



A Preliminary Screening for Isolation of Lovastatin Producing Unknown Fungi from Forest Region Pachmarhi, M.P. India

Shadma Siddiqui*¹, Renu Mishra²

Abstract

The present investigation was intended to explore certain Lovastatin producing soil fungi from forest regions of Pachmarhi Bioserve of M.P in Central India. Many microorganisms survive in soil and produce enthralling and structurally complex bioactive products of pharmaceutical importance. Lovastatin is an interesting fungal metabolite and world widely prescribed drug to combat hypercholesterolemia. Commercially, lovastatin is produced by *Aspergillus terreus*. Due to high cost of production poses the need to investigate and screen out the potent lovastatin producer fungal species from the unexplored outreaches. Soil sampling was collected from the outer skirts of Pachmarhi Town in November 2020 which was used for serial dilution and cultured on PDA media plates for raising fungal colonies. The developed colonies were counted and pure cultured were subjected to screening of lovastatin production by yeast inhibition model. The promising fungal isolates were used for fermentation activity in Czapek yeast extract (CzYE) culture broth at 27°C in a BOD incubator for 5 days in shaking condition at 60 rpm. The harvested fermentation extract was then used for HPLC analysis to detect and estimate lovastatin at 246 nm wavelength compared to standard marker lovastatin (Himedia). The total fungal count of 7×10^8 at 10^{-7} dilution, there were 5 distinct fungal isolates obtained in present study one of which belongs to *Fusarium* spp. and other 4 were *Aspergillus* spp. as per morphological and microscopic features. One of the isolated D-2 which probably be *Aspergillus tubigensis* or *Aspergillus versicolor* was observed positive in *S. cereviceae* (MTCC-170) inhibiting bioassay which during fermentation activity resulted in 3.2 µg/ml lovastatin production *in vitro* when tested in HPLC analysis. The confirmed identification of the lovastatin positive fungi is the matter of further investigation using advance molecular techniques involves genome sequencing. The forest soil around Pachmarhi Bioserve region is rich in variety of soil fungi with metabolic capabilities.

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Keywords: Pachmarhi Bioserve, Lovastatin, *Aspergillus* spp, HPLC.

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Background

Ever since the discovery that microorganism not only cause infections but also produce certain organic compounds that cure infections and help treat a variety of non-infectious diseases, microorganisms have had a significant impact on the advancement of medical science (Gunathilake, 2017; Singh, *et al.*, 2017). Even if microbes are ubiquitous, their metabolic capabilities are greatly influenced by the habitat in which they live. With the unique conditions of pH, temperature, pressure, oxygen, light, nutrients, and salinity, there is a high potential for those to produce metabolites that exhibit special biological activities (Gunathilake, 2017). Many microorganisms

(Bacteria/Fungi/Actinomycetes) survive in soil and produce enthralling and structurally complex bioactive products of pharmaceutical importance (Demain 1999; Demain 2007). Lovastatin is the world widely prescribed drug to combat hypercholesterolemia and was the first statin drug which was approved by United States Food and Drug Administration in the year 1987 (Immanuel and Anusha, 2019). Lovastatin is an interesting fungal metabolite. It functions as a competitive inhibitor of the enzyme, 3-hydroxy-3methyl-glutaryl enzyme in cholesterol biosynthesis. HMG Co-A reductase is an important enzyme in the process of converting HMG CoA to mevalonate. HMG CoA reductase is associated with lovastatin at higher

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Optimization Of Carbon Sources For Maximal Production Of Lovastatin By Forest Soil Fungal Isolates Under Liquid State Fermentation (LSF)

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Abstract

Most fungal secondary metabolites are remarkably complex bioactive compounds. Soil Fungi produce a large variety of compounds mainly through the polyketide biosynthesis pathway. Lovastatin is a fungal secondary metabolite used for lowering blood cholesterol. It acts as an effective inhibitor of the enzyme hydroxymethylglutaryl, coenzyme A (HMG-CoA), reductase (mevalonate: NADPI oxydoreductase, EC 1.1.1.34) that catalyzes the reduction of HMG-CoA to mevalonate during synthesis of cholesterol. The main objective of the study is screening of various fungal species and optimization of different carbohydrate sources for maximizing lovastatin production by *Aspergillus spp* using Liquid State Fermentation (LSF). The soil samples were collected on the random basis from different locations around Pachmarhi, Madhya Pradesh (India). The pure cultures of these fungal isolates were screened for production of statin or lovastatin were evaluated by yeast inhibition test. Potential species were subjected to *in vitro* carbohydrate optimization in LSF fermentation and concentration of Lovastatin was estimated by HPLC. The pure culture of indigenous fungal isolated were screened for their capability of producing statin or lovastatin like substances was evaluated by adopting yeast inhibition model. For this ATCC culture of *Candida albicans* and *Saccharomyces cerevisiae* were used as model organism against which statin screening fungal isolates that showed antagonistic activity. Fungal isolate were subjected to *in vitro* production of lovastatin under the influence of different carbohydrate sources at a concentration of 30gm per litre in LSF medium. The quantity of lovastatin produced by *Aspergillus spp* using HPLC was found to be 1.48, 0.94, 8.19, 1.69, 0.07, percentage using Sucrose, Dextrose, Mannitol, Lactose and Maltose as source of carbohydrate respectively. Production of lovastatin was maximum using mannitol as a source of carbohydrate.

Keywords: Soil fungi, Statin, Lovastatin, HPLC, LSF

INTRODUCTION

In the development of medical science, microorganism have a major impact since the discovery as they not only cause infections but also produce certain organic compounds that cure infections and help in treatment of variety of non-infectious diseases (Gunathilake, 2017; Singh, *et al.*, 2017). Though, microbes are ubiquitous, but their metabolic capabilities are greatly influence by the habitat they survive with unique conditions of pH, temperature, pressure, oxygen, light, nutrients and salinity, there is a high potential for those to produce metabolites exhibit special biological activities (Gunathilake, 2017). Microorganisms are of immense importance to environment and essential to all life forms, and are primary source of nutrients and act as chief recycler in environment (Bisen *et al.*, 2012). For the sake of ever increasing world population microbes have been known extensively for their potential in the development of bioprocess technologies for production of secondary metabolites which are organic compounds that form at the end or near the stationary phase of growth, and are not directly associated with growth, development, and reproduction of microorganisms itself. These products include nutrition supplements such as, vitamins and amino acids, organic acids, agriculturally important metabolites, enzymes, flavoring agents, coloring agents and pharmaceutical and healthcare products like antimicrobial agents, antiparasitic agents, antitumor, enzyme inhibitors and immunosuppressive etc. (Demain 1999; Demain 2007). Soil is the reservoir of the quantity of microorganism where microbial load in soil is dependent upon intricate network between of physical and biological factors. Numerous microorganisms (Bacteria/Fungi/Actinomycetes) exhibits diversity survives in soil to produce enthralling and structurally complex bioactive products of pharmaceutical importance.

MICROBIAL METABOLITES

Microorganisms are present in extremely large sphere of environment and thrive from abyssal zone to stratosphere (at heights up to 60 km) and in a wide range of temperatures ranging from arctic ice to boiling volcanoes (Imshenetsky *et al.*, 1978; Wainwright *et al.*, 2006). These microscopic organisms are used in the preparation of variety of foods and also used as a source of food and feed supplements. For example, amino acids are obtained from *Corynebacterium*, *Brevibacterium* and *Escherichia coli*; vitamins from *Propionibacterium* and *Pseudomonas*; organic acids from *Aspergillus*, *Lactobacillus*, *Rhizopus* and enzymes from *Aspergillus*, *Bacillus* (Shimizu 2001; Gürung *et al.*, 2013;

Polymer Blend: An experimental injection moulding approach

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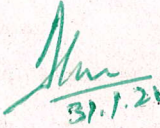
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Abstract- All across the world, demand for HDPE products is steadily growing. Green technology research is being done to develop metakaolin alternatives that use metakaolin combined with a polymer to create a material that is more affordable, performs better, and is termite resistant. Additionally, they are inexpensive, low density, highly specific, biodegradable, and do not abrade the materials being processed. High density polyethylene is employed as a matrix and is combined with metakaolin in this investigation. An injection moulding technique was used to create each sample. The mechanical characteristics of the prepared samples were characterised. The specimens were created based on the mass ratio of metakaolin to polymer. Tensile and flexural, tests revealed that increasing the amount of metakaolin content improves mechanical characteristics. The findings imply that metakaolin/HDPE polymer composites could be utilised in the building sector.

Keywords: - High density Polyethylene (HDPE), Metakaolin, polymer composite, reinforced, Injection Molding.


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Ameliorative role of thymoquinone against reprotoxic effect caused by potassium bromate in female mice

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Abstract

Environmental toxicants are chemical substances that remain in the environment owing to various activities such as manufacturing, product leaching, and human contamination which may result in adverse health effects. In this study, we investigated the effects of potassium bromate (KBrO₃) and thymoquinone (TQ), on reproductive hormone levels and histomorphological variations in the ovaries and uteri of female mice. In the current study, all experimental animals were orally administered KBrO₃ (100 mg/kg body weight) and TQ (20 mg/kg body weight) for 60 days. Alterations in hormone and antioxidative parameters along with histomorphological variations were assessed in mice. The findings demonstrated that the oral administration of KBrO₃ had a significant effect on body weight, uterine weight, and gonadosomatic index (GSI), along with changes in gonadotropin, estrogen, and progesterone levels in female mice. Specifically, KBrO₃ degenerated the thecal layer around follicles and caused vacuolization. KBrO₃ decreased the number of growing follicles and increased the number of mature follicles. TQ administration restored normal ovarian histoarchitecture. TQ protected female mice against reproductive toxicity induced by KBrO₃. Our findings suggest that TQ can be used as a natural therapeutic agent to combat KBrO₃-induced reproductive toxicity by improving the hormonal and histomorphological parameters. Our study implies that TQ can be used as natural therapeutic medicine against the reprotoxic effect caused by KBrO₃ by improving hormonal and histomorphological parameters.

