Perelman SCHOOL OF MEDICINE
UNIVERSITY of PENNSYLVANIA

Department of Medicine
Division of Infectious Diseases

November 06, 2023

Consent letter from Overseas Host: To Whom It May Concern,

I, Dr. Raiees Andrabi, Associate Professor of Medicine, Division of Infectious Diseases, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, USA will be hosting Dr. Mohammad Iqbal Rather, Assistant professor, Department of Biochemistry, Govt Degree College Kulgam, Department of Higher Education, Govt of Jammu and Kashmir, India under SIRE Scheme of Science and Engineering Research Board, Ministry of Science and Technology, Govt. of India for his visit to my laboratory for undertaking the proposed research work entitled "Isolation of potent SARS-CoV broadly neutralising antibodies and their evaluation for therapeutic intervention in a small animal model" for a duration of 03-(three) to 06-(six) months.

The applicant from India will be supported his fellowship by Science and Engineering Research Board, Ministry of Science and Technology, Govt. of India.

I agree to defray the research cost involved with his research stay in my laboratory.

Sincerely,

Raiees Andrabi, Ph.D.
Associate Professor of Medicine
Perelman School of Medicine
Division of Infectious Diseases, Department of Medicine
University of Pennsylvania
Email: raiees.andrabi@pennmedicine.upenn.edu

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Eye Institute
Bethesda, Maryland 20892

J. Fielding Hejtmancik, M.D., Ph.D.
OMGS/OGVFB/NEI/NIH
Room 1N02E
5625 Fisher's Lane
Rockville, MD 20852
email: hejtmancikj@nei.nih.gov
phone: 301-496-8300
November 3, 2023

Rather Mohammad Iqbal, PhD
Assistant Professor,
Dept. of Biochemistry,
GDC-Kulgam,
University of Kashmir, Kashmir.

Dear Dr. Rather,

I am writing to support your application for a Science and Engineering Research Board SERB International research Experience in the Ophthalmic Molecular Genetics Section, Ophthalmic Genetics and Visual Function Branch, National Eye Institute, National Institutes of Health, USA. I have enthusiastic reports about you and your work from Dr. Mohd Hussain Shah and have verified that we can bring you on board as a special volunteer in the lab if you can verify that you have support for the visit. I also am enthusiastic about your proposal to investigate age related eye diseases such as age-related cataract through monitoring them at the epigenetic level including the effects of histone and DNA methylation and their possible reversal using epigenetic drugs, although I suspect in the short time you will have with us you may only be able to accomplish the monitoring phase of your project. I hope you are successful in your application and look forward to having you join our lab.

Sincerely,

James F. Hejtmancik -S

Digitally signed by James F. Hejtmancik -S
Date: 2023.11.03 14:47:04 -04'00'

J. Fielding Hejtmancik, M.D., Ph.D.
Chief, OMGS/OGVFB/NEI/NIH

Teachers Associateship for Research Excellence

Mandatory Attendance Certificate

TARE Reference Number TAR/2020/000169

This is to certify that **Dr. Mohammad Iqbal Rather**, Assistant Professor, GDC-Kulgam grantee of Teachers Associateship for Research Excellence has fulfilled the mandatory 90 days attendance for the period 15/12/21 t0 14/12/22 in our institute and become eligible for receiving the fellowship for the year 2021/2022.

Signature of the Mentor

विभागाध्यक्ष
Head
जैव प्रौद्योगिकी विभाग
Department of Biotechnology
जीवन विज्ञान स्कूल
School of Life Sciences
कश्मीर केन्द्रीय विश्वविद्यालय, गान्दरबल
Central University of Kashmir, Ganderbal

Signature and seal of the Registrar

कुलसचिव
Registrar
कश्मीर केन्द्रीय विश्वविद्यालय
Central University of Kashmir

Date: 04/05/23

Place: Ganderbal

RESEARCH & DEVELOPMENT SECTION
10/5/23

Put up shortly w/r.

