil in the form of tri-acyl-glycerol as storage lipids [18], which are valuable in the biofuel industry as a renewable source of energy and fuel. The annual productivity and the lipid content of certain species of algae are found to be far higher than that of seed crops [19].

Currently, the biomass and biofuel extraction from algae is well soon as an industrially reliable process. Although reports on the

few limited numbers of species exist in the a large number of algae remain entirely

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Collaborations of Indian institutions which conduct mathematical research: A study from the perspective of social network analysis

Authors: 🔼 K. Reji Kumar, 🔔 Shibu Manuel Authors Info & Claims

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Partial Discharge Analysis via the Pathway Model

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Journal of Probability and Statistical Science 16(1), 25-35, Feb. 2018

Partial Discharge Analysis via the Pathway Model

Naiju M. Thomas

Centre for Mathematical Sciences & Banaras Hindu University

ABSTRACT We conduct a study on partial discharge phenomena in the field of electrical engineering, using statistical techniques. Partial discharges are localized electrical discharges that behave as a sequence of electrical stress concentrations in insulation material or on the surface of the insulation. We use the pathway probability model for the statistical analysis. The density function of the amplitude of the pulses which are emitted during the partial discharge process, expressed in units of charge, is obtained. A real data analysis is made in order to corroborate the results developed. A statistical study on the location of the partial discharge, measured at different time points, is carried out, a graphical representation of its distribution for the different values of the parameters is provided and based on that, a new generalized integral form of the density function of the amplitude of the pulses is defined.



Optics & Laser Technology

Volume 105, September 2018, Pages 207-220



Full length article

An experimental and computational approach to electronic and optical properties of Diglycine barium chloride monohydrate crystal: Applications to NLO and OLED

Jesby George ª, D. Sajan ª 🝳 🖾 , Javeesh Alex ª, Arun Aravind ª, G. Vinitha ^b, R. Chitra ^c

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Issue 6, 2018

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From the journal: New Journal of Chemistry

Directional growth, physicochemical and quantum chemical investigations on pyridinium 2-carboxylate: 4nitrophenol (P2C4N) single crystal for nonlinear optical (NLO) applications †



<u>V. Sivasubramani</u>, ^(b) *^a <u>Jesby George</u>,^b <u>M. Senthil Pandian</u>,^a <u>P. Ramasamy</u>,^a <u>P. Pounraj</u>,^a <u>K. K.</u> <u>Maurya</u> ^c and <u>D. Sajan</u> ^b

Author affiliations



Abstract

Some Properties of Soft Inverse Semigroups

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DOI : http://dx.doi.org/10.29055/jcms/1076

ABSTRACT

The concept of soft set theory is a general mathematical tool for dealing with uncertainty and vagueness. In this paper, we introduce the concept of soft sets to inverse semigroups and investigate some properties of soft inverse semigroups. We give a relation connecting soft inverse semigroups and soft groups. AMS Classification: 20M18, 03E75, 06D72.

Keywords : Inverse semigroups, soft inverse semigroups, soft inverse subsemigroups.

Back

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IMPACT OF WTO REFORMS ON INDIAN CARDAMOM

Dr. Jaimol James

, Asst Professor, Department of Economics, St.Dominic's College, Kanjirappally

ABSTRACT

Cardamom, the queen of spices, is native to the Evergreen forest of Western India. Until the mid of 1980's, India has the monopoly in cardamom trade. However, after that its exports as well as production started declining. Once the leading producer and exporter of cardamom, India now struggles to stand in the field of trade. Cardamom economy in Kerala confronted many challenges both in production and in price front. Media in the country and also the growers and traders of the crop argued that the trade liberalization policy adopted by India put the cardamom economy in to its present situation. So this study made an attempt to analyze the various provisions under W.T.O relates to cardamom economy and how it affects this sector. India should take the advantage of the different provisions of the W.T.O. agreements related to spices trade and for that, an efficient bureaucracy and enlightened farmers and traders should emerge.

Keywords: AoA (Agreement on Agriculture), TRIPS (Trade Related Intellectual Property Rights)GIS (Geographical Indications), CBD (Convention On Biological Diversity), TRIMS (Trade Related Investment Measures) SPS(Sanitary and Phyto-Sanitary measures).



INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

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ANTIBACTERIAL AND PHYTOCHEMICAL STUDIES ON THE LEAVES OF ADENOCALYMMA ALLIACEUM MIERS.