Keywords Potassium bromate · Thymoquinone · Anti-oxidant · Reprotoxic · Anti-proliferative · Endocrine-disrupting-chemical (EDC)

Introduction

Infertility is currently one of the biggest concerns among young couples (Mascarenhas et al. 2012). One in every six couples experiences infertility. Genetic, environmental, and nutritional factors contribute to infertility (Winters and Walsh 2014; Baraskar et al. 2021). Humans are frequently

exposed to endocrine-disrupting chemicals (EDCs) as they are widespread in the environment. Many EDCs have been found to specifically target the female reproductive system, primarily the ovaries, at an alarming rate. In females, the ovary is a vital organ for reproduction and endocrine functions. Numerous issues related to reproductive health, including infertility, early ovarian failure, and abnormal sex hormone levels, have been associated with EDC exposure. The effects of numerous EDCs on adult ovarian function have been thoroughly investigated (Bagur and Mautalen 1992; Patel et al. 2015; Craig et al. 2011).

EDCs are exogenous agents and drugs that interfere with the synthesis, secretion, transport, metabolism, binding, and clearance of endogenous blood hormones, which are crucial for homeostasis, reproduction, and the developmental process (Diamanti-Kandarakis et al. 2009; Craig et al. 2011). Nuclear hormone receptors such as androgen, estrogen, progesterone, thyroid, retinoid, and neurotransmitter receptors are thought to be affected by EDCs (Diamanti-Kandarakis

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Thymoquinone Attenuates Hematological and Biochemical Alterations Induced by Potassium Bromate Toxicity in Female Albino Mice, *Mus musculus*

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ABSTRACT: It has never been demonstrated that thymoquinone (TQ), the primary active component of the essential oil present in *N. sativa* seed, protects against the deterioration of blood indices brought on by potassium bromate (KBrO₃). Consequently, the objective of this work was to examine Potential protective effects of TQ against KBrO₃-induced biochemical and haematological changes in female albino mice. TQ's ability to protect female albino mice against KBrO₃-induced haematological and biochemical changes was investigated in this work. We employed 24 mature, female albino mice (*Mus musculus*) in this investigation. For 60 days, they were separated six animals each, divided into four groups Control group (20 mg/kg b.w. dissolved in vehicle corn oil), the KBrO₃ group (100 mg/kg b.w. dissolved in double distilled water), the KBrO₃ + TQ group (100 mg/kg b.w. dissolved in double distilled water along with 20 mg/kg body weight dissolved in vehicle corn oil) and the TQ group (20 mg/kg b.w. dissolved in vehicle corn oil). Throughout this inquiry, blood metabolites were examined to see how KBrO₃ affected several haematological, enzymatic, and oxidative stress indicators as well as glucose, cholesterol and lipid metabolism. In addition, we compared TQ's ability to counteract KBrO₃ toxicity and lessen the disruption of serum homeostasis. We discovered in the present study that TQ was significantly enhanced the haematological parameters like total RBCs count (p<0.001), WBCs total count (p<0.001), and haemoglobin level (p<0.001) along with SOD (p<0.001), CAT (p<0.01) and GPx (p<0.01) and high density-lipoprotein HDL (p<0.001), on the other hand TQ remarkably lowered the serum glucose (p<0.001), cholesterol (p<0.001), triglycerides (p<0.001), and LDL (p<0.001) and platelets count (p<0.001) along with Aspartate aminotransferase (AST) (p<0.001) Alanine aminotransferase (ALT) (p<0.001), and Alkaline phosphatase (ALP) (p<0.001), as compared to KBrO₃ group. The findings show that TQ can treat hematological, biochemical, and oxidative changes brought on by KBrO₃ poisoning.

Keywords: Potassium bromate, Thymoquinone, Hematology, Oxidative stress and Hepatic marker.

INTRODUCTION

KBrO₃ is a common flour enhancer and maturation additive. Since 90 years ago, it has been a culinary ingredient (Oloyede *et al.*, 2009; Vadlamani *et al.*, 1999). In bakeries, it is employed as a flour enhancer to help bread rise while also giving dough strength and flexibility during baking. The bread that results is typically sturdy, supple, and having a 'fine' crumb structure. In dough, bromate encourages the growth of gluten as well. Beer, cheese, and fish paste products frequently contain KBrO₃ as an additive (Ahmad *et al.*, 2016a). Additionally, it is a component of cold wave hair treatments and is employed in the pharmaceutical and cosmetic professions (International Agency for Research on Cancer, 1999) (Chipman *et al.*, 1998). An ozonization of bromide-containing water may produce KBrO₃ as a byproduct. Free radicals generated due to the biotransformation of KBrO₃ may harm vital biological macromolecules in an oxidative manner, significantly harming the kidneys and causing cancer in treated mice (Chipman *et al.*, 1998). Since the International Agency

for Research on Cancer (IARC) classified KBrO₃ as a potential cancer-causing agent, its usage in food processing was prohibited (category 2B). Moreover, KBrO₃ has been linked to a variety of organ damage in both humans and lab animals, according to a number of past research (Ahmad *et al.*, 2015; Farombi *et al.*, 2002; Kujawska *et al.*, 2013). Additionally, studies on animals have shown that KBrO₃ has mutagenic and carcinogenic effects (Kurokawa *et al.*, 1986). In New Zealand, there were several incidences of unintended child poisoning brought on by the intake of bromate solutions and bromate-tainted sugar (Paul, 1966). The primary vitamins present in bread are destroyed by KBrO₃, which has been conclusively demonstrated in toxicological investigations to have an impact on the nutritional quality of bread (Sai *et al.*, 1992). According to several reports, KBrO₃ causes oxidative stress in tissues (Chipman *et al.*, 1998; Parsons *et al.*, 2000; Sai *et al.*, 1992; Watanabe *et al.*, 1992). KBrO₃ treatment has affected blood biochemistry, renal and hepatic histology, and reduced the capacity of Swiss mice's livers to produce antioxidants, among other impacts (Altoom *et al.*,

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Ameliorative effects of gallic acid on GLUT-4 expression and insulin resistance in high fat diet-induced obesity animal model mice, *Mus musculus*

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Abstract

Reduced activity of glucose transporter type 4 isoform (GLUT-4), an insulin-sensitive glucose transporter distributed on the adipocytes, is associated with impaired insulin signaling. Insulin resistance resulting from alteration in glucose transport is responsible for exacerbating the emergence of metabolic abnormalities. The present study aimed to investigate the effects of the antidote gallic acid (GA) on expression-related changes in GLUT-4 and insulin receptor substrate-1 (IRS-1) in the visceral adipose tissue and on the subsequent development of insulin resistance in a high-fat diet (HFD)-induced obesity animal model. **Methods:** Twenty-four female Swiss albino mice were used and separated into the following four groups (six animals in each group): control group (standard pellet diet), HFD group, (60% HFD), HFD + GA group (60% HFD and GA 50 mg/kg body weight for 60 days), and GA group (GA 50 mg/kg body weight for 60 days). The effect of HFD on serum glucose, total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL), low-density lipoprotein (LDL) cholesterol, and insulin was evaluated. Additionally, homeostasis model assessment for insulin resistance (HOMA-IR) and glucose tolerance test (GTT) was performed. The serum antioxidative profile, which comprises oxidative parameters (superoxide dismutase [SOD], catalase [CAT], and glutathione peroxidase [GPx]) was measured. The effectiveness of GA against HFD-induced alteration in GLUT-4 and IRS-1 expression was also evaluated. **Results:** The experimental group that fed on GA + HFD had improved levels of serum triglycerides ($p < 0.001$), cholesterol ($p < 0.05$), and LDL cholesterol. GA administration also significantly improved hyperinsulinemia and HOMA-IR index ($p < 0.001$) in HFD mice. GA improved GTT results ($p < 0.05$); activity of SOD, CAT, and GPx ($p < 0.05$); and upregulated mRNA expression of GLUT-4 and IRS-1 ($p < 0.05$) in the visceral adipose tissue in the HFD + GA experimental group. **Conclusion:** A link exists between insulin resistance, GLUT-4, and IRS-1 expression in the adipose tissue, and the initiation of metabolic syndrome, a condition characterized by obesity. GA may promote insulin signaling, glucose uptake, and lipid metabolism in the adipose tissues by mitigating oxidative stress. GA can also be used to manage obesity-related comorbidities including type 2 diabetes and dyslipidemia.

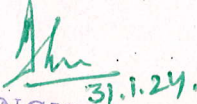
Supplementary information: The online version contains supplementary material available at 10.1007/s40200-023-01194-5.

Keywords: GLUT-4; Gallic acid; High Fat Diet; IRS-1; Insulin resistance; Obesity.

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Mycodiversity in *Phyllanthus Emblica* L. fruits

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Abstract

Phyllanthus emblica fruit is an important herb with the richest natural source of Vitamin C and antioxidant properties. This is a rasayan used as therapeutic agents for prevention of diseases and ailments as mentioned in Charak samhita. A variety of relationship exists between the endophytic fungi and the host plants, ranging from mutuality or symbiotic to antagonistic or slightly pathogenic because of what appears to be their contribution to the host. Total 19 different fungi of two divisions Ascomycota and Zygomycota followed by four classes viz. Dothideomycetes, Eurotiomycetes, Sordariomycetes, Mucoromycetes and six families i.e. Pleosporaceae, Davidiellaceae, Trichocomaceae, Hypocreaceae, Nectriaceae, Mucoraceae were identified in amla fruits sampled from Bitthal sabji market, Govindpura sabji market, Vindhya Harbal Garden, Mangalwara Market Mandideep, Piplani Hatt, Sunday Market TT Nagar, Bangrasia Sunday Market and Sehore Bajar during fruit harvesting season.

Keywords: - *Phyllanthus emblica*, endophytes, mycodiversity, ailments, immunity.