11/05/23

DIRD

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Vulnerability of municipal solid waste: An emerging threat to aquatic ecosystems

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[h] Environmental Engineering Department, Middle East Technical University, Ankara, 06800, Turkey

HIGHLIGHTS

- Dumping waste materials into aquatic ecosystems poses a danger to all life forms.
- Deadly impacts of solid wastes on different ecosystem components are presented.
- MSW release concentrated contaminants, which are lethal for all ecosystems.
- Availability and long-term risks of contaminants from MSW are explained.

ARTICLE INFO

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ABSTRACT

Dumping waste materials into aquatic ecosystems leads to pollution, which directly and indirectly poses a danger to all life forms. Currently, huge quantities of wastes are generated at a global scale with varying constituents, including organic fractions, emerging contaminants and toxic metals. These wastes release concentrated contaminants (leachates), which are lethal for all ecosystems around the globe because they contain varying concentrations of chemical constituents with BOD_5 and COD in the order of 2×10^4–2.7×10^4 mg/L, and 3.4×10^4–3.8×10^4 mg/L, respectively. Herein, in-depth knowledge of municipal solid waste dumping into the aquatic ecosystems, changes in physicochemical characteristics, availability of in-/organic contaminants, and long-term unhealthy effects are presented. Moreover, an attempt has been made here to summarize the facts related to identifying the deadly impacts of waste on different ecosystem components. The unresolved challenges of municipal waste management are emphasized, which will help employ suitable waste management techniques and technologies to conserve the everlasting freshwater resources on earth.

1. Introduction

The rates of municipal solid waste generation have increased with high economic growth in a proportionate way. The diverse types of wastes produced include a municipal solid waste (MSW) (Parveen et al., 2020), "radioactive waste" (Links, 2006), biomedical (Azam et al.,

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Ceratophyllum demersum-An accretion biotool for heavy metal remediation

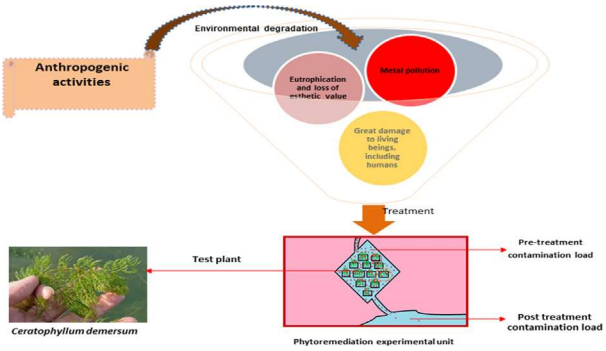
Humaira Qadri *, Baba Uqab, Ovais Javeed, Gowhar Hamid Dar, Rouf Ahmad Bhat

Sri Pratap College, School of Sciences, Cluster University Srinagar, Srinagar-1, India

HIGHLIGHTS

- *C. demersum* is the dominant colonizer in eutrophic Dal lake.
- The order of metal uptake efficiency of *C. demersum* is Co > Cd > Mn > other metals.
- The carbohydrate- protein plot reveals positive correlation with metals.
- Uptake of Cr and Mn is synergistic to lipid-proteins.
- *C. demersum* can be used as an efficient remediation tool for heavy metals.

GRAPHICAL ABSTRACT



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Protein

ABSTRACT

Freshwater habitats are under serious threat due to the diverse pressures of development and restoration of these ecosystems is an important challenge in the present era. With a number of scientifically advanced methods available for restoration of these systems, phytoremediation finds its unique space as an ecologically sustainable technique. In this paper, a case study of *Certophyllum demersum* as a tool of heavy metal remediation in Dal lake, a natural freshwater system in Kashmir, India is presented. At all concentrations (2 ppm, 4 ppm, 6 ppm) the metal accumulation efficiency of *C. demersum* is of the order of Co > Cd > Mn followed by other metals. The carbohydrate- protein plot reveals positive correlation (0.696) with the heavy metal uptake while the lipid-protein plot overall shows a weak correlation (0.296) and the carbohydrate-lipid plot shows an insignificant correlation (0.019). The results of the present study revealed attenuation of protein levels at low doses which lowered with increased heavy metal concentrations. Further, the overall lipid and carbohydrate content of the cultured *C. demersum* displayed a general decline with a rise in the concentration of heavy metals The overall study indicates the efficiency of *C. demersum* to adapt in polluted conditions and its potential to remove heavy metals for sustainable restoration of the degraded aquatic systems.