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Journal of Photochemistry and Photobiology A: Chemistry Volume 371, 15 February 2019, Pages 91-97

Phase transfer reaction for the preparation of stable polymer-quantum dot conjugates

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Experimental and theoretical studies on bifurcated hydrogen bonded NLO active material of pure and crystal violet dyedoped L-argininium bis dihydrogen phosphate

Reena Ittyachan ^a ♀ ⊠, Jesby George^b, Ligi Cherian ^c, Lynnette Joseph^b, D. Sajan^b ♀ ⊠, G. Vinitha^d

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<u>G.P. Sheeja Mol</u>^{a b}, <u>D. Aruldhas</u>^b ♀ ⊠, <u>I. Hubert Joe</u>^c, <u>S. Balachandran</u>^d, <u>A. Ronaldo Anuf</u>^e, <u>Jesby George</u>^f

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Jesby George ª, Merin George ª, Javeesh Alex ª, D. Sajan ª 🝳 🖾 , N.K. Shihab ^b, G. Vinitha ^c, R. Chitra d

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Reena Ittyachan ^a A 🖂 , Jesby George ^b, Ligi Cherian ^c, Lynnette Joseph ^b, D. Sajan ^b A 🖂 , G. Vinitha^d





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ECONOMIC VIABILITY OF CARDAMOM CULTIVATION IN KERALA

Dr. JAIMOL JAMES ASSISTANT PROFESSOR, DEPARTMENT OF ECONOMICS

St. DOMINIC'S COLLEGE, KANJIRAPALLY, MAHATMA GANDHI UNIVERSITY

ABSTRACT : Cardamom , the Queen of spices , deserves special attention in Kerala economy in recent times. It fetches a historical hike in its price ranging up to Rs.5000/ Kg for higher grade variety. There are mainly two factors on which the price and profitability of this crop depends; first the international production and the second is the climatic condition. Since the demand is seemed to be almost consistent, it is the conditions of supply that matter. The volatility in the price of cardamom negatively affects all its stakeholders mainly farmers, traders and exporters .As most of the cultivators in the field belongs to small and marginal category, the question here is whether they would be

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SOCIO-ECONOMIC IMPACT OF JALANIDHI PROJECT; A CASE STUDY IN THE PARATHODU GRAMA PANCHAYAT, KANJIRAPALLY, KERALA

Sandra Mathews, Dr Jaimol James

Abstract: Safe drinking water is one of the basic fundamental right of a human being. And it is the duty of the a democratic government to ensure the same to its citizens. Jalanidhi is a World Bank assisted "Kerala Rural Water Supply and Sanitation Project" for the prompt delivery of adequate quantity of water and sanitation implemented. The project introduced some reforms in rural water supply sector and is based on principles such as demand responsiveness, community ownership and sustainability of investments through cost recovery and participatory operations and management. The study concludes that the Jalanidhi project can be considered as beneficial not only from the economic point of view but also it improves the self esteem the vulnerable sections of the society.

Keywords: Jalanidhi, Kerala Rural Water Supply and Environmental Sanitation Project, solid waste management, Samitis.

Title: SOCIO-ECONOMIC IMPACT OF JALANIDHI PROJECT; A CASE STUDY IN THE PARATHODU GRAMA PANCHAYAT, KANJIRAPALLY, KERALA

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M. S. Sajna, V. P. Prakashan, M. S. Sanu, G. Vimal, P. R. Biju, Cyriac Joseph, V. P. Mahadevan Pillai & N. V. Unnikrishnan

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Volume 1221, 5 December 2020, 128866

Spectroscopic and molecular structure investigation of Propachlor herbicide: A combined experimental and theoretical study

<u>N. Suma</u>^{a b}, <u>D. Aruldhas</u>^b <u>A</u> <u>M</u>, <u>I. Hubert Joe</u>^c, <u>B.S. Arun Sasi</u>^d, <u>A. Ronaldo Anuf</u>^e, <u>G.P. Sheeja Mol</u>^f, <u>S. Balachandran</u>^g, <u>Jesby George</u>^h

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N. Suma ^{a b}, D. Aruldhas ^b A M, I. Hubert Joe^c, S. Balachandran ^d, A. Ronaldo Anuf^e, Arun Sasi^f, Jesby George^g

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Crystal growth and nonlinear optical properties of guanidinium carbonate single crystals for optical limiting applications ♀

Jesby George 🖂



+ Author & Article Information AIP Conference Proceedings 2265, 030398 (2020)

RESEARCH ARTICLE | NOVEMBER 05 2020

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Guanidinium Carbonate (GC), an organic third order NLO single crystal has been successfully grown in water solution by slow evaporation technique. The crystalline purity of the crystal was measured by nowder X-ray diffraction technique. Photoluminescence studies confirm blue emission which leads to

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RELAXATION AND REENERGIZING THROUGH HEALTH TOUR

Honey Thomas

Assistant Professor, Research and P.G. Department of Commerce St. Dominic's College, Kanjirapally, Kottayam Dist. Kerala E.mail: honeythomas23@gmail.com

ABSTRACT

Kerala Tourism is having a global presence and with its clear strategy for growth and marketing activities, it has gained a lot of tourists from all over the world, especially fro UK, USA, France and Australia. Kerala Tourism is to position itself as a global destination tourism, based on the advantage of the local resources, thereby attracting investmen resulting in sustainable development for the people of Kerala. An equable climate, a shoreline with serene beaches, tranquil stretches of emerald backwaters, lush gree stations and exotic wildlife, waterfalls, sprawling plantations and paddy fields, Ayur health holidays, enchanting art forms, magical festivals, historic and cultural monuments exotic cuisines, make Kerala a unique experience.