Introduction:

Emblica officinalis (*Phyllanthus emblica* L.) is also known as Amla/aola/ Indian gooseberry is an important herb with richest natural source of high content of vitamin C, constitute of phyllembin, gallic acid, ascorbic acid, tannins etc (Ghoshal *et al.*, 1996). This can rejuvenate the organ system of body and provide strength and wellness for improvisation of immunity. This has been useful in amelioration of cold, cough, influenza, diabetes, lungs, heart, and many chronic infections. Amla is also used as a tonic to build up lost energy and vigor, blood purifier, cardio-protective, diuretic, laxative. Ayurvedic practitioners believed regular takes of amla with other product or alone can prevent from many diseases. This is much useful in treating diabetes, asthma, jaundice, cough, inflammation etc. and highly valued in Indian traditional medicines (Scartezzini *et al.*, 2006). A variety of relationship exists between the endophytic fungi and the host plants, ranging from

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***In-Vivo* Acute Oral Toxicity Study As Per Oecd 423,By Alengium Salvifolium Flower Extract On Winstar Albino Mices For Determination Of Ld50/Noael:- A Research Study**

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ABSTRACT

The objectives of large-scale toxicity testing are to obtain information on the biologic activity of chemicals and gain an understanding of how it works. The highly toxic system data tested is used to identify risks and risk management in the context of the production, management and use of chemicals. The amount of LD₅₀, defined as a statistically significant dose that, when tested in a highly toxic test, is expected to cause 50% of animal deaths over a period of time, is currently the basis for the toxic chemical decay. In previous LD₅₀ studies, lab mice and mice were the most preferred species. The result of extensive discussions on the importance of LD₅₀ value and the concurrent development of various processes is that authorities today do not require older LD₅₀ tests involving large numbers of animals. Limitations, consistent dosage process, toxic class method, and up and down routes all point to some simple methods using only a few animals. Efforts have also been made to develop in vitro systems; e.g., it has been suggested that acute systemic toxins can be broken down into multiple bio kinetic chemicals, cells, and molecules, each of which can be identified and calculated by appropriate models. Different elements can be used in different combinations to model large numbers of toxic events to predict risk and classify compounds. In vitro toxicity testing can be used in a limited testing scheme to reduce animal populations, the suffering used and the reduction of animals. Such a method is natural for the development of recent efforts to improve the testing of large toxins using a series of methods, such as toxic procedures and advanced procedures. In addition, in vitro testing can be used in conjunction with other in vivo tests to increase the initial selection volume: in these in vivo tests, the use of the lowest number of potential animals depends on the appropriate selection dose. This option can be improved by performing appropriate in vitro tests prior to any animal tests that were present when considered necessary. Numerous studies have shown a positive correlation between in vitro cyto toxicity data obtained by unrelated cell lines and LD₅₀ data. However, the best toxic system can be caused by a variety of processes. Methods should be found taking toxic kinetic parameters to account where in vivo predictions are based on in vitro data.

Key words:-acute oral toxicity, oral administration, toxins, cytotoxic

INTRODUCTION

Acute oral toxicity (OECD 423)

The acute toxic class technique / the critical toxicological approach set out in this Guideline is a stepwise procedure or slow moving process through the use of 3 single sex animal per step. Depending on the death and / or moribund condition of animals, on usual 2-4 steps may be required to allow for result of toxicity of the test material. This material is delivered orally to a set of investigational animals in one of the define doses. The substance/object is tested using a stepwise procedure, each step using three same sex animals. lack or occurrence of compound-related mortality of the animals dose on single step will find out the next step, i.e.; no further testing is required, dose of three extra animals, with the same dose and, dosing of three additional animals at the next higher or the next lower dose level.

Type:-Wistar Albino rat

Sex:-Male

PHYTOCHEMICAL SCREENING AND CHARACTERIZATION OF ACTIVE COMPONENT OF
SPATHODEA CAMPANULATA (RAKTURA) FOR THEIR ANTI-ARTHRITIC ACTIVITY

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ABSTRACT

S. campanulata, widely distributed in India is traditionally used as astringent, aphrodisiac, purgative, anthelmintic, depurative, febrifuge and expectorant. The plant is also used in rheumatism, dropsy, urinary diseases and jaundice. The purpose of this study is to evaluate the anti-arthritis activity of the methanolic extract of the flower of *S. campanulata* in experimental animal models. The powdered drug was subjected to successive solvent extraction, with solvents in increasing order of polarity to obtain the methanolic extract of the aerial parts of the plant. Isolation and characterization of plant extract were performed through UV, IR, NMR and Mass spectroscopy. Characterization approximately confirmed the isolated compound was kaempferol. *S. campanulata* was evaluated for anti-arthritis action by Freund's adjuvant induced arthritis test in adult Albino rats (150-200 gm). Rats were injected 0.1 ml of complete Freund's adjuvant into the planter region of the left hind paw. Statistical analysis was performed using One way analysis of variance (ANOVA) followed by Bonferonni test. $P < 0.05$ was considered statistically significant. The methanolic extract of in doses of 200 and 400 mg/kg showed 75.50% and 68.33% protection against increase in paw edema, respectively. *S. campanulata* showed dose-dependent action in all the experimental models.

Keywords: *S. campanulata*, Anti-arthritis, Freund's adjuvant induced, Paw edema.

1. INTRODUCTION

The goal of treatment for rheumatoid arthritis patient is to eliminate symptoms, slow disease progression, and optimize quality-of-life [1]. Therefore, before starting the treatment of RA certain goals must be kept in mind such as relief of analgesia, reduction of inflammation, protection of articular structure, maintenance of function, and control of systemic involvement [2]. Presently for the treatment of RA, strategies have changed from traditionally used non-steroidal anti-inflammatory drugs (NSAIDs) or disease modifying antirheumatic drugs (DMARDs) to novel biological agents, like TNF monoclonal antibody. Clinically, the treatment of RA includes five strategies. The foremost approach is the use of NSAIDs followed by mild doses of glucocorticoids to minimize the signs of inflammation as well as progression of disease. In chronic patients, the use of DMARDs such as methotrexate, sulfasalazine, gold salts or D-penicillamine can be included in the treatment. In certain cases, TNF- α neutralizing agents like infliximab, etanercept etc; IL-1 neutralizing agents like

anakinra; and the drugs which interfere with T-cell activation such as abatacept can also be included in treatment of chronic cases. Finally, immunosuppressive and cytotoxic drugs such as cyclosporine, azathioprine, and cyclophosphamide are used for the treatment of chronic patients [3-5]. The above-mentioned therapeutic agents reduce the inflammation and joint destruction but their long-term risks are still unknown. However, long-term risks of drugs includes gastrointestinal ulcers, cardiovascular complications, hematologic toxicity, nephrotoxicity, pulmonary toxicity, myelosuppression, hepatic fibrosis, stomatitis, cirrhosis, diarrhea, immune reactions, and local injection-site reactions. Moreover, higher costs and side effects which include high risks of infections and malignancies requires continuous monitoring [6].

S. campanulata is a monotypic genus in the flowering plant family Bignoniaceae. The single species it contains, *S. campanulata*, is commonly known as the African tulip tree, fountain tree, pichkari or Nandi flame. The tree grows between 7-25 m (23-82 ft) tall and

**TRANSLATION THEORIES AND PRACTICE IN THE INDIAN
CONTEXT: A CRITIQUE****DR. MEGHA SINGH,**Assistant Professor in English,
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Bhopal, Madhya Pradesh, India.**ABSTRACT**

Translation is a form of communication between two languages-the source language and the target language. At the spoken level, it is an interpretation of the source language for the listener in the target language. But at the writing level, translation is always considered as rewriting of the original text. In other words, translation is a text about a text and hence, it is a meta-text. It reproduces what the author in the original language (i.e. the Source Language (SL)) says what he means. Translation has variously been described as an "Art", " Craft" and "Science". But it is more than all these. It is a process of analysis, interpretation and creation which leads to a replacement of one set of linguistic resources and values for another. Translation comes after the original and is dependent on it. Hence, it is secondary to the original. To translate is to put an original text to a process of decoding and find out an equivalent of it in the target language through the process of recording. In the West translation used to be considered as secondary and inferior to the original. But this is not the case in India. Translation is rather taken as new writing in India. The present paper highlights and endeavours to explore translation theories and practice in the context of India and literature in India.

Keywords : Communication, Meta-Text, Source Language

"Translation Theory" is and is not a new field; though it has existed only since 1983 as a separate entity in the Modern Language Association International Bibliography, it is as old as the tower of Babel (Gentzler 1993:1). The credit of formulating a systematic theory of translation goes to the French humanist Etienne Dolet who published a short outline of the principles of translation titled, *La maniere de bien traduire d'une langue en aultre* (How to Translate well from one Language to Another) in 1540. Dolet's principles ranked as they are in a precise order stress the importance of understanding the Source Language (SL) text as a primary requisite. The translator is far more than a competent linguist, and translation involves both a scholarly and sensitive appraisal of the SL text and an awareness of the place the translation is intended to occupy in the TL system (Bassnett-McGuire 1991:54). George Chapman, the great translator of Homer in his dedication of Seven Books (1598) echoed Dolet's views of translation, in his prescription for the translator to avoid word for word translation and to make an attempt to catch the spirit of the original. The act of the Renaissance aimed at nativising European languages and that is why, The Bible and the works of Homer received the attention of the translators.

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PRINCIPAL
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REVIEW ARTICLE

Therapeutic Role of Phytophenol Gallic Acid for the Cure of COVID-19 Pathogenesis

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Abstract: The SARS CoV-2 virus, the causative agent of COVID-19 uses the ACE-2 receptor of the host to penetrate and infect the cell, mainly in the pulmonary, renal, and cardiac tissues. The earlier reported Delta and the recent Omicron are the variants of concern. The mutations in the RBD region of spike protein are associated with increased RBD-ACE-2 receptor interaction. This binding affinity between spike protein and the receptor is greater in Omicron than in the Delta variant. Moreover, the Omicron variant has numerous hydrophobic amino acids in the RBD region of the spike protein, which maintain its structural integrity. Gallic acid is a phytophenol and shows high binding affinity toward the ACE-2 receptors, which may be helpful for better outcomes in the treatment of COVID-19 pathogenesis. In the present study, significant data were collected from different databases *i.e.*, PubMed, Scopus, Science Direct, and Web of Science by using keywords like anti-oxidative, anti-inflammatory, and antimicrobial properties of gallic acid, in addition to receptor-based host cell interaction of SARS CoV-2 virus. The finding shows that gallic acid can reduce inflammation by attenuating NF- κ B and MAPK signaling pathways to suppress the release of ICAM-1, a cell surface glycoprotein; various pro-inflammatory cytokines like TNF- α , IL 1- β , IL-6, IL-10, and chemokines like CCL-2,5, CXCL-8 along with tissue infiltration by immune cells. The purpose of this review is to highlight the therapeutic potential of gallic acid in COVID-19 pathogenesis based on its strong anti-oxidative, anti-inflammatory, and anti-microbial properties.

Keywords: Inflammation, antioxidative, immunomodulatory, COVID-19, cytokines, gallic acid.

1. INTRODUCTION

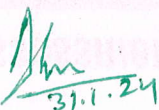
1.1. Global Coronavirus Disease

The coronavirus disease 2019 (COVID-19) is a pathogenic, communicable disease that originated in China and spread rapidly across the globe [1]. It is a viral infection caused by the severe acute respiratory syndrome corona virus-2 (SARS-CoV-2) [2] and belongs to the category of beta (β) coronavirus [3]. Among the mammalian species, the SARS-CoV was first detected in several different wild species of horseshoe bat in the year 2002-03 in China [4]. The human SARS-CoV-2 is phylogenetically close to SARS-like virus found in the bats [1] with initial common symptoms of cough, fatigue, fever, and breathing problems [5]; computerized tomography (CT) scan indicates that advanced stages of coronavirus infection affect the alveolar tissues along with the reduction in the number of leukocytes [6]. The World Health Organization (WHO) declared COVID-19 as a pandemic on 11th March 2020 due to an alarming rise in COVID-19 cases around the world [7].

