



DAHM RESEARCH

NANOTECHNOLOGIES IN ANIMAL HEALTH AND THERAPEUTICS. NEW TOOL FOR NANODRUG DEVELOPMENT

S. Vijayakumar & M. Anjugam
(Research Scholars)

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"The Greatness of a Nation and its Moral Progress can be Judged by the Way its Animals are Treated."

Mahatma Gandhi

Detection and intervention are two important tools of an integrated animal disease management strategy that is critical to significantly reducing losses/ threats from the disease, and/or eradicating disease, or preventing disease introduction into the animal production. Nanotechnology has the potential to enable revolutionary changes in this area, and some specific may be feasible in near future given the current and development. Nanotechnology offers



in detection and diagnostics including high specificity and detection of multiple targets, rapid, robust, on-

g, communication, convenient to use, and cost. The uses of portable, portable or wearable devices are particularly welcome in agricultural applications. Early detection is relative so that quick, simple and intensive treatment strategies can



be taken to remedy the situation.

Nanotechnology based drugs and vaccines can be more effective in treating/preventing the diseases than current technologies, thus reducing cost. Precise delivery and controlled release of nanotechnology enabled drugs leave little footprint in the animal waste and the environment, which alleviate the increasing concern of antibiotic resistance, and decrease health and environmental risks associated with the use of antibiotics. The targeted delivery and active nanoparticles may enable new drug administration's that are convenient, fast, non-intrusive to animals, and cost effective. Theragnostics a new generation of smart treatment combining diagnostics and therapy in a single step via nanotechnology will further improve disease treatment efficiency and cost, and eliminate the diseases at early stage, even pre-clinically. The effectiveness of new drug delivery technology platforms must first be established using pharmacokinetic and pharmacodynamic studies in vivo to investigate the relationship between dose, drug concentration at the site of action, and drug response. Only then can a new drug delivery system be deployed. Research and development for dealing with zoonotic diseases should collaborate with expertise from the human and veterinary medical communities for a more effective advancement.

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UTILIZATION OF AGRO WASTE FOR SYNTHESIS OF METALLIC NANOPARTICLE TO TREAT BACTERIAL BIOFILMS AND CANCERS

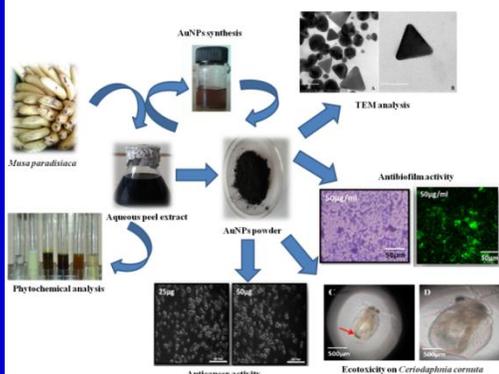
S. Vijayakumar

DST-INSPIRE

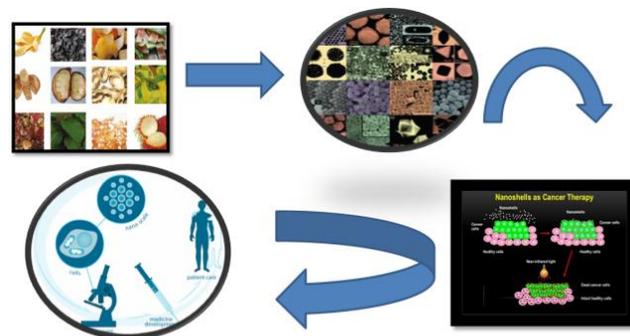
(Research Scholar)

Huge economic losses emanating from poor postharvest management practices and growing awareness about

the benefits of processing of perishable commodities has led to an increase in the processing of horticultural commodities worldwide. Increase in processing of horticultural commodities also results in generation of a huge quantity of residues. The non-edible portion of fruits and vegetables after processing (waste), such as peels, pods, seeds, skins, etc., accounts for about 10–60% of the total weight of the fresh produce. Such waste poses increasing disposal and potentially



severe pollution problems and represents a loss of valuable biomass and nutrients. Fruit and vegetable processing waste is rich in organic matter, phytochemicals, and compounds with nutraceutical properties. However, due to nonavailability of proper infrastructure to handle such a large quantity of biomass and in the absence of any established commercial use



Science is the acceptance of what works and the rejection of what does not, That needs more courage than we might think.

for such an invaluable biomass, it is poorly disposed of, leading to environmental pollution problems.