Key words: Ayurveda Tourism, Wellness tourism, Medical Tourism, Yoga and Naturopati

Kerala has been well-known for its practice of Ayurveda for hundreds of y Ayurveda is the traditional health science of India. The word 'Ayurveda' means 'Scien Life' which explains the knowledge of various guidelines to be followed to keep one health Kerala, Ayurveda is not just a healthcare system, but part and parcel of every aspect of lit fact, it is a lifestyle in Kerala so to speak. Travellers from the western world have been co here for spiritual and physical awakening ever since the Beatles made their sojourn to lac the mid 1960s. Ayurveda is popular in the UK, France, Spain, Italy, Germany and few countries like Saudi Arabia and UAE. However, the largest number of tourists coming to for Ayurveda is from Germany. The growth rate of tourists flocking for Ayurveda is increa every year at a rate of around 20-25 per cent. The backwater of Kerala is a unique feature of State and is found nowhere else in the world. Backwaters are a network of lakes, canals, estuaries and deltas of 44 rivers that drain into the Arabian Sea. The backwaters of Kerala self supporting eco-system teeming with aquatic life. The canals connect the villages togs and are still used for local page part. /Kegala's haclouter offer a spectacular opportunity a the State and can be easily traversed by boat. Houseboat rentals are very popular

CELEBRITY ENDORSEMENT AND PRODUCT LIABILITY

Honey Thomas

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Dr. Jacob Thomas Research Guide, Department of Commerce S.B. College, Changanacherry, Kottayam Dist.

ABSTRACT

Sales promotion through advertisements is a well established practice in modern business world and there is no point in going into its merits and demerits. Also, much has been written on the need to regulate the advertisement sector as such in order to protect the gullible customers from falling prey to misleading advertisements. So much so that most of the countries have framed rules in this regard and India is no exception to this. Advertising Standards Council of India (ASCI) was established in the year 1985 to deal with complaints against such advertisements which are indecent, false, misleading, illegal and leading to unsafe practices or unfair to competition. There are many laws which contain provisions regulating certain type of advertisements. Also there are certain laws like, The Indian Contract Act, 1872, The Sale of Goods Act, 1930 and the Consumer Protection Act, 1986, which tend to protect the interests of deceived consumers and provide cause of action to them apart from the guidelines prescribed by the Supreme Court of India through a series of decisions. There are various practical difficulties in invoking the laws and regulating the menace. In India there is no specific statute which governs product liability claims. But the concept product liability is incorporated under Chapter VI of the new Consumer Protection Act 2019 and an effort is made by the Indian legal system to control the issues relating to celebrity endorsements.

Key Words: Celebrity Endorsement, Product Liability, Product, Service, Consumer, Sales, Advertisement, Liability

INTRODUCTION

Common people have a strong emotional bond towards their favourite personalities whom they treat as their idol. They are deeply impressed by their words and when they get the message of these celebrities recommending some product or service, they become inclined to purchase it without going in to merits or demerits thereof. This area is the 'Celebrity Endorsement' of products and services. When eminent personalities, recognized for their contribution in any area directly connected to the public at large, like Cinema, Television, Music (Classical also, of late), Sports (mostly Cricket and Tennis) etc., take some deliberate action on their part, aiming at the target audience, with an intention to encourage

Media of Intellectual Reading and Research Of Researchers 64

MIRROR Vol.10 No.1 March 2020 MIKIN 2020 Miking Journal ISSN 2249-8117

the sale of the sponsored products or services through them, such act may fall into the category of the sale of the sale of the following ways. Celebrity Endorsement. It may be in any one or more of the following ways.

(1). Through messages in personal capacity

This is the most controversial form of celebrity endorsement when the celebrities try to convey the message that the sponsored products or services are being personally used by them and have the message in development of one or more traits in them, which is usually one, they are known in the contributed in divertisements showing a form contributed in advertisements showing a famous athlete getting tired on the ground, then regaining public to be the source of his energy and thereby secret of his success, is an example of such endorsements.

(2).Through messages as model

In this form of endorsement, celebrities give a direct message to target audience, recommending use of the sponsored products or services but as an actor not as a person. TV advertisement showing an actress in the role of a house maid, praising the qualities of a washing powder, falls in to this category.