The clinical data obtained from the infected patients revealed that with the increase in the severity of infection, the amount of pro-inflammatory molecules increases, but the number of helper T, regulatory T, and suppressor T cells decreases significantly. The population of lymphocytes is affected due to the infection that subsequently impairs the immune system [8]. The over-expressed inflammatory cytokines affect pulmonary tissues and cause the dysfunction of other organs [9]. The clinical data suggest that the first symptom appears after a minimum of 5 days, hospitalization may occur on the 7th day in severe cases and acute respiratory distress syndrome (ARDS) may set in by the 8th day [10].

Both the variants, Delta and Omicron spread rapidly and can cause severe infection. The Omicron variant exhibits more hydrophobic amino acids in its spike protein, especially in the receptor-binding domain (RBD), which imparts better integrity to its structure [11]. Recently it has been shown that there are 46 dominant mutations in the Omicron variant, of which 23 reside in spike protein and the rest in nucleocapsid, membrane, and envelope [12]. Out of 23 mutations in spike protein, 15 are typically located in the RBD region [13]. Also compared to the Delta, variant Omicron has a higher affinity for ACE-2 receptor [11]. The mutations in the RBD region of the spike are responsible for improved RBD-ACE-2 interaction

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31.1.24



Female obesity: Association with endocrine disruption and reproductive dysfunction

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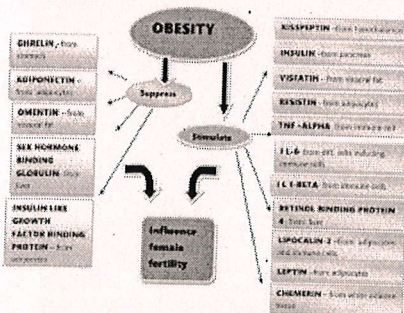
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Abstract

Obesity affects female fertility and fecundity through a complex set of mechanisms involving an imbalance of hormones; changes in the adipose tissue, reproductive-system, adipokines, cytokines, metabolic perturbation, dysbiosis, and ovulatory and embryonic malfunction. Obesity is an important factor for hyperandrogenism, hyperinsulinemia, and the development of polycystic ovarian syndrome (PCOS). PCOS impairs the functioning of gut microbes which in turn interrupts inflammatory signaling in the hypothalamic-pituitary-gonadal (HPG) axis and oocyte development. It causes abnormalities in the reproductive cycle, an increase in the body mass index (BMI), and alters the outcome of assisted reproductive treatment. Furthermore, kisspeptin-dependent leptin pathways augment the regulation of gonadal releasing hormone (GnRH) secretion to maintain ovarian function. The level of ghrelin and leptin is associated with the onset of puberty and inflammatory factors, mainly tumor necrosis factor (TNF)- α and interleukin (IL)-6. These affect the fertility of females by exacerbating oocyte development, insulin resistance, and PCOS. This article highlights the effect of obesity on the female reproductive system with the involvement of the interaction of various hormones, binding protein, inflammatory agents, metabolic perturbation, dysbiosis, obesity-induced alteration in the hypothalamic-pituitary-ovarian (HPO) axis and sustainable goals to manage obesity.

Graphical abstract



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Novel non-hydroxyl synthesis and fabrication of advanced hybrid inorganic-organic geopolymeric coating material for corrosion protection

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ABSTRACT

The objective of this paper was to fabricate advanced geopolymeric coating materials having advanced hybrid inorganic-organic characters (using novel solid state geopolymerization processes), which can effectively protect mild steel substrates from the damaging effects of corrosion. To achieve this objective, different geopolymeric mix designs were formulated using fly ash as an amorphous silicoaluminous source and rice husk as a source of organic components and other raw materials. The developed materials were coated on the substrate via a paint brush technique. In order to understand and correlate coating performance, fabricated hybrid geopolymeric coatings were first tested for adhesive strength and then for water resistance and corrosion resistance properties. A geopolymer-epoxy composite was also prepared using epoxy resin as yet another hybrid organic additive and results indicated the superiority of this composite in terms of adhesion and other studied properties. The microstructures, thickness and elemental composition of different geopolymeric coating compositions were studied using FESEM and EDX spectral analysis. Results revealed that rice husk addition to geopolymeric matrix not only enhanced gelation but also contributed to good adhesion and excellent corrosion protection for the underlying substrate. A geopolymer-epoxy composite on other hand, owing to its high crosslinking structure, performed extremely well for all parameters. Fabricated hybrid geopolymeric coating material find its application as corrosion protective coating for different industries to ensure metal durability and reduction in unwanted maintenance cost.

1. Introduction

Directly, corrosion affects the performance of metal based structures and indirectly affects the producers and suppliers of goods comprising such structures. In general, the lives of metal based structures or equipments are greatly reduced due to corrosion. The loss varies from industry to industry and country to country depending upon several working and climatic conditions. Generally, localized corrosion is a great risk issue for different engineering structures where corrosion can occur at isolated sites and propagate at occluded sites [a pit, a crevice or a crack]. Indeed, from a practical point of view, it is impossible to eliminate corrosion effects entirely. However, determining methods by which decrease in the corrosion rate will take place seems to be a more realistic option [1–3]. The corrosion of mild steel in aggressive environments and during its working life not only affects its durability and performance but can also be associated with operational and usage hazards. In an effort to mitigate corrosion, the primary strategy has

always been to isolate exposed surfaces from a corrosive environment. Isolation of these aggressive environments from mild steel is found to be the most economic method to address corrosion problems. Different organic and inorganic protective coatings have been developed to protect mild steel from corrosion. These coatings impart passivation towards corrosion for the underlying substrate and produce a physical barrier to restrain ingress of deleterious species [4–6]. Although functional protective coatings are able to perform this function they can impose a considerable extra economic burden on industries. Also, industrial synthesis of such coating materials, especially organic coatings, can have a marked adverse effect on the environment due to the release of toxic chemicals as by-products during their synthesis. With the increase in concerns for the environment among scientists and researchers, the development of greener methods which involve less environmental hazards, are comparatively economic and provide end products with improved properties, are given extreme importance now-a-days.

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Formulation of herbal hand sanitizer from Indian herbs

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A RETROSPECTIVE OBSERVATIONAL STUDY ON RECEPTOR STATUS AND CO-MORBIDITIES OR HISTORY OF THYROID DISORDERS AND/OR GALLBLADDER STONES ASSOCIATED WITH BREAST CANCER PATIENTS.

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ABSTRACT

Breast cancer is the commonest cancer found in females and has been increasing alarmingly in India since the last decade or so. In order to understand the risk factors associated with this disease, an observational retrospective study was done on total 110 registered breast cancer patients of the age group 18 to 65 from Jawaharlal Nehru Cancer Hospital and Research Centre (JNCHRC), Bhopal. Patients files from the hospital were analyzed in detail for clinical and pathological information including hormone receptor (HR) status. Medical history with a special focus on co-morbidities like thyroid disorders and gallbladder stone history was recorded. These two diseases have been linked to breast cancer development and the present observational study was aimed to throw light into this connection. Out of the 110 breast cancer patients, the receptor most prevalent was Er+ (39%) followed by Her2+ (30%) and Pr+ (26%). There were 33% triple negative cases and only 7% were triple positive. It was found that out of 110 breast cancer patients 59% had thyroid disorders and 32% had gall bladder disease/stones. A long-term large-scale population-based study is required to come to a firm conclusion to find a link so that aggressive measures could be taken to prevent cancer development in these high-risk categories of females.

KEYWORDS: Breast cancer, co-morbidities, gall bladder stones, receptor status, thyroid disorder.

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INTRODUCTION

Breast cancer is one of the most prevalent cancers in women and in Bhopal, Madhya Pradesh alone it has been increasing at an alarming rate. Some diseases have been linked with the development of breast cancer by various studies; notably, among them are thyroid disorder (thyroidism) and gallbladder stones (cholelithiasis). To find a link between these diseases and mechanism, a number of studies have been done in the last decade. The current research work aims to evaluate the possible association of thyroid disorders and gallbladder stones with carcinoma of breast. A number of breast cancer patients are found to have a history of thyroid problems and/or gallbladder stones indicating a possible role of these diseases in the development of breast cancer. Hyperthyroidism has been shown to pose a higher risk of breast cancer (Mette Sogaard *et al.*, 2016). Similarly, studies have shown a link between gall bladder disease and breast cancer risk (Wysowski *et al.*, 1986 and Shabanzadeh *et al.*, 2017). Large population, lack of screening program or participation in screening program along with lack of awareness are the major reasons for high number of increased cases and high net mortality (Chauhan A, *et al.*, 2011). What is alarming is the fact that more and more younger females of premenopausal age are getting afflicted with breast cancer (Agarwal G, 2007). Besides known risk factors that contribute to the disease, certain medical conditions are also linked with developing breast cancer. These are diabetes mellitus, thyroid disorders, gall bladder stones etc. A number of studies have been done to find an association between these diseases and development of breast cancer. The current retrospective observational study has been done to find a possible link between these medical conditions or co-morbidities as

Formulation of herbal hand sanitizer from Indian herbs

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MINI-REVIEW ARTICLE

Oxytocin as a Potential Adjuvant Against COVID-19 Infection

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Abstract: This study summarized the benefits of oxytocin in the attenuation of coronavirus disease (COVID-19) pathogenesis. The recent outbreak of COVID-19 has become a pandemic with 7,323,761 infected patients and has created a health emergency worldwide. On the basis of the clinical study, COVID-19 shows homology with other coronavirus pathogenesis, *i.e.*, inflammation, oxidative stress, and hyperactivation of the immune system, resulting in cytokine storm and causing acute lung infection (ALI), acute respiratory distress syndrome (ARDS), and kidney dysfunction. Oxytocin is a peptide of nine amino acids and a well-known anti-inflammatory, anti-oxidant, and immune-modulator, which is protective against ALI/ARDS, nephrotoxicity, sepsis, and ischemia-reperfusion medical condition. Oxytocin is a neuromodulator, effective for stress, anxiety, social behavior, and depression, which may be helpful for better outcomes in patients with COVID-19. Significant data show that oxytocin can be useful in the treatment of COVID-19 pathogenesis. A direct application of OT in COVID-19 is unclear; however, its use in an experimental model and humans has continuously demonstrated its safety, and its use in patients with COVID-19 is predicted to be highly beneficial.

