Patents

Patent-1

File no: 202341001562

Title of Invention: Development of CuONPs Using *Dictyota Dichotoma* – Anti- Oxidant And Anti-Microbial Activity (Published On: 13th January, 2023)

Office of the Controller General of Patents, Designs & Trade Marks
Department of Industrial Policy & Promotion,
Ministry of Commerce & Industry,
Government of India

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Application Details	
APPLICATION NUMBER	202341001562
APPLICATION TYPE	ORDINARY APPLICATION
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APPLICANT NAME	1 . Dr. N. John Sushma 2 . K. Sai Manogna 3 . Dr. B. Deva Prasad Raju 4 . K. Kusuma
TITLE OF INVENTION	DEVELOPMENT OF CuONPs USING DICTYOTA DICHOTOMA - ANTI-OXIDANT AND ANTI-MICROBIAL ACTIVITY
FIELD OF INVENTION	BIO-CHEMISTRY
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Awards

On 20th June, 2023 received Andhra Pradesh State Best Student of the year-2023 from honourable chief minister of Andhra Pradesh

ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A STATUTORY BODY OF THE GOVERNMENT OF A.P.)

APSCHE EXCELLENCE AWARDS - 2023

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This certificate is proudly presented to

Kandati Kusuma

pursuing II Year Ph.D in *Sri Padmavathi Mahila Viswavidyalayam, Tirupati* for securing the First position in the State Level APSCHE EXCELLENCE AWARDS - 2023 in the category of Best Student Award held on Thursday, 04th May 2023 at Andhra Pradesh State Council of Higher Education, Mangalagiri.

Prof. Y. Nazeer Ahammed
Secretary, APSCHE

Prof. K. Hemachandra Reddy
Chairman, APSCHE

- The findings of our publication titled "**The Influence of Probiotics in Reducing Cisplatin Toxicity in Zebrafish (Danio rerio)"** have been published as **Current Science Reports in the issue of May 10, 2023.**

In the course of their literature survey, the team came across a cysteine-rich protective antigen of the parasite. The residues of the amino acid, cysteine, interlinked with each other to create a protein structure, used by the parasite to enter red cells. The protein exhibits high immunogenicity and induces neutralising antibodies. A perfect candidate.

But the large-scale production of these antigens remained a challenge. To resolve the problem, the group cloned the gene sequence coding the antigen and inserted it into *E. coli*.

The *E. coli* were cultured. After breaking *E. coli* cells, the researchers extracted the protein from the insoluble fraction.

To purify the protein, the researchers first unfolded the protein and then refolded it to its native conformation. They confirmed the quality of the refolded purified protein using reverse phase high performance liquid chromatography.

Satisfied with their method for producing the antigen, they scaled up the production using fermenters.

Now the issue was adjuvant for the vaccine formulation. The group tested formulations with three different human compatible adjuvants: AddaVax, Monatide ISA 720 and Alhydrogel. They immunised mice with the purified protein and found a strong antibody response with all three formulations.

The efficacy of the antibody in the alhydrogel formulation was greater than found in the other two.

But why is there this variation in the effects? The team checked.

The antigen in the Alhydrogel formulation induced secretions of different cytokines such as the tumour necrosis factor alpha, interleukin 4 and interleukin 6. This was not the case with the other formulations.

But is the formulation effective enough to neutralise different strains of Plasmodium?

The group evaluated its efficacy against the strains 7G8, Dd2, FVO and HB3. They observed 80 to 96 per cent inhibition of erythrocyte invasion by these strains.

The cysteine-rich protective antigen monomer forms complex oligomers. Which one induces the better immune response - the monomer or the oligomer?

The team found that antibodies induced by monomers inhibited erythrocyte invasion better than those induced by oligomers.

The cysteine-rich protective antigen seems to be more effective than the one that is currently in use.

However, further *in vivo* studies followed by clinical trials are needed for the vaccine candidate to be used in clinical settings.

DOI: 10.3389/fimmu.2022.1005332

Cisplatin Toxicity

Probiotics mitigate?

Cisplatin, a widely used cancer chemotherapy drug, arrests DNA replication, ultimately resulting in cancer cell death. Although this platinum-based drug effectively treats advanced cancer, it also causes severe side effects on the kidneys, ears and brain, affecting the quality of life of cancer patients undergoing treatment.

To reduce these side effects, can we use probiotics that promote gut health, boost the immune system and reduce inflammation?

Buddolla Viswanath and team from Dr. Buddolla's Institute of Life Sciences, Tirupati recently investigated the possibility. To test their hypothesis, the research team conducted experiments using zebrafish, a popular animal model in biomedical research.

They exposed the zebrafish to cisplatin and found that the drug caused various side effects, including histopathological abnormalities. Cisplatin-treated tissues lost intact basement membranes surrounding the intestines. It also caused ovarian damage and a decrease in follicle number.