(3).Giving public appearances

In some cases, celebrities give a deliberate public appearance with an intention to attract the attention of the viewers at the sponsored products or services. Using car of a particular brand with its logo prominently inscribed on it, in a manner which is not usual, while arriving to participate in some public function, falls in to this category.

(4).Attending events

Inaugurating factories, show-rooms, offices etc. by celebrities, on special invitation, to spread an impression among public, of some connection of the celebrity with that factory, showroom, or office, is covered under this category. This is the least controversial form of celebrity endorsement, if nothing is specifically suggested by the celebrity regarding goods or services.

(5).Authorizing use of name etc.

Authorizing use of their names, photographs or messages by the celebrities in relation to such products or services is covered under this category.

How it Boosts the Sales of Products or Services

Common people have a strong emotional bond towards their favourite personalities whom they treat as their ideal. They are deeply impressed by their words and when they get the message of these celebrities recommending some product or service, they become inclined to purchase it without going in to merits or demerits thereof. Also, the fans of these celebrities, specially the youngsters, get mesmerized with the glamour surrounding them and want to follow the footsteps of their role models in a bid to become one like them overnight. Hence when the celebrities claim in the advertisements that they have been able to achieve success after using the given product or service, they are induced to procure the same in order to achieve the same level of success as the celebrity has acquired.

Some Examples of Offending Celebrity Endorsements

The list of such type of offending advertisements in which the statements or actions of the participating celebrities seem to show clear intention of exploiting the public sentiments or encash the faith reposed in them by public, to serve the interests of the businesses retaining them and ultimately of their own, is very large. Here some examples may be sufficient to bring the point home -

A renowned Cricketer claiming some health drink to be the source of his energy, while the background 1. he comes from, clearly indicates that he has been brought up in a natural environment which appears to be the real source of his energy. Had the celebrity merely claimed that this drink contains elements needed to keep the body in a state of fitness, it could have been accepted for once. But claiming that he has got his energy from that drink is a clear case of misleading the public who may purchase the

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Jesby George<sup>a</sup>, A.K. Thomas<sup>b</sup>, D. Sajan<sup>a</sup> ♀ ⊠, S. Sathiyamoorthi<sup>c</sup>, P. Srinivasan<sup>d</sup>, Nithin Joy<sup>e</sup>, Reji Philip<sup>e</sup>
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Abstract

μ - Graph of a Finite Group

Rani Jose^{#1}, Dr. Susha D^{*2}

^{#1} Department of Mathematics, St. Dominics College, Kanjirapally-686512, Kerala, India. ^{*2} Research Supervisor, Department of Mathematics, Catholicate College, Pathanamthitta - 689645, Kerala; India.

Abstract: μ - graph of a finite group G is a graph whose vertex set is same as G itself and two vertices x, y are adjacent if and only if $\mu(|x|/|y|) = \mu(|x|) \mu(|y|)$. The objective of this paper is to introduce μ – graph of a finite group and discuss some of its properties.

Keywords - Adjacency matrix, Eigen value, Energy, Mobius function, μ – graph of a finite group

I. INTRODUCTION

Studies in group theory and graph theory play a crucial role in modern mathematics. Associating a group to a graph can be done in different ways and it is available in literature. Graph theory in mathematics is the most explored research field mainly because of its applications in different areas like chemistry, biology, physics, engineering and computer science. One of the important mathematical tool used for learning symmetries comprises group theory. They are usually connected to automorphisms of graphs. Studies in both the branches act a crucial role in modern mathematics.

A deep analysis of algebraic structure by graphs may unfold interesting results in the area of algebraic graph theory. We can associate a group to graph in many ways. One such method is by using order of the elements of the group. In [9], M. Sattananathan and R. Kala defined the Order Prime Graphs of a finite groups and studied some properties of order prime graphs. Further Ma et al [6] presented the order prime graph of finite group, they are known as Coprime Graphs. Also in [1], R. H. Aravinth and R. Vignesh introduce the Mobius function graph M_n (G).

The aim of this paper is to introduce the concept of mobius function in connection to order of elements of a group. Here we try to define a new graph namely μ – graph of finite group and investigate some of its properties. In section 2 we try to remember some of the basic concepts. Section 3 we try to introduce a new graph namely μ – graph of finite group with an example. Then in section 4 we deal with some properties of μ – graph. In section 5 we discuss about the eigen values of μ - graph.

II. PRELIMINARIES

Here we are going to give a fast out look to the definitions and theorems which we are useful in the upcoming sections.