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1. INTRODUCTION

Coronaviruses belong to the virus family of Coronaviridae, order Nidovirales [1, 2]. The coronaviruses are the largest RNA virus family having approximately 31 kilobases (kb) genome [2, 3]. They are important pathogens of humans and several other vertebrate species, causing several respiratory complications in humans [4, 5]. These viruses are further classified into four subgroups: alpha, beta, gamma, and delta. Apart from this, seven coronaviruses cause diseases in humans: 229E (alpha coronavirus), NL63 (alpha coronavirus), OC43 (beta coronavirus), HKU1 (beta coronavirus), MERS-CoV (beta coronavirus), SARS-CoV (beta coronavirus), and SARS-CoV-2 newly identified novel coronavirus in 2019 (COVID-19) [6]. The recent outbreak of COVID-19 has created a health emergency worldwide.

In late December 2019, the Wuhan city of China reported a series of unexplained cases of pneumonia of unknown etiology [7] with symptoms of common viral pneumonia such as fever, cough, and shortness of breath [6], which is now rapidly spreading to the rest of the world [8]. Until June 10th, 2020 approximately 7,323,761 patients infected with COVID-19 and 413,731 death cases were reported [9]. India has reported 276,146 infected and 7,750 death cases until date [9]. After analyzing the updated data from the Worldometer report dated June 10th, 2020, the fatality rate was significantly higher in the more than 80 years of age group.

In addition, different reports published by the Indian Council of Medical Research of India have stated older age and comorbidities as high-risk factors for COVID-19 fatality, and has put the effect of aging and comorbidity on the immune system in the spotlight. Aging is a multifactorial dynamic physiological process ongoing with time [10] and also responsible for immunosenescence and decrease in immunity and fitness, which are major factors for the lethality of infectious disease [11]. Moreover, the Worldometer report has presented the sex ratio of COVID-19 fatalities; the confirmed death cases were 4.2% in males versus 2.8% in females in China, which may be because of gender-related behavioral effects such as, smoking, alcohol consumption, and biological differences in the immune system of males [12-14], which enhance the probability of respiratory infection. Moreover, male dominance in COVID-19 pathogenesis may be because of the activation of androgen receptive element (AREs) of transmembrane serine proteases type 2 (TMPRSS2) gene [12]. Serine proteases enzyme plays an important role in spermatogenesis, homeostasis, and food digestion. It has been previously reported that viruses hijack these enzyme functions and assist their own entry into host cells [15-17]. Recently, a study from Wuhan city, China, has reported that COVID-19 significantly increases inflammatory cytokines and infection-related biomarker and novel COVID-19 directly acts on T lymphocytes [18], which may be a crucial factor of early screening, diagnosis, and treatment of COVID-19. Until date, there is no effective targeted treatment against COVID-19, and persistent infection may involve both stages of silent and productive infection of the host cells [19]. Thus, COVID-19 infection highly challenges the immune system.

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Optimization studies and characterization of advanced geopolymer coatings for the fabrication of mild steel substrate by spin coating technique

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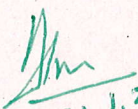
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Advanced inorganic fly ash – metakaolin- phosphatic geopolymer has been developed via greener approach and deposited on mild steel substrate using spin-coating method, to improve the substrate-matrix interaction. The present research investigates the effect of incorporation of metakaolin and phosphate to geopolymer matrix to assess the performance of coating and optimization of spin coating parameters are performed as well to achieve maximum adhesion strength. XRD, FTIR, and SEM studies coupled with energy dispersive spectroscopy (EDX) have been carried out for determination of mineralogical phases, bonding interactions, substrate-matrix interface, and microstructural and chemical analysis. Results indicated that spin coating method produced well-ordered thin geopolymeric coating (thickness 13-20 micrometres), therefore spin coating deposition is the simplest way to obtain thin coatings of visibly thick materials. Maximum adhesion strength of material with substrate is 2.5M.Pa. which is obtained at optimized water to precursor ratio 0.5 at 500rpm spinning speed. It is concluded that new inorganic phases (originated from mutual contribution of phosphate, metakaolin and fly ash) like sodium iron aluminium phosphate, aluminium phosphate and sodium iron phosphate were responsible for good adhesion of material to the substrate and then related properties. The developed and optimized method can be used to produce homogeneous coating of heterogeneous geopolymer material on low carbon steel to endorse its advanced applications.

Keywords: Adhesion strength, Optimization studies, Spin-coating, Substrate-matrix interface

Geopolymers are amorphous to semi-crystalline three-dimensional silica-aluminate materials prepared by alkali hydroxide and alkali silicate activation of amorphous alumina and silica containing materials such as fly ash, metakaolin, red mud^{1,2}. Geopolymers are eco-friendly, green, competent building material developed from cast-aside of energy efficient process³⁻⁵. The alkali activation of alumino-silicious material like fly ash follows the bimolecular nucleophilic substitution (S_N2) mechanism⁶. This conventional sol-gel technology of manufacturing geopolymer using coal combustion residue is considered as user unfriendly approach as it is associated with different handling and safety issues⁷⁻⁹. In order to reduce the alkali hazards and making the synthesis process risk free, advanced geopolymeric material were developed by a novel process of mechano-chemical co-grinding of raw materials and adding water only in appropriate quantity to solid precursor powder obtained to prepare geopolymeric material^{6,10}. The advanced geopolymer undergoes solid state chemical route and follows

unimolecular nucleophilic substitution mechanism (S_N1)^{6,11}. The new chemical route mechanism enhances the gelation property of the geopolymer and expand the application zone of the material. The developed innovative and inexpensive material has multifunctional applications along with benefits over the conventional methodology, and can be used to make low cost bricks, panels, tiles, coating materials etc with tailored properties. Geopolymer based coatings demonstrate efficient protective property and enhance the efficiency of metal surface¹². Various coating techniques are conventionally used to fabricate the metal substrate to improve the protective efficiency of the coating material like spray coating, spin coating and dip coating¹³. Spin coating technique proves highly efficient for reproducible fabrication of coating material on metal substrate and has the potential to develop uniform coatings even in the micrometre range which is not possible with other techniques¹⁴. Slurry viscosity is one of the considerable parameters which affect the thickness and ultimately performance


31.1.24

Fluorometric Method to Quantify Monoamines: A Brain Region-Based Study Using Milligram Amounts of Brain Tissue

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Abstract

BACKGROUND: The predominant catecholamines in the brain are dopamine, noradrenaline, and adrenaline. Catecholamines exist in low (micromolar) concentrations in the brain when compared to amino acid neurotransmitters such as glutamate and γ -aminobutyric acid. Although monoamines are distributed in the mammalian central nervous system, concentrations vary in different regions of the brain. Therefore, we investigated the regional distribution of monoamines to understand the metabolism and complex pathways involved in neurotransmission.


NEW METHOD: In this study, we purpose a novel methodology of analysis of monoamine in milligram amount of brain tissue. The small tissue size of tissue required a standard technique for dissection and an appropriate referencing system to calculate concentration. Therefore, we presented a definitive volume of reagent concentration with respect to tissue weight and detailed calculation of concentration as well as conversion of florescence reading into nmol/g of tissue weight.

RESULTS: Recovery for this assay depends on tissue size, definite reagent volume proportion and calculation.

COMPARISON WITH EXISTING METHODS: This is a new approach for the representative values for brain parts from control mice dissected and assayed for DA, NA, and 5-HT. While it is possible to process with ease about 50 samples of frozen tissues per day.

CONCLUSION: This is a very useful assay procedure especially in any experiment that generates many samples. This procedure should greatly facilitate the correlation of neurotransmitter levels in brain regions with changes in behaviour produced by experimental manipulations.

ORIGINAL ARTICLE


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Research Paper

Effects of exogenous oxytocin and atosiban antagonist on GABA in different region of brain

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ABSTRACT

Gamma amino butyric acid (GABA) is the primary inhibitory neurotransmitter in the vertebral central nervous system. It functions by altering the membrane conductance of Cl^- ions, maintaining the membrane potential close to the resting potential. The hormone oxytocin (OT) has a central action where it acts as a neuromodulatory peptide and exerts its action depending upon the distribution of OT receptors (OTR) in the target site. OTRs are G-protein-coupled receptors (GPCRs) comprising different subunits (Gq, Gi, and Gs). The G-protein isoforms have the ability to activate different pathways, but specific agonists and antagonists may show different affinities to OTRs, depending on the specific G-protein isoform to which they are coupled. It is well documented that OTR distribution varies with age and species and in regions of the brain. In this study, we attempted to observe the impact of OT and atosiban (OTA), an OT antagonist, on GABA levels in different regions of the brain. Study animals were exposed intraperitoneally (i.p.) to normal saline (0.89%), OT 0.0116 mg/kg, and OTA 1 mg/kg in different combinations, for 30 days. It was observed that OT and OTA administration modulated GABA levels in different regions of brain, while normal saline had no effect. It may be due to OTR receptor expression in different regions of the brain.

This is significant because region-specific expression of different receptors could be important in the development of new drugs targeting specific neuropsychiatric disorders.

1. Introduction

Oxytocin (OT) is a neuropeptide synthesized in the hypothalamus by neurosecretory cells (magnocellular neurons) of the hypothalamic paraventricular (PVN) and supraoptic nuclei (SON), and secreted by the posterior pituitary lobe into the blood (Bargmann, 1949). OT neurons are also present in the parvocellular neurons of the PVN, supra-chiasmatic nucleus, bed nucleus of stria terminalis (BST), medial amygdalae, dorsomedial hypothalamus, vertical diagonal band of Broca, and olfactory bulb nuclei in rats (Buijs, 1978; Caffé and Leeuwen, 1983). However, OT neurons are absent from the dorsomedial hypothalamus, vertical diagonal band of Broca, and olfactory bulb of mice (Caffé and Leeuwen, 1983; Tobin et al., 2010). It is possible that this is related to species-dependent differences in social behavior. OT is a hormone involved in different physiological and pathological functions like sexual activity, penile erection, ejaculation, pregnancy, uterus contraction, milk ejection, maternal behavior, and social bonding among others (Stoop, 2012). In addition, OT acts centrally as a neurotransmitter and the release of OT within the brain occurs from

dendrites, axons, and somata of magnocellular neurons of the PVN in different regions of the brain (Dumais and Veenema, 2016; Moghadam et al., 2018). Furthermore, OT plays an important role in the brain by interacting with specific receptors in different regions of the brain and helps in neuromodulations. It has been shown that receptor distribution varies with age (Elizabeth and Hammock, 2015) and species of animal (Dumais and Veenema, 2016).