Because of the significant presence of cellulose, hemicellulose, pectin, minerals, vitamins, and low lignin content, this waste offers a huge potential for its conversion into useful products, such as enzymes, ethanol, and biocolors. Orange peels, banana peels, cauliflower waste, peapods, apple pomace, pineapple waste, etc. have been exploited as substrates for production of industrially important enzymes such as cellulases, amylases, pectinases, proteases, etc. through fermentation at a laboratory scale, however, commercial application of such wastes has not been fully realized.

We have recent studied and reported the article MPPE-AuNPs to analyze the phytochemical constitution of *Musa paradisiaca* fruit peel extracts. In addition, the synthesis and characterization of gold nanoparticles using *M. paradisiaca* fruit peel extract (MPPE-AuNPs) was performed. The potential of MPPE-AuNPs to inhibit the biofilm of multiple antibiotic resistant strains (MARS) of *E. faecalis* was investigated. The anticancer leads of MPPE-AuNPs were investigated on the human (A549) lung cancer cell lines. Lastly, the ecotoxicity of MPPE-AuNPs was determined on the freshwater microcrustacean *Ceriodaphnia cornuta*. The results of the present study will facilitate easy green synthesis of gold nanoparticles using food waste materials and their effective applications in biomedical fields as antibacterial dressings, antibacterial and anticandidal drugs, cancer treatments, proteasome inhibitors, cosmetic industries as sunscreen lotion and anti-aging creams, food sector as antibacterial coatings, and pharmaceutical sectors as medicines and drug formulations.

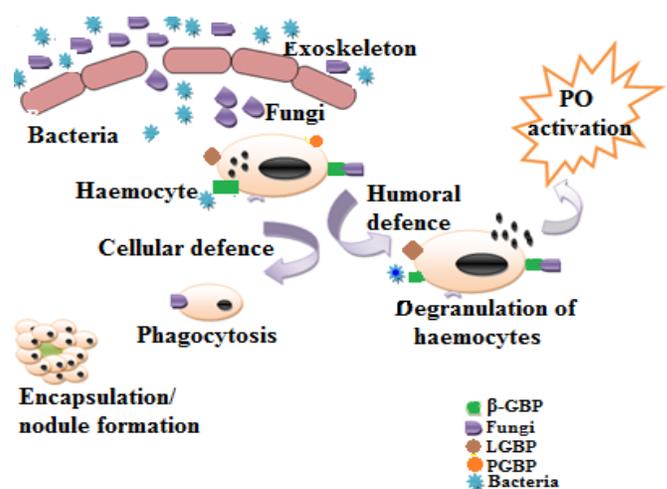
INVOLVEMENT OF PRPs IN CRUSTACEAN DEFENSE SYSTEM

M. Anjugam & A. Iswarya

DBT-JRF DBT-JRF

(Research Scholars)

Basically all multicellular organisms possess various defense systems to protect themselves against invading microorganisms. These defense systems are crucial for their survival and perpetuity. Unlike vertebrates, invertebrates do not have immunoglobulin; therefore most invertebrate species show no evidence of acquired immunity. They have developed unique modalities to detect and respond to microbial surface antigens, such as lipopolysaccharide (LPS), peptidoglycan and β -glucan. These surface antigens are collectively known as Pathogen associated molecular patterns (PAMPs). Hence, the protection mechanism of crustaceans depends exclusively on the innate immune system that is stimulated by PAMPs found on the surface of bacteria and fungi.



In wonted conditions, crustaceans maintain a healthy state and keep infections under control. Externally they are covered by a hard, rigid exoskeleton that functions as an efficient physicochemical barrier against mechanical gash and microbe invasion. However, once the cuticle barrier gets disrupted, pathogenic microorganism can penetrate into the haemocoel and thereby activating the immune defences of crustaceans.

In the time of pathogen introduction into the host, there are some proteins to identify whether the intruder is self or non-self. Such type of proteins are known as pattern recognition proteins or receptors (PRPs/PRRs) which includes β -glucan binding protein (β -GBP), Gram negative binding protein (GNBP), peptidoglycan recognition proteins (PGRPs), lipopolysaccharide and β -glucan binding proteins (LGBP), and which in turn, elicit cellular or humoral effectors mechanisms to devastate invading pathogens in innate immune system of crustaceans. Each PRPs can bind specifically to microbe/pathogen-associated molecular patterns (M/PAMPs), which are molecules shared by groups of related microbes. Hence, for the better survival of invertebrates especially crustaceans, researchers focused on aquaculture to minimize the mortality of such animals by triggering their innate immune system to compete the invading microorganisms.