Definition 2.1:[10] The Mobius function μ is defined as follows:

 $\mu (1) = 1$ If n > 1, write n = $p_1^{a_1} p_2^{a_2} \dots p_k^{a_k}$. Then $\mu(n) = \begin{cases} (-1)^k & \text{if } a_1 = a_2 = \dots = a_k = 1\\ 0 & \text{otherwise} \end{cases}$

Definition 2.2:[7] For a pair of vertices u and v of a graph G, the length of any shortest path between u and v of a connected graph G is called the distance between u and v and is denoted by d(u, v).

The diameter of G is defined as max {d (u, v)| $u, v \in V(G$)} and is denoted by diam(G). **Definition 2.3:**[3,4] Let G be a graph with n vertices $v_1, v_2, ..., v_n$. Then the adjacency matrix, A = A (G) is a square matrix of order n whose (i,j)- entry is defined as

$$A_{i,j} = \begin{cases} 1 & \text{if } v_i \text{ adjacent to } v_j \\ 0 & \text{otherwise} \end{cases}$$

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Careers in sports management



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Careers in sports management

Dr. Joji M Philip and Praveen Thariyan

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Abstract

Sports management is a branch of knowledge that is directly involved in sports and recreation. It becomes a discipline of academic interest and deals with areas such as administration, finance, law, and ethics. There are different aspects of sports management. Those interested in the financial and financial aspects of the sports world may consider focusing their studies on finance and related subjects. Similarly, sports managers who want to work in international sports organizations should take courses such as international marketing. Advertising of various sports leagues in various sports in India started a world of possibilities and increased the scope of activities. A special achievement of a degree in sports management is a range of career paths to choose from. From traditional career options such as athletic coaches, athletic administrators, player or coach agents to sports organizations, team managers, coaches, or even a sports event planner to retail sales and branding, the scope of the situation varies. Developing countries like India can take advantage of the immense potential of the sports world by promoting sports management.



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ANTECEDENTS OF WORD OF MOUTH ADOPTION IN MOTION PICTURE INDUSTRY

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ABSTRACT

Word-of-mouth plays a crucial role in the success of theatrical motion pictures. Motion pictures', being artistic and experiential in nature, assessment ambiguity is the greatest challenge before the movie-goer. Before watching a new release, movie-goers' collect all the necessary information for arriving at a purchase decision. Movie-goers' prefer the opinion of others as they are considered to be more reliable than various industry initiated promotion activities. This study tries to identify the antecedents of word-of-mouth adoption in the motion picture industry. Source trustworthiness, credibility, expertise, homophily and tie strength were identified as the major antecedents of word-of-mouth adoption in the motion picture industry based on the findings of the earlier studies in this field. Also a theoretical model that can be empirically established is added to the existing literature.

Keywords: Word-of-Mouth, Motion Picture Industry, Trustworthiness, Credibility, Expertise, Homophily, Tie Strength.

Introduction

The evolution of word-of-mouth (WOM) can be traced back to the origin of mankind. Hence, WOM is considered to be the oldest and at the same time the most commonly used medium of communication among people (Ismagilova et al., 2017). However it was only in the late 1950's, the researchers started discussing its products or services for taking a favorable purchase decision. In the case of an intangible or experiential product, the only option before the buyer to have a quality assessment prior to purchase is to engage in WOM (Zhang, 2016).

Movie selection by audience to a great extent depends on the words of other movie-goers' (Mishra et al., 2016). WOM is detrimental in Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/ Journal of Tianjin University Science and Technology ISSN (Online): 0493-2137 E-Publication: Online Open Access Vol:54 Issue:10:2021 DOI: 10.17605/OSF.IO/Y9CM4

ROLE OF TIE STRENGTH IN WORD-OF-MOUTH RECEPTIVENESS AND MOVIE PROMOTION: EVIDENCE FROM INDIAN MOTION PICTURE INDUSTRY

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Abstract

Word-of-mouth plays a crucial role in shaping consumer buying behavior. Performance of motion picture industry is highly susceptible to the occurrence of word-of-mouth. One of the main factors that decide the receptiveness of word-of-mouth is the perceived social relationship between the source and the recipient. This study investigates the role of tie strength in the word-of-mouth receptiveness and movie promotion among the Indian movie-goers. 868 movie-goers were selected using multi-stage random sampling technique from the state of Kerala, India. Findings reveal that young movie-goers are more receptive to word-of mouth than older movie-goers. For frequent movie-goers, monthly income is found to be insignificant with their word-of-mouth receptiveness. The strength significantly influence the movie-goer's word-of-mouth receptiveness and it act as a moderating variable between word-of-mouth receptiveness and movie-going intention. When compared to weak-tie, strong-tie exerts a greater influence on word-of-mouth receptiveness.