On the zebrafish exposed to cisplatin, the researchers administered *Bacillus megaterium*, a large bacillus known for its ability to produce compounds with antimicrobial, anti-inflammatory and antioxidant properties. The probiotic reduced side effects. The follicles and epithelial barriers in the intestines remained normal and intact.

What is the underlying mechanism of the reduced toxicity?

The team measured the reactive oxygen species scavenging activity in the intestines and ovaries of zebrafish treated with cisplatin along with the probiotic.

They found that the probiotic increased scavenging activity in both organs.

They measured the levels of enzymes involved in scavenging reactive oxygen species - glutathione reductase, glutathione peroxidase, catalase, and superoxide dismutase. *Bacillus megaterium* reduced lipid peroxidation and increased the levels of all the enzymes involved in scavenging reactive oxygen species. This suggests that the probiotic works by reducing the oxidative stress caused by cisplatin.

The research provides evidence for the potential use of *Bacillus megaterium* to reduce the toxic effects of cisplatin-induced toxicity. However, further studies are needed to determine its efficacy and safety in other animal models and human subjects.

DOI: 10.1007/s00284-023-03203-5

Spontaneous Cancer Regression

Target genes identified

Almost all cancers seem capable of regressing spontaneously. This regression is thought to be caused by The activity of certain biomolecules in the immune system. However, the genes involved in spontaneous regression are poorly understood.

Recently, scientists from IIT Varanasi, the Indian Institute of Information Technology, Nagpur, Jawaharlal Nehru University, New Delhi and Shiv Nadar University, Delhi collaborated to gain insights into the biomolecules involved in tumour regression.

They injected rats with a malignant cell culture. About 35 per cent of the rats developed malignant tumours and died. But 65 per cent showed a decline in tumour cells and their tumours completely disappeared.

Investigating the activity of the immune system of this group, the researchers found that the infiltrating leukocyte cells - T cells and natural killer cells - were highly activated.

Received Best Presentation award for presenting oral talk on "The influence of probiotics in reducing cisplatin toxicity in zebrafish" at The International Conference on Global Trends in Applied Sciences, Medical, and Health Sciences organized by the School of Applied Sciences, REVA University, Bangalore. (28th & 29th October 2022)

REVA UNIVERSITY
Bengaluru, India

UMS

School of Applied Sciences, REVA University
in collaboration with
Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah

Best Oral Presentation Award

This is to certify that

Kusuma Kandati, Sri Padmavati Mahila Visvavidyalayam (I st prize)

for winning the Best Oral Presentation Award in a Faculty Category for the paper entitled The influence of Probiotic in reducing cisplatin-toxicity in Zebrafish.

during the 2nd International Conference on "**Global Trends in Applied Sciences, Medical and Health Sciences (ICGTAMH-2022)**" held from 28th -29th October 2022.

Prof. Shilpa. BR
Convener-ICGTAMH-2022
Deputy Director - SoAS
REVA University

Dr. Pasupuleti Visweswara Rao
Convener, ICGTAMH-2022
Director, International Relations & Research Collaboration, REVA University

Dr. M. Dhanamjaya
Vice-Chancellor
REVA University

Received Best Presentation award for presenting oral talk on "**A Novel Approach for Overcoming Antibiotic Resistance *through Tamarindus indica Seed Extract Mediated Polyphenol***

Functionalized Magnesium Oxide Nanoparticles With Possible Molecular Mechanisms" at International Conference on "BioTech-MicroCon: Shaping the sustainable future" Organized by Department of Biotechnology & Department of Applied Microbiology, SPMVV, On 22nd & 23rd December 2023

Received Best Presentation award for presenting an oral talk on **Exploring the Protective Effects of Probiotics Against Cisplatin-Induced Toxicity in Zebrafish (*Danio rerio*) at 4th Annual International Conference on Applications of Millets and Probiotics on Cancer Therapy and**

Management (ICAMP 2024) Organized by School of Life Sciences & Association of Cancer Education and Research, B. S. Abdur Rahman Crescent Institute of Science and Technology, in association with Purdue University, USA On 30th & 31st January 2024

Crescent
Institute of Science & Technology

Certificate
of Participation

This certificate is presented to

Kandati Kusuma

Research Scholar from **Sri Padmavati Mahila Visvavidyalayam** presented a paper title **"Exploring the Protective Effects of Probiotics Against Cisplatin- Induced Toxicity in Zebrafish (Danio rerio)"** and won **Best Presentation Award** in the **"4th Annual International Conference on Applications of Millets and Probiotics on Cancer Therapy and Management (ICAMP 2024)"** organized by School of Life Sciences and Association of Cancer Education and Research (ACER), B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai, India In association with Purdue University, USA held on **January 30 & 31, 2024**.

Dr. P. Ashok Kumar
Coordinator

Dr. Neesar Ahmed
Coordinator

Dr. S. Hemalatha
Organizing Secretary

Certificate No.: 20240131102