

Life Science/Biomedical Science



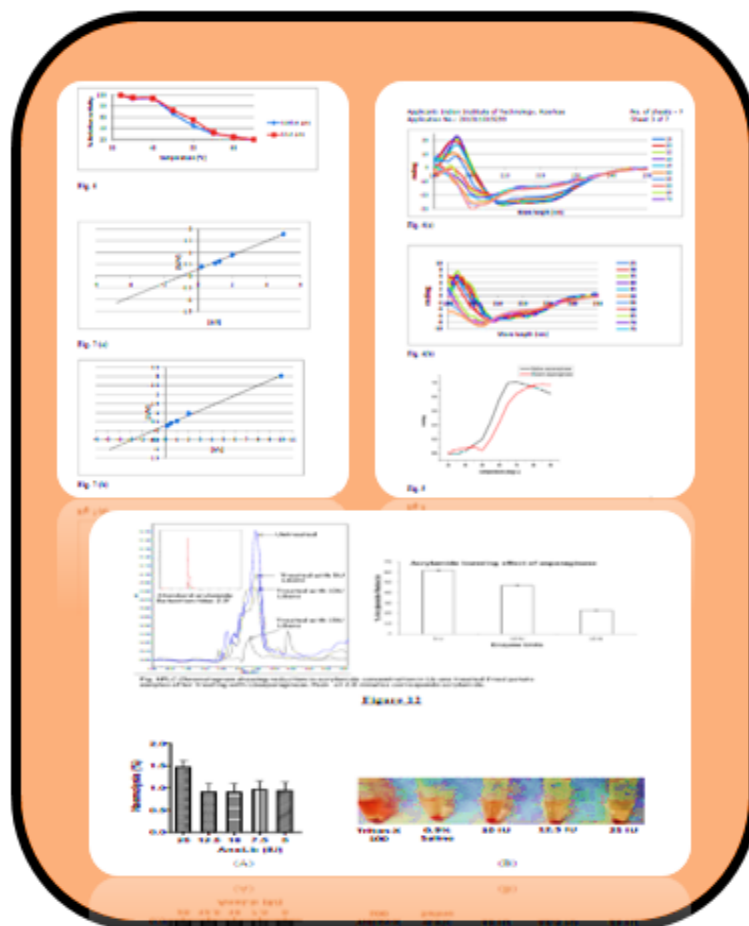
1. Title: Asparaginase and its variants

Name of the inventor: Naveen Kumar Navani, and Tamoghna Ghosh (BT)

Application number: 201811019299(IN)

Date of Patent Filing: 23.05.2018

Summary: The present invention is to provide an effective mutant of bacterial enzyme from probiotic source i.e. *Lactobacillus brevis* NKN55 with improved efficacy and thermostability useful for