Keywords: Word-of-mouth, word-of-mouth-receptiveness, motion picture industry, tie strength, strong tie, weak tie

1. Introduction

Indian Motion Picture Industry (MPI) is the biggest in the world in terms of number of films it produces annually and second in terms of annual theatrical admissions just behind China (Jain et al., 2016; Shankar & Ram, 2021). This industry comprises of several sub-set on the basis of numerous linguistic groups in India. According to a report published by Deloitte in 2016, the Indian box office revenue of 138 billion is expected to mark an 11 percent CAGR, crossing 238 billion by 2020 (Jain et al., 2016). The Malayalam MPI commonly known as '*mollywood*' occupies fourth position in the country in terms of revenue generation (Statista Research Department, 2021). The key growth drivers consist of increasing number of multiplexes in rural and semi urban cities, growing number of middle class with more disposable income, digitization and

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WORD-OF-MOUTH MARKETING AND DIGITAL STREAMING: A SUSTAINABLE SOLUTION FOR COVID DROWN INDIAN MOTION PICTURE INDUSTRY?

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ABSTRACT

Indian Motion Picture Industry (MPI) has been heavily affected by COVID-19. Movie houses were closed following the lockdown announced by the governments. Even though the unlock process has started, watching new releases in theaters will be a distant dream for Indian moviegoers'. Understanding the reality and exploiting the online infrastructure of the country, movie producers started harnessing the possibility of Word-of-Mouth Marketing (WOMM) for movie promotion and Digital Streaming (DS) for content delivery. This study examines how WOMM and DS platforms lead to the revamping of the lost glory of Indian movies through Technology Acceptance Model (TAM). COVID-19 restrictions and WOMM have induced movie-goers to have a try for DS. Perceived Ease of Use (PEOU) and Perceived Usefulness (PU), TAM variables, have moderated the adoption of over the top (OTT) platforms by the Indian moviegoers. The contribution of this conceptual paper to the academic community is a customized TAM for DS in the Indian context. The empirical establishment of the proposed model will bring a turmoil over the traditional believes of Indian MPI.

Key Words: COVID-19, Indian Motion Picture Industry, Word-of-Mouth-Marketing, Digital Streaming, Over the Top Access through your institution

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Growth, Quantum Chemical Computations, NLO and Spectroscopic Studies of 2-Amino 5-Chloro Pyridine Single Crystal in Comparison with Certain Aminopyridine Derivatives.

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WORKING CONDITIONS OF UNORGANISED WORKERS: ISSUES AND SOLUTIONS: A CASE STUDY OF UNORGANISED WORKERS IN ERNAKULAM DISTRICT

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ABSTRACT

Unorganised labour market constitutes a vast segment in any society, whether it is in developed or developing countries. India is an emerging economy with 460.43 million workers in 2011-12. Unorganised workers suffer from access to imperfect information and not fully aware of their legal rights. This led to the bad condition of work like long working hours, hazardous nature of work, absence of safety conditions and above all poor wage rates, 93 % of India's workforce is working as unorganised workers have not been benefited growth. Kerala constitutes a major share of unorganised workers in the country. It is identified that this sector is severely exploited in the workplace in different forms. The proposed study is to discuss the issues associated with the working condition of unorganised workers in the urban areas of the Ernakulum district of

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Kerala Scheduled Caste and Scheduled Tribe Sub Plan outlay on Social Welfare and Poverty Alleviation

Abstract :

This paper presents the trends in public expenditure for social welfare activities and poverty alleviation programs for the Scheduled Caste and Scheduled Tribe population of the state. The data collected from 2011 till 2019 shows that the fund allocation and utilization has increased over the years, thus resulting to the better livelihood of SC/ST population. A two pronged strategy followed by the state government shows the state interest in the upliftment of the weaker sections. The role of Local Self Government institution in supporting the SC/ST population has got special importance in this study and a case study is conducted in Kanjirapally Grama Panchayat. An important finding of the study is that the public fund allocation and utilization has a positive impact in the rural livelihood and employment generation programs. Kerala Government earmarks fund for Scheduled Caste Sub Plan (SCSP) from State Plan outlay in proportion to the percentage population of Scheduled Caste, and allocates fund for Tribal Sub Plan (TSP) more than that of ST population percentage. A two pronged strategy is followed for the

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Article Isolation and In Silico Inhibitory Potential against SARS-CoV-2 RNA Polymerase of the Rare Kaempferol 3-O-(6"-O-acetyl)-Glucoside from Calligonum tetrapterum

Yerlan M. Suleimen ^{1,2}, Rani A. Jose ^{3,4}, Gulnur K. Mamytbekova ⁵, Raigul N. Suleimen ^{5,*}, Margarita Y. Ishmuratova ⁶, Wim Dehaen ³, Bshra A. Alsfouk ⁷, Eslam B. Elkaeed ⁸, Ibrahim H. Eissa ⁹ and Ahmed M. Metwaly ^{10,11,*}