1. Introduction

Natural freshwater habitats reflect the global hydrological cycle from terrestrial phases and include rivers, streams, lakes, ponds, wetlands, as well as groundwater (Heino et al., 2021; Tockner, 2021). Although freshwaters represent just 0.01% of the Earth's water and make up less than one-tenth of the global land surface area, they sustain >10% of all documented organisms and ~30% of all vertebrate species (Dudgeon et al., 2006; Cantonati et al., 2020). During present times the degradation of freshwater ecosystems, due to the numerous fundamental factors such as overpopulation, industrialization, accelerated urbanization, overuse of pesticides, detergents and farm chemicals,

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The first ergatoid male of *Platythyrea* (Hymenoptera: Formicidae: Ponerinae), with contribution to colony labor suggested by observation and comparative morphology

Brendon E. BOUDINOT, Aijaz Ahmad WACHKOO & Himender BHARTI

Abstract

The first ergatoid male for the ant genus *Platythyrea* is discovered and described. The male of *P. sagei* FOREL, 1900, in addition to being apterous, is unique among *Platythyrea* species for bearing elongate scapes. In the field, males of *P. sagei* were observed leaving and returning to a nest with workers, some with debris in their mandibles. The male morphology of *P. sagei* is contrasted with the worker and with female / male sets for eight *Platythyrea* species. Although based on limited observation, a role in colonial labor for the ergatoid males is supported by the elongate scapes, anteroposteriorly long pronotum, and robust scapes. A lectotype of *Platythyrea sagei* is designated.

Key words: Taxonomy, lectotype designation, morphology, colony life cycle, convergent evolution, winglessness.

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Introduction

Platythyrea is the sole genus of the ponerine tribe Platythyreini, and is sister to the Ponerini (SCHMIDT 2013). The genus comprises six extinct and 38 extant species, for which males of 15 species are described (Tab. 1). *Platythyrea* species have remarkable biology, which is reviewed in SCHMIDT & SHATTUCK (2014). Particularly, there is considerable variation for reproductive females: Most species have alate queens and gamergates (reproductive workers), some species have gamergates only, one species has ergatoid queens only (apterous worker-like queens), and another has variably developed queens and gamergates which may reproduce via thelytokous parthenogenesis (MOLET & PEETERS 2006, SCHMIDT & SHATTUCK 2014). Here, we describe the ergatoid male of *P. sagei*, a species without winged queens. This is the first known ergatoid male in the genus. Contribution to colony labor by the male of *P. sagei* is suggested by observation and comparative morphology.

Materials and methods

Specimens were examined with a Wild M5 stereomicroscope with 50× maximum magnification (BEB) and a Nikon SMZ 1500 stereomicroscope with 120× maximum magnification (AAW). Measurements were carried out by AAW using a calibrated Nikon ocular micrometer. Dissections were carried out in a watch glass filled with 95% ethanol with a flattened piece of Blu-Tack (Bostik, Paris, France) for specimen stabilization. Images were montaged using stacked micrographs captured with a JVC KY-F57U digital camera mounted on a Leica MZ 16.A microscope using Auto-Montage Pro (Synoptics Ltd., Cambridge, England); all images were edited in Photoshop CS5 (Adobe Systems Inc., California, U.S.A.) and figures were composed using Illustrator CS6 (Adobe Systems Inc., California, U.S.A.). Terminology systems are from the following sources: head (BOUDINOT & al. 2013), mesosoma (BOUDINOT 2015), and genitalia (BOUDINOT 2013). The term frontal lobe is here used to describe the structure formed by the fusion of the frontal carina itself and the dorsal torular arch, although this usage is not necessarily recommended.

Measurements and indices: All metrics were recorded in millimeters to three significant figures and are presented to two significant figures due to measurement error and / or variation in specimen orientation. Metrics are listed in alphabetical order. Two scape indices are provided to account for head capsule allometry.