BENEFICIAL EFFECTS OF COMPLIMENTARY ALTERNATIVE MEDICINE IN TYPE 2 DIABETES

R. Anjali

DST-INSPIRE

(Research Scholar)

Diabetes is a rising global health problem and affects people of all ages. Globally the overall prevalence of diabetes is predicted to double from 171 million to 366 million by 2030 with a maximum increased in India. Currently India is facing an uncertain future in relation to the potential burden that diabetes may impose upon the country. Different forms of therapies such as oral medication and insulin are available to manage the type 2 diabetes. Despite their beneficial effects, these drugs often exhibits side effects, viz., weight gain, weakness, stomach bloating, diarrhea and lactic acidosis in a patient with abnormal kidney or liver, thus encouraging the development of more efficient and safe alternative diabetic medicines. Alternative medicine is used instead of standard medical treatment. It is distinct from complementary medicine is not to replace and standard medical practices. Patients are now practicing different alternatives medicines in holistic approach in order to overcome the majority of the chronic disease including diabetes. Complimentary alternative medicine therapies fall into three categories such as whole medicinal system, biological based practices and Mind body practices. Furthermore, a recent literature review found that the usage of complimentary alternative medicine (CAM) among people living with diabetes ranged from 17% to 73%. A study was conducted among Karaikudi Population by our research team to find out the prevalence of CAM usage was 45.4% among the Karaikudi

“The whole of science is nothing more than a refinement of everyday thinking”

diabetes patients. Among this group, 91.3% were aware of CAM and reported using both biological and mind body based practices. 54.9% of the CAM user reported that they are satisfied within the CAM treatment. Better glyceemic control was observed in CAM users when compared to non CAM users. The study concludes that the patients who underwent regular exercise practices showed improved glyceemic control reduce oxidative stress and effective antioxidant properties, being crucial for improving the mitochondrial function among the type 2 diabetes.

DAHM EVENTS

MEMORABLE ACHIEVEMENTS OF DEPARTMENT OF ANIMAL HEALTH AND MANAGEMENT

➤ **Department achievement**

The Department of Animal Health and Management of Alagappa University celebrated the global event, World Animal Day on 4th October 2016, Tuesday at 10.30 am in the Conference hall, Science campus. It was inaugurated by **Dr.V.Balachandran**, Registrar i/c of Alagappa University and he pointed that how to treat and protect the animals and the welcome speech delivered by **Dr.B.Vaseeharan** Professor and Head, Department of Animal Health and Management. He conversed be thankful to the animal life in all its different forms, to value and preserve humankind's relationship with the animal kingdom.



The special address conveyed from **Dr.G.Archunan**, Professor and Head, Department of Animal Science, Bharathidasan University and he delivered how animals helped to preserve ecological balance and improve the animal welfare. The thematic address by **Dr.T.R.Gurumoorthy**, Dean of Research, Alagappa University

“By denying scientific principles, one may maintain any paradox”

delivered a talk on this occasion about how to respect and love the animals and improved standards animal welfare throughout the world. The celebration ended with the vote of thanks given by **Dr.P.Kumar**, Assistant Professor, Department of Animal Health and Management. It was very useful program to increase the awareness and it will lead the way to improved standards of animal welfare throughout the world.



➤ **Achievement by DAHM Faculty**

Dr. M. Biruntha, Assistant Professor, has participated in the National Conference on “Biotechnology – New Horizons and Hopes 2016 (BNHH - 2016)” on 20-21 October, 2016 at Madurai Kamaraj University, Madurai and also participated in National seminar on Advances in Computer Science NSACS 2016 on 22nd October at Department of Computer Science, Alagappa University.

Mrs. S. Manju has been awarded Ph. D., in Zoology under the Guidance of **Prof. B.Vaseeharan**, Head, Department of Animal Health and Management. Miss.M.Latha, Mrs.R.G.Nisha and Miss. K.Devi has been awarded Ph.D., in Animal Health and Management under guidance of **Dr.N.M.Prabhu**, Assistant Professor, Department of Animal Health and Management.

All the Faculty Members and from Animal Health and Management attended and presented papers in International Conference on “Recent Trends in Microbiology” (RTM – 2016) during 7th and 8th December, 2016 organized by Department of microbiology, Alagappa University.

“Your assumptions are your windows on the world. Scrub them off every once in a while, or the light won't come in”

➤ **Achievement by DAHM students**



The Animal Health and Management Students have participated and won many prizes in cultural Events of Alagappa University Talent Exhibit show (ALUTES')2016 on 5th October 2016 organized by Alagappa University.

Research Scholars and PG students attended the National level workshop on Gas Chromatography (GC-DMB-2016) organized by Department of Microbiology, Alagappa University held on 15th December, 2016.

All the research Scholars from Animal Health and Management attended and presented papers in International Conference on “Recent Trends in Microbiology” (RTM – 2016) during 7th and 8th December, 2016 organized by Department of microbiology, Alagappa University.

“Ask not what your country can do for you ; ask what you can do for your country”