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Abstract: The phytochemical constituents of Calligonum tetrapterum Jaub. & Spach (Family Polygonaceae) were studied for the first time. The study resulted in the isolation of the rare flavonol glycoside, kaempferol 3-O-(6"-O-acetyl)-glucoside,(K3G-A). The potential inhibitive activity of K3G-A toward SARS-CoV-2 was investigated utilizing several in silico approaches. First, molecular fingerprints and structural similarity experiments were carried out for K3G-A against nine co-crystallized ligands of nine proteins of SARS-CoV-2 to reveal if there is a structural similarity with any of them. The conducted studies showed the high similarity of K3G-A and remdesivir, the co-crystallized ligand of SARS-CoV-2 RNA-dependent RNA polymerase (PDB ID: 7BV2), RdRp. To validate these findings, a DFT study was conducted and confirmed the proposed similarity on the electronic and orbital levels. The binding of K3G-A against RdRp was confirmed through molecular docking studies exhibiting a binding energy of -27.43 kcal/mol, which was higher than that of remdesivir. Moreover, the RdRp-K3G-A complex was subjected to several MD studies at 100 ns that authenticated the accurate mode of binding and the correct dynamic behavior. Finally, in silico ADMET and toxicity evaluation of K3G-A was conducted and denoted the safety and the drug-likeness of K3G-A. In addition to K3G-A, two other metabolites were isolated and identified to be kaempferol (K) and β -sitosterol (β -S).

Keywords: *Calligonum tetrapterum;* SARS-CoV-2 RNA-dependent RNA polymerase; structural similarity; DFT; molecular docking; ADMET; MD simulations



Citation: Suleimen, Y.M.; Jose, R.A.; Mamytbekova, G.K.; Suleimen, R.N.; Ishmuratova, M.Y.; Dehaen, W.; Alsfouk, B.A.; Elkaeed, E.B.; Eissa, I.H.; Metwaly, A.M. Isolation and In Silico Inhibitory Potential against SARS-CoV-2 RNA Polymerase of the Rare Kaempferol

3-O-(6"-O-acetyl)-Glucoside from Calligonum tetrapterum. Plants 2022, 11, 2072. https://doi.org/10.3390/ plants11152072

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Article Isolation and In Silico SARS-CoV-2 Main Protease Inhibition Potential of Jusan Coumarin, a New Dicoumarin from Artemisia glauca

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Abstract: A new dicoumarin, jusan coumarin, (1), has been isolated from *Artemisia glauca* aerial parts. The chemical structure of jusan coumarin was estimated, by 1D, 2D NMR as well as HR-Ms spectroscopic methods, to be 7-hydroxy-6-methoxy-3-[(2-oxo-2H-chromen-6-yl)oxy]-2H-chromen-2-one. As the first time to be introduced in nature, its potential against SARS-CoV-2 has been estimated using various in silico methods. Molecular similarity and fingerprints experiments have been utilized for **1** against nine co-crystallized ligands of COVID-19 vital proteins. The results declared a great similarity between Jusan Coumarin and **X77**, the ligand of COVID-19 main protease (PDB ID: 6W63), M^{pro}. To authenticate the obtained outputs, a DFT experiment was achieved to confirm the similarity of **X77** and **1**. Consequently, **1** was docked against M^{pro}. The results clarified that **1** bonded in a correct way inside M^{pro} active site, with a binding energy of -18.45 kcal/mol. Furthermore, the ADMET and toxicity profiles of **1** were evaluated and showed the safety of **1** and its likeness to be a drug. Finally, to confirm the binding and understand the thermodynamic characters between **1** and M^{pro}, several molecular dynamics (MD) simulations studies have been administered. Additionally, the known coumarin derivative, 7-isopentenyloxycoumarin (**2**), has been isolated as well as β -sitosterol (**3**).

Keywords: *Artemisia glauca;* jusan coumarin; new dicoumarin; COVID-19 main protease; molecular similarity; structure fingerprint; DFT; ADMET; toxicity; molecular dynamics



Citation: Suleimen, Y.M.; Jose, R.A.; Suleimen, R.N.; Ishmuratova, M.Y.; Toppet, S.; Dehaen, W.; Alsfouk, A.A.; Elkaeed, E.B.; Eissa, I.H.; Metwaly, A.M. Isolation and In Silico SARS-CoV-2 Main Protease Inhibition Potential of Jusan Coumarin, a New Dicoumarin from *Artemisia glauca. Molecules* **2022**, *27*, 2281. https://doi.org/10.3390/ molecules27072281

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Jusanin, a New Flavonoid from *Artemisia commutata* with an In Silico Inhibitory Potential against the SARS-CoV-2 Main Protease