In a recent study, it was also shown that OT protects against inflammation and oxidative stress, which is due to OT and GABA_A receptor interaction in the CNS (Kaneko et al., 2016). Gamma amino butyric acid (GABA) is the principal inhibitory neurotransmitter synthesized by decarboxylation of glutamate through the action of glutamic acid decarboxylase (GAD) and binds to three receptors namely GABA_A , GABA_B , and GABA_C (Kaneko et al., 2016; Jones, 1980).

GABA_A receptors are ionotropic Cl^- channels gated by the major inhibitory neurotransmitter γ -aminobutyric acid and are widely expressed throughout CNS. They play a major role in synaptic inhibition in the CNS (Kaneko et al., 2016; Wisden and Seeburg, 1992). OT modulates GABA_A receptor subunit expression, which mediates the

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Oxytocin: An Important Aspect for Designing Neuropsychiatric Drugs

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Mini Review

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Abstract

The hormone oxytocin (OT) has a central action where it acts as a neuromodulatory peptide and exerts its action depending upon the distribution of OT receptors (OTR) in the target site. OTRs are G-protein-coupled receptors (GPCRs) comprising different subunits (Gq, Gi, and Gs) and have the ability to activate different pathways, but specific agonists and antagonists may show different affinities to OTRs, depending on the specific G-protein isoform to which they are coupled. In recent study it has been found that OTR distribution varies with age and species and in regions of the brain, region-specific expression of different receptors could be important in the development of new drugs targeting specific neuropsychiatric disorders.

Keywords: Neuropeptide; Neurotransmitter; Receptor; Neuromodulation

Introduction

OT (oxytocin) is a neuropeptide synthesized in the hypothalamus by paraventricular (PVN) and supraoptic nuclei (SON), and secreted by the posterior pituitary lobe into blood circulation [1,2]. In central action OT is a neurotransmitter but, in peripheral action, OT is a hormone and is involved in different physiological and pathological functions like sexual activity, penile erection, ejaculation, pregnancy, uterus contraction, milk ejection, maternal behavior, social bonding etc. [3].

Brain neuropeptide OT has been shown to affect social processes in animals; this molecule and its receptors participate in the treatment of neurodevelopmental disorders [4]. Classical neurotransmitters are packaged in small synaptic vesicles and are localized at vesicles [3].

However, peptides are stored in large dense-core vesicles (LDCV) which are distributed in soma, dendrites, axonal, as well as nerve endings of magnocellular neurons of the paraventricular nucleus in different regions of the brain [5]. Oxytocin from the hypothalamus reaches different regions of the brain by axonal release from the OT containing fibers that specifically target areas of the brain expressing its receptors [6].

Oxytocin receptors (OTR) are members of the G-protein coupling receptor (GPCR) superfamily. The gene of the OTR contains 3 introns and 4 exons and is located in a single copy on chromosome 3p25, and the structure of GPCRs is characterized by seven transmembrane (7-TM) α -helices connected by three intracellular (IL-1 to IL-3) and three extracellular loops (EL-1 to EL-3) [1]. These receptors can be coupled to different G-proteins, and



Corrosion and Fire Protective Behavior of Advanced Phosphatic Geopolymeric Coating on Mild Steel Substrate

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Abstract

The research objectives of this study were to investigate and compare corrosion and fire protective properties of conventional and advanced phosphatic geopolymeric coating on mild steel substrate using spray coating technique. For these studies two compositions were developed using conventional geopolymerisation route by adding alkali activator solution to fly ash and six compositions were developed using advanced geopolymerisation process in which water was added to solid precursor powder obtained by together co-grinding of raw materials for a period of 8 h. Coated plates were tested for adhesion strength, water resistance, fire protection and corrosion resistance. Results indicated that coating developed from two passes with thickness $100 \pm 15 \mu\text{m}$ showed better adhesion as compared to single pass and also proved to be promising corrosion protective coating material for mild steel substrate under sea water conditions. The developed material is able to withstand flame for more than 45 min and a¹ no cracks were observed in coating by direct heating on liquefied petroleum gas flame. Thus developed phosphatic geopolymeric material is well suited for protecting the mild steel structures from fire and corrosion.

Keywords Advanced geopolymeric coatings · Spray coating · Fire protection · Adhesion strength · Corrosion protection

1 Introduction

In the present scenario, with increase in environmental concerns, the significance of geopolymers as coating material is self-evident. Geopolymer coatings are one of the protective coatings which are good in adhesion with substrate, corrosion protection, fire and heat resistant [1–6]. Fly ash based geopolymer are rich in siloxane bond, silicate bond (Al-O-Si) and the metal cations (Na^+) which provide charge neutrality and provides durable coating by utilizing waste of thermal power plant [7, 8]. To increase the protection efficiency of the metal surface from the external environmental conditions, the alkalinity of the geopolymer gel is best suited as it enhances the production of the protective layer

over the metal surface [9–11]. The conventional method of preparation of geopolymers by sol-gel mechanism is associated with the drawback of handling of hazardous alkali and therefore have limited application spectrum. To overcome the issues associated with conventional technique of geopolymer development a novel solid state mechanism of geopolymerization have been conceptualized which provide uniform gel matrix and hence improve the corrosion resistance behavior of the metal [12]. In addition to these properties, the other concerns like strong adhesion and durability of coating on are addressed by adding $\text{Ca}_3(\text{PO}_4)_2$ (tricalcium phosphate). Phosphate based coatings are reported to possess effective corrosion protective and fire protective properties, enhance the inhibition efficiency and improve the passivity of the metal surface [13].

Spray coating techniques is most suitable in terms of applicability [14] and has been widely used for fabricating the metal substrates for excellent performance and also has broad industrial application. Nowadays, spray techniques is gaining more attention for the recovery of the damaged structural parts [15]. Apart from technique used, adhesion and thickness coating material were the important parameters in improving the efficiency of the coated-substrate material [16].

In the present studies different compositions of geopolymeric coating material were prepared by conventional as well as advanced technique by varying Na/Si, Si/Al and Ca/Si ratio utilising

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Quadrifunctionality Variation of Aluminosilicate Silicon Nucleus on Solid State Geopolymerisation Observed by ^{29}Si Magic Angle Spinning Nuclear Magnetic Resonance Studies

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Abstract

Solid state ^{29}Si MAS NMR is a versatile spectroscopic technique to study anisotropic interactions of Si in geopolymeric cement systems. This article is concerned with the analysis of structural information and mechanism for evolution of tailored geopolymeric precursor powder originated after mechanical co-grinding of fly ash, NaOH and amorphous tricalcium phosphate. The solid state ^{29}Si MAS NMR of geopolymeric precursor material shows distinguishable chemical shifts. Results indicated that developed geopolymeric precursor contain Si/Al tetrahedral network in which SiQ4(3-4Al) dominated among Q0, Q1 and Q2. The evolution of green phosphatic geopolymer cement material takes place after addition of water to developed precursor material. Results also provide an insight about -Si-O-Si- interactions in geopolymer precursor formation, due to reorganization and structural disordering, as a noteworthy greener solid state mechanism. Another eminent finding of this study is the occurrence of significant change in chemical shift values caused by grinding. These shifts are accompanied by incorporation of Al in Si-O-Si linkages and 3D crosslinking into the matrix in geopolymeric precursor material itself, leading to formation of transient Si/Al containing species following solid state mechanism.

Keywords Tailored geopolymeric precursor · Geopolymeric cement · Greener solid state mechanism · Chemical shift

1 Introduction

^{29}Si and ^{27}Al Magic Angle Spinning Nuclear Magnetic Resonance (MAS NMR) have been proved to very useful tool for the structure determination of silicon containing compounds [1–5]. Solid state NMR spectroscopy reveals all anisotropic features of magnetic interactions present in solids. Having a non-zero spin angular momentum $I = 1/2$; ^{29}Si is a NMR active nuclei having potential to resonate in radiofrequency region in presence of applied magnetic field. NMR interactions with the nuclear spin site m of any sample under

the influence of a strong magnetic field B_0 is represented as Eq. (1), where B_0 stands for magnitude of magnetic field, γ denotes spin gyromagnetic ratio, ω_0 is Larmor frequency and δ_m presents isotropic chemical shift [6, 7].

$$\omega_m = -\gamma B_0(1 + \delta_m) = \omega_0(1 + \delta_m) \quad (1)$$

With the advent of magic angle spinning technique, it has been possible to identify Si/Al interactions in glassy aluminosilicate. The technique specifically involve rotation of any sample placed in a magnetic field at certain angle relative to direction B_0 which substantially caused peak narrowing and effectively remove all orientation-dependent part of magnetic interactions [8, 9]. ^{29}Si NMR studies also have capacity to distinguish crystalline and amorphous silica. Crystalline silica consist of *long range* three dimensional network of silicate tetrahedral (SiO_4) whereas vitreous silica exhibit *short range* identical structures of silica polymorphs. With reference to several researches, it is known that in the crystalline phase of silica, observed chemical shift (δ_{Si}) is basically due to the mean internuclear distance of Si-O and mean Si-O-Si bond angle which are; on the contrary, distributed type in glassy

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IMPAIRMENT OF OVARIAN BIOCHEMICAL CONTENTS AND ENZYMES ACTIVITIES DURING POTASSIUM BROMATE (KBrO_3) INTOXICATION IN ALBINO MICE *MUS MUSCULUS*

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Keywords:

Potassium Bromate,
Food additive, Oxidizing agent,
Biochemical, Ovary

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ABSTRACT: Potassium bromate (KBrO_3) is a chemical compound commonly used as an oxidizing agent that has been used as a food additive for baking of white bread, bun, pav and pizza bread. Potassium bromate (KBrO_3) is mainly known to generate free radicals, which cause oxidative damage to essential cellular macro molecules, leading to cause nephrotoxicity in experimental animals. In this part of experiment biochemical profile *i.e.* alkaline phosphatase, acid phosphatase and protein content along with ovarian histopathological changes were observed. The animals were treated with KBrO_3 , 0.7 mg/g b.wt. in 0.125 ml distilled water orally through cannula upto 15 and 30 days. It has been observed significantly lowered ALP, protein and ACP level elevated. However ovarian histopathological changes were not observed after 15 days KBrO_3 treatment. Along with the ovary treated with potassium bromate upto 30 days show degenerative cells in the thecal layer and less amount of cytoplasmic was noticed. Our result concludes that in a very low amount, potassium bromate if available in the body may pose transitory reproductive disruption and are dependent upon the dose and durations employed.