EL Eye length, maximum diameter of eye with head oblique to show full eye surface.

GL Gaster length, maximum length of the gaster in lateral view from the anteriormost point of the first gastral segment (third abdominal) to the posteriormost point.

HL Head length, length of head capsule from anterior clypeal margin to mid-point of posterior head margin in full-face view.

HW Head width, maximum width of head, excluding eyes, in full-face view.

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Evaluation of polyphenols as possible therapeutics for amyloidoses: Comparative analysis of Kaempferol and Catechin

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ABSTRACT

Several mammalian proteins fold abnormally under non physiological conditions, to form pathological deposits that are associated with many degenerative diseases. In vitro variation of solvent conditions and pH can lead to partial unfolding and subsequent fibril formation. In the present study, we examined the effects of low pH on goat brain cystatin (GBC) with a focus on amyloid fibril formation. The results demonstrate that GBC can form amyloid like fibrils at pH 3.0. Moreover this study is aimed at exploring the inhibitory activity of polyphenols, Kaempferol (KM) and Catechin (CA) against the fibrillation of GBC. Using fluorescence spectroscopic analysis with Thioflavin T, CD and electron microscopic studies, anti-fibrillation effects of polyphenols, KM and CA were analyzed. The study also revealed that KM and CA produced a concentration dependent anti-fibrillogenic effects with KM producing more pronounced effect compared to CA. The study proposed a mechanistic approach assuming structural constraints and specific aromatic interactions of polyphenols with β sheets of GBC fibrils.

1. Introduction

Proteins are involved in all stages of cellular activities, ranging from transport, cell adhesion, accepting and transmitting signals, metabolic reactions, harness energy to pump molecules through membranes, changes in cytoskeleton, regulation at the gene and RNA levels, etc. An active protein conformation is required for successful cell functioning. The failure of a specific protein to adopt its native functional conformation may result in pathological conditions known as "protein misfolding diseases." Misfolding diseases include a wide range of diseases with different pathological mechanisms [1]. The exact cause underlying protein misfolding and aggregation remains unknown. However several factors (protein sequence, pH, temperature and the presence of metal/toxicants) induce partially denatured intermediate (misfolded protein) between folded and unfolded forms that is susceptible to aggregation. One of the most common groups of misfolded diseases is the amyloidoses, which involves the aggregation of the specific proteins into ordered, insoluble, extracellular deposits [2]. These protein deposits contain fibrillar protein assemblies characterized by their specific dye-binding properties, cross-β X-ray fibre diffraction pattern and macroscopic long, straight and unbranched morphology [3]. Amyloidosis may be hereditary, caused by the deposition of the following proteins: transthyretin, lysozyme, cystatin C, apolipoprotein AI, gelsolin. Cystatin C amyloidosis presents as cerebral amyloid angiopathy with silent systemic deposits. Gelsolin amyloidosis presents cranial neuropathy. Apolipoprotein A-I and lysozyme present non neuropathy systemic amyloidosis that can affect all major viscera [4].

Amyloid fibril formation, a protein dysfunction often pronounced, extracellular or intracellular fibril deposits in vital organs, is a source of several debilitating diseases [5], distinguished by the location of amyloid deposits in the body. These diseases are difficult to treat because they are refractory to most of the current drugs and using multiple medications had been unsuccessful so far. However; attractive therapeutic approaches are based on the idea of smoothing the protein landscape to prevent accumulation of aggregation-prone or toxic species. Proteolytic cleavage is an especially interesting therapeutic target, because proteolytic enzymes may be susceptible to the development of high potency small molecule inhibitors, this is major strategy for Alzheimer's disease, aiming to decrease or prevent b-amyloid peptide formation, based on the inhibition of γ- and β-secretase activities or enhancement of α-secretase activity. Since Aβ formation proceeds into amyloid plaque formation and neuronal death, blocking its production may constitute rational therapeutic approach in AD [6,7].

Abbreviations: GBC, goat brain cystatin; KM, Kaempferol; CA, Catechin; μM, micromole.

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