Yerlan M. Suleimen ^{1,2}^(D), Rani A. Jose ^{3,4}, Raigul N. Suleimen ^{5,*}, Christoph Arenz ⁶(D), Margarita Y. Ishmuratova ⁷(D), Suzanne Toppet ³, Wim Dehaen ³(D), Bshra A. Alsfouk ⁸(D), Eslam B. Elkaeed ⁹(D), Ibrahim H. Eissa ¹⁰(D) and Ahmed M. Metwaly ^{11,12,*}(D)

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Abstract: A new flavonoid, Jusanin, (1) has been isolated from the aerial parts of Artemisia commutata. The chemical structure of Jusanin has been elucidated using 1D, 2D NMR, and HR-Ms spectroscopic methods to be 5,2',4'-trihydroxy-6,7,5'-trimethoxyflavone. Being new in nature, the inhibition potential of 1 has been estimated against SARS-CoV-2 using different in silico techniques. Firstly, molecular similarity and fingerprint studies have been conducted for Jusanin against co-crystallized ligands of eight different SARS-CoV-2 essential proteins. The studies indicated the similarity between 1 and X77, the co-crystallized ligand SARS-CoV-2 main protease (PDB ID: 6W63). To confirm the obtained results, a DFT study was carried out and indicated the similarity of (total energy, HOMO, LUMO, gap energy, and dipole moment) between 1 and X77. Accordingly, molecular docking studies of 1 against the target enzyme have been achieved and showed that 1 bonded correctly in the protein's active site with a binding energy of -19.54 Kcal/mol. Additionally, in silico ADMET in addition to the toxicity evaluation of Jusanin against seven models have been preceded and indicated the general safety and the likeness of Jusanin to be a drug. Finally, molecular dynamics simulation studies were applied to investigate the dynamic behavior of the M^{pro}-Jusanin complex and confirmed the correct binding at 100 ns. In addition to 1, three other metabolites have been isolated and identified to be capillartemisin A (2), methyl-3-[S-hydroxyprenyl]-cumarate (3), and β-sitosterol (4).

Keywords: Artemisia commutata; new flavonoid; Jusanin; COVID-19 main protease; molecular similarity; DFT; molecular docking; ADMET; toxicity; molecular dynamic simulations



Citation: Suleimen, Y.M.; Jose, R.A.; Suleimen, R.N.; Arenz, C.; Ishmuratova, M.Y.; Toppet, S.; Dehaen, W.; Alsfouk, B.A.; Elkaeed, E.B.; Eissa, I.H.; et al. Jusanin, a New Flavonoid from *Artemisia commutata* with an In Silico Inhibitory Potential against the SARS-CoV-2 Main Protease. *Molecules* **2022**, *27*, 1636. https://doi.org/10.3390/ molecules27051636

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Article Isolation and In Silico Anti-SARS-CoV-2 Papain-Like Protease Potentialities of Two Rare 2-Phenoxychromone Derivatives from Artemisia spp.

Yerlan M. Suleimen ^{1,2}, Rani A. Jose ³, Raigul N. Suleimen ^{4,*}, Christoph Arenz ⁵, Margarita Ishmuratova ⁶, Suzanne Toppet ³, Wim Dehaen ³, Aisha A. Alsfouk ⁷, Eslam B. Elkaeed ⁸, Ibrahim H. Eissa ⁹, and Ahmed M. Metwaly ^{10,11,*}

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Abstract: Two rare 2-phenoxychromone derivatives, 6-demethoxy-4'-O-capillarsine (1) and tenuflorin C (2), were isolated from the areal parts of *Artemisia commutata* and *A. glauca*, respectively, for the first time. Being rare in nature, the inhibition potentialities of 1 and 2 against SARS-CoV-2 was investigated using multistage in silico techniques. At first, molecular similarity and fingerprint studies were conducted for 1 and 2 against co-crystallized ligands of eight different COVID-19 enzymes. The carried-out studies indicated the similarity of 1 and 2 with TTT, the co-crystallized ligand of COVID-19 Papain-Like Protease (PLP), (PDB ID: 3E9S). Therefore, molecular docking studies of 1 and 2 against the PLP were carried out and revealed correct binding inside the active site exhibiting binding energies of -18.86 and -18.37 Kcal/mol, respectively. Further, in silico ADMET in addition to toxicity evaluation of 1 and 2 against seven models indicated the general safety and the likeness of 1 and 2 to be drugs. Lastly, to authenticate the binding and to investigate the thermodynamic characters, molecular dynamics (MD) simulation studies were conducted on 1 and PLP.

Keywords: Artemisia commutate; 2-phenoxychromones; SARS-CoV-2; COVID-19 Papain-Like Protease; molecular docking; molecular fingerprints; ADMET; MD simulations



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