INTRODUCTION: Potassium bromate (KBrO_3) is a chemical compound commonly used as an oxidizing agent that has been used as a food additive for baking of white bread, bun, pav and pizza bread. Apart from this, it is also used in cheese production, beer making and is commonly added to fish paste products ¹. Beside this it is used in pharmaceutical and cosmetic industries and is a constituent of cold wave hair solutions ². In addition to it, KBrO_3 is used in the treatment of flour, treating barley in beer making and it has been used for the improvement of the quality of fish-paste products in Japan ³.

Several researches have been carried out in different parts of the world to prove that potassium bromate is dangerous to health if consumed in food or water. It has been shown to be nephrotoxic in both man and experimental animals ⁴. Breathing potassium bromate can irritate the nose, throat and lungs causing coughing, wheezing, headache, irritability, impaired thinking and personality changes.

Many reports have documented that KBrO_3 can induce multiple organ toxicity in humans and experimental animals ^{5,6,7}. Potassium bromate has deleterious effect on CNS of mice ⁸. Potassium bromate causes oxidative damage to essential cellular macro molecules, leading to marked nephrotoxicity and cancer in experimental animals ⁹. Bromate was first found to cause tumors in rats in 1982. Furthermore it induces renal cell tumors, mesotheliomas of the peritoneum, and follicular cell tumors of the thyroid ¹⁰.

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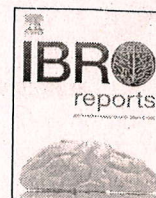
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Research Paper

Effects of exogenous oxytocin and atosiban antagonist on GABA in different region of brain

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Development and Characterization of Inorganic-Organic (Si-O-Al) Hybrid Geopolymeric Precursors via Solid State Method

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Abstract

In this study, an innovative one part, solution free concept applied for the development of hybrid inorganic–organic geopolymeric precursors having Si-O-Al networks at the precursor stage only. For the process development, fly ash, sodium hydroxide along with rice husk were together mechano-chemically dry grinded for a period of 8, 16 and 24 hours and ‘organic in-organic hybrid geopolymeric precursors’ in solid powder form is obtained. Mechano-chemically derived tailored organic in-organic hybrid geopolymeric precursors were characterized by different techniques like XRD, ²⁹Si MAS NMR, ²⁷Al MAS NMR, SEM and FESEM. XRD results revealed presence of inorganic phases and organic phase in organic in-organic hybrid geopolymeric precursors. ²⁹Si MAS NMR spectra revealed partial transformation of tetracoordinated Si into pentacoordinated silica due to presence of organic moiety. ²⁷Al MAS NMR spectra indicated presence of peaks centered at δ 52 to δ 66 ppm confirmed the formation of geopolymeric precursors. Developed geopolymeric precursor overcome the process drawbacks of conventional geopolymerization process via solution chemistry by making it user friendly as geopolymer from these geopolymeric precursor is obtained by addition of water only unlike conventional geopolymerization process which involves addition of hazardous alkaline solution to aluminosilicate raw material like fly ash. Further, the development of geopolymeric precursor utilize two environmentally unsafe waste materials and resulted in development of material with improved mechanical properties.

Keywords Solution free · Mechanochemically · Fly ash · Silica · Precursors

1 Introduction

From development point of view today, inorganic-organic hybrid materials are fascinating and alternatives for several unusual applications. The formation of composites using properties of both inorganic and organic compounds make it possible to control performances of the end products. In this context, careful selection of different raw materials is utmost need which not only provide inorganic and organic

functional groups but also presents a greener way in their synthesis with controllable and tailored properties of end products [1].

Geopolymers, contain strong three dimensional network of Si-O-Si and Si-O-Al type bonds in structure, prepared by alkali activation of different silica and alumina containing raw materials at different ambient and elevated temperatures. This strong silicate and aluminate network provide geopolymers with excellent strength, durability, mechanical properties with eco-friendly nature and greener production characteristics. Geopolymeric material are well suited for broad range low tech and high tech commercial applications i.e. from construction to air craft cabin materials [2–5]. Previous studies on geopolymers focused on the dissolution of glassy silicoaluminous phase from the raw materials (fly ash, red mud, rice husk ash, metakaolin, slag etc.) in a highly aqueous alkaline solution comprising of sodium hydroxide with or without sodium silicate [6–10]. However, from the literature survey, it is clear that the current

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Effects of Additive supplements in tissue culture of *Gloriosa superba* L. - a medicinally important plant

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Abstract

Gloriosa superba is frequently used in traditional medicine system for treatment of several diseases including infectious ones. Several active phytochemicals are present in this plant and they show remarkable effect on pathogenic bacteria. *In vitro* propagation was carried out for direct regeneration of clone plants with same genotype. Optimized hormonal combination of 5.0 mg/l BAP+1.0 mg/l NAA showed 88% bud initiation and multiplication in *Gloriosa superba* was maintained as control medium. Various supplements like coconut water, GA₃, ABA, and Biotin were added to enhance shoot multiplication in tuber sprouts of *Gloriosa superba*. With addition of 15% coconut water (cw) there was enhancement in shoot multiplication (14.6 ± 1.1 cm), length of shoot was 5.6 ± 0.6 cm and days taken were twenty two. Coconut water improved both the quality and development of shoots in *in-vitro* cultured *Gloriosa superba*. The other additives such as GA₃, Biotin and ABA had less or no supportive effect on multiplication of shoots in *Gloriosa superba* explant.

Medicinal plants constitutes a very important natural resources of India because she has one of the richest plant based ethno-medicinal traditions in the world going back to over 3000 years old medicinal heritage¹⁴. A high level exploitation over the recent years coupled with habitat loss and degradation as a result of various biotic pressures has led to a noticeable decline in the population levels of many valuable medicinal plant species, particularly those belonging to perennial category.

In vitro techniques are being increasingly used for the multiplication and conservation of the germplasm of medicinally important plants threatened with extinction^{6,7}. These techniques are now successfully applied to a range of threatened and endangered medicinal and aromatic plant species¹⁶.

Gloriosa superba L. (Glory lily) is a medicinal plant previously belonging to family Liliaceae, presently included in family Colchicaceae. It is a semi-woody herbaceous, branched tuberous climber Traditionally, many


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Phytochemical analysis and Antimicrobial activity of ethanolic extract of *Cissus quadrangularis* L. against some pathogenic microorganisms

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Abstract

Plants have important medicinal properties. In traditional remedies *Cissus quadrangularis* L. has been used as a popular folk medicine.


Present investigation revealed that aqueous extract and ethanolic extract of *Cissus quadrangularis* show significant activity against pathogenic microorganisms.

The qualitative phytochemical screening was evaluated by using crude extract of the stem of plant. Antimicrobial activity of *C. quadrangularis* was studied against some pathogenic bacteria and fungi. In this study, the secondary metabolites such as steroids, tannins and flavonoids were found present in the crude extract of *C. quadrangularis*. The antimicrobial activity of ethanolic extract of plant was evaluated against some human pathogenic bacteria and fungi and the results are discussed. The ethanolic extract and aqueous extract of fresh stems exhibited antimicrobial activity against *E. coli*, *Psuedomonas sp.*, *Aspergillus niger* and *Aspergillus flavus*. The study reveals the *C. quadrangularis* can be used as antimicrobial agent.

Plants have various medicinal properties. Medicinal plants are in use for thousands of years and are renowned for their effectiveness in various ailments. The medicinally usable plants were identified and extracted for biochemical profile and formulated for medicinal applications. *Cissus quadrangularis* is an important medicinal plant belonging to the family *Vitaceae*¹⁹. It has versatile therapeutic uses as well as pharmacological actions. The present study

highlights the health promoting and therapeutic properties of *Cissus quadrangularis*^{2,5,12}.

In India, *C. quadrangularis* is widely used as a common food item. *Cissus quadrangularis* is one of the most common species scattered all over India particularly in tropical regions. It is known to be an ancient medicinal plant, with optimal healing in white tissue area of the body (tendon, ligament, etc.)⁶. Phytochemical analysis of *Cissus*


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Antimicrobial activity of *Rhizobium japonicum* and *Bradyrhizobium japonicum* on different plant pathogenic fungal strains

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ABSTRACT

Symbiotic nitrogen fixation is a key to the nitrogen nutrition to the legumes. The most important agents for the symbiotic nitrogen fixation are the bacteria of the genus *Rhizobium*, which invade the root hairs of leguminous plant and develop nodules on the roots, where nitrogen fixation occurs. *Rhizobium* promotes growth of plants by fixing nitrogen from the atmosphere and is also a biocontrol agent which inhibits growth of pathogens. The biocontrol effect is due to the secretion of secondary metabolites. The present study describes the physiological, biochemical characterization and antagonistic activity of *Rhizobium* species were isolated from root nodules of leguminous plant. The *Rhizobium spp.* were rod shaped, gram negative and mucous producing. Antifungal activity of *Rhizobium spp.* isolates were tested against three fungi which are potential phytopathogens on legumes. Inhibition zones were observed, hence *Rhizobium spp.* can be used as biocontrol agent.

KEY WORDS: ANTAGONISTIC ACTIVITY, ANTIFUNGAL ACTIVITY, BIOCONTROL EFFECT, INHIBITION ZONE, *RHIZOBIUM SPP*

INTRODUCTION

Chemicals used to control plant diseases contaminate the soil environment, degrade its fertility and also defile underground water, causing health risk. Thus, biocontrol agents emerge as an alternate to those antifungal

chemicals, these are inexpensive, eco-friendly and have no harmful effects on human, animals and plants (Deshwal *et al.*, 2003). Legumes establish a symbiotic interaction with soil bacteria termed as Rhizobia. These bacteria in association with legumes can fix atmospheric N and through this feature. Hence, they are introduced

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ANTIMICROBIAL ACTIVITY AND PHYTOCHEMICAL ANALYSIS
OF *PHYLLANTHUS NIRURI* AND *CISSUS QUADRANGULARIS*
AGAINST HUMAN PATHOGEN

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ABSTRACT

Plants have been an important source of medicine with other qualities for thousands of years. *Phyllanthus niruri* commonly known as "Bhumi amla" with wide variety of phytochemical and their pharmacological properties is known. *Cissus quadrangularis* commonly called "Hadjod" is also one of the important medicinal plant. The plant is well known in Ayurveda for its bone healing properties. The present study was aimed at the determination of the antimicrobial effect of *Phyllanthus niruri* and *Cissus quadrangularis*. The study revealed that combination of *Phyllanthus niruri* and *Cissus quadrangularis* showed potent antimicrobial activity. The aqueous

extract, petroleum ether and methanolic extract of the two medicinal plant were subjected to *in vitro* antimicrobial assay employing against some human pathogen like *E.coli*, *Psuedomonas Species*, *Aspergillus niger* and *Aspergillus flavus* etc. Zone of inhibition were also determined. Among the plants tested, *Phyllanthus niruri* was most effective against pathogenic microorganism where as when their extracts were combined, it was found more effective than individual extracts of both the plants. *Phyllanthus niruri* and *Cissus quadrangularis* showed that almost all of the chemical constituents are present in them like tannin, alkaloids, saponin, flavonoids, steroids, starch etc.

KEYWORDS: Antimicrobial effect, flavonoids, phytochemical, *Phyllanthus niruri*, *Cissus quadrangularis*.

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Time efficient microwave mediated synthesis of silver nanoparticles using leaf extract of *Vinca rosea* and its antibacterial activity

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Abstract

The objective of this study was to develop time efficient microwave mediated synthesis of silver nanoparticles of *Vinca rosea* leaf extract and to study their antibacterial activity. The shade dried leaves of *Vinca rosea* were subjected to extraction with the help of microwave using water as solvent. The flavonoids and proteins present in plant extracts act both as reducing agent as well as capping agent. The method is time efficient as compared to conventional method of Soxhlet extraction which takes more than 24 hours whereas the same task was accomplished in less than 5 minutes. The compounds present in the aqueous leaf extract were identified by their phytochemical analysis. Silver nanoparticles were synthesized by adding 0.01 M silver nitrate solution.

The change in colour from light green to reddish brown confirmed the formation of nanoparticles. It was further characterized by SPR at 410 nm and zeta potential of 17.4 mV. The biosynthesized time efficient silver nanoparticles showed promising antibacterial activities against *S. mutans* bacteria which is responsible for tooth decay.

Keywords: Silver nanoparticles, *Vinca rosea*, antibacterial activity, zeta potential.

Introduction

Nanotechnology and metallic nanoparticles are finding growing uses in various fields of science, engineering and medicine. The changes in properties due to their small size and morphology have intrigued the scientists to study their synthesis and applications using various techniques. Among many nanoparticles, silver nanoparticles have been of particular interest due to their chemical stability, catalytic behaviour and anti-microbial activity.¹

Intelligent silver nano-systems can be used for drug delivery at specific areas and can be used in various fields of agriculture, disease diagnosis, anti-microbial activities and engineering technology. Several methods have been used to synthesize and stabilize silver NPs. Physical methods include evaporation-condensation and laser ablation of metallic bulk materials in solution. Chemical methods involve use of reducing agents like sodium borohydride, elemental hydrogen, Tollen's reagent etc.

These reducing agents reduce silver ion to silver which agglomerate into clusters. Use of protective agents is important to stabilize these NPs.²⁻⁴ Photochemical methods, microwave processing and biological synthetic methods have also been reported.⁵

However, the need of the hour is to develop clean, non toxic and eco-friendly procedures for synthesis and agglomeration of metal NPs. Physical and chemical sources of generation of silver NPs involve use of some hazardous materials or high energy radiation which are difficult to dispose of and cause environmental pollution thus limiting their use. In order to overcome the toxic side effects of chemical synthetic methods, emphasis was laid on development of greener methods using microwave for extraction process.

Vinca rosea is an evergreen shrub which is grown for its ornamental and medicinal value. Also known as Periwinkle or *Catharanthus roseus*, it belongs to the family Apocynaceae. It has been used as folk medicine in treating and managing diabetes, dysentery, haemorrhage and wound healing.⁶ Different plant parts like root, stem, flower, seeds have been reported to have antibacterial activity.⁷ Leaves of the plants have also exhibited antimicrobial activity.⁸

AgNP's synthesized from different plant extracts showed inhibition against many pathogens like *Staphylococcus*, *Lactobacillus*, *Escherichia coli* and *Pseudomonas* etc.^{9,11} AgNP's have received much attention in nano biotechnological research due to their physical, chemical and biological properties attributed to their catalytic activity and bactericidal effects. These AgNP's are efficiently used as antimicrobial agents, topical creams and as anticancer agents.¹²⁻¹⁴ Owing to vast potential of plant extracts as reducing as well as stabilising agents, this work aims at describing the synthesis of silver NPs using aqueous leaf extracts of *Vinca rosea*, their phytochemical analysis and antimicrobial activity against *S. mutans*.

Material and Methods

Silver nitrate (AgNO_3) of analytical grade was purchased from Thomas Baker Chemicals and was used without further purification. 0.01M AgNO_3 solution was prepared using Millipore water. Spectral studies were carried out by UV-Visible spectrophotometer (Systronic - 116) using a standard quartz cuvette having the path length of 1 cm. Antimicrobial activities against *S. mutans* were studied by well diffusion method.

Studies on fly ash based geopolymeric coating material compositions incorporated with TiO_2 and Fe_2O_3 nanoparticles for mild steel

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In the present studies, three different compositions of geopolymeric coating material have been developed utilizing fly ash, red mud, alkali activators and sodium dihydrogen phosphate. TiO_2 and Fe_2O_3 nanoparticles are added to the developed coating material compositions as additives. These compositions are applied to mild steel plates by spray coating technique. Further, adhesive strength, water stability and anti-corrosion behavior of geopolymeric coated mild steel plates are determined. Developed geopolymeric coating material compositions are characterized by mineralogy, bonding behavior and morphology by XRD, FTIR and SEM respectively. Results revealed that among all the three coating material compositions, composition containing nano TiO_2 exhibited best performance in terms of adhesive strength [3.1 MPa at 7th day], water resistance and corrosion resistance characteristics in 3.5 weight % sodium chloride solution by electrochemical measurements.

Keywords: Geopolymeric coating, Adhesive strength, Water stability, Electrochemical measurements

Mild steel is extensively used for different low tech and high tech commercial applications. During the course of time, mild steel surface undergoes excessive corrosion due to different types of aggressive environments including aqueous alkaline or acidic medium resulting in serious economic losses to the industries. Efforts are under progress to mitigate this problem by application of different organic and inorganic coatings on mild steel surface. Such type of coatings act as barrier and delayed or inhibits the corrosion process to provide effective corrosion protection to the substrate¹.

Now-a-days, increased environmental awareness among the researchers leading to the development of greener methods for product synthesis which involves less environmental hazards and also improved properties of the end products. Different studies in the area of corrosion protection of mild steel indicated the application of inorganic alkali activated aluminosilicate materials i.e. geopolymers on mild steel substrate because of its high chemical resistance, superior mechanical properties, possibility of tailoring the composition for specific application and also due to

their greener method of synthesis as compared to other commercially available organic coating materials²⁻⁴. Geopolymers are unique material having Si-O-Si and Si-O-Al linkages in three dimensional framework and they are known to provide corrosion protection to mild steel. The silicate and aluminate network in geopolymers exhibit high adhesion strength with mild steel and the inert nature of N-A-S-H network actively passivates the diffusion of ions from outer to inner environment and vice-versa to protect the surface from being corroded⁴. Work has been done in current years on addition of different types of additives to the geopolymeric gel matrix like silica fumes, nano- SiO_2 and Al_2O_3 , nano-clay, carbon nanotubes, CaCO_3 nanoparticles and their effect on properties of geopolymers have been studied and reported⁵⁻⁹.

According to the reported literature, the presence of nanoparticles (viz. SiO_2 , Fe_2O_3 , TiO_2 etc.) in the coating formulations greatly enhanced the corrosion resistant properties as well as mechanical performance^{10,11}. In the present studies, three different compositions of geopolymeric coating material for mild steel substrate were prepared utilizing fly ash, red mud, sodium dihydrogen phosphate (NaH_2PO_4),

[#]Authors equally contributed to this work.



Importance and Significance of Question Hour

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Abstract

The Rules changed in 1937, a part had to indicate the official assignment of the Government part to whom the inquiries was directed, as well as the name of the non-official part if the inquiry was routed to one. If a part handled an inquiry improperly, it was on to the department whose agent processed the inquiry to inform the Assembly department of which government part was prepared to respond to the question.

The Assembly Department moved on without further reference to the part who posed the inquiry on the paper for the first day designated for the appropriate response of inquiries by the Government part concerned for which the inquiry list had not yet been given, that the part posing the inquiry had not depleted his standard of inquiries for that day.

Keywords-: - Question, Importance, Brighter Future, Speaker,

A section expected to demonstrate the time on which the request was planned to be determined to the summary of answer rean quests. On account of an inquiry which was routed to the concerned Department yet the part accidentally gave an off-base date and needed an answer thereto on a day not saved for the Department which was worried about the topic thereof, the inquiry was put down on the following day accessible for that Department.

No Question was put on the rundown of inquiries for an answer until five sunny mornings' notification of the confirmation of an inquiry by the Speaker was given to the Government by the part worried, aside from on account of Short Notice Questions. Not more than five inquiries conceded for the sake of a similar part were called for an answer on any one day. Be that as it may, individuals could pull out of more than five inquiries which, whenever conceded, were completely imprinted in the last rundown of inquiries. However, individuals were not allowed to pose any of their five inquiries imprinted in the rundown.

The Questions were brought in the request wherein they remained on the rundown. No restriction was, be that as it may, recommended for unstarred inquiries to be posted on any one day by a part.



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Title

Origin of Questions in the Indian Parliamentary System

Authors

Dr. Shriji Seth

Abstract

Question is one of the important Parliamentary devices available to the Members to seek information on a matter of urgent public importance subject to conditions imposed by the Rules of Procedure, Conduct of Business in Lok Sabha, and the Directions by the Speaker. A Member may ask questions for the purpose of obtaining information on a subject matter of public importance within the special cognizance of the minister to whom it is addressed. The first hour of a sitting session of India's Lok Sabha is devoted to questions raised by Members of Parliament about any aspect of administrative activity. The Minister in question is required to respond to the Parliament, either orally or in writing, depending on the nature of the question raised.

Key Words

Questions, Lok Sabha, Parliament, Conduct of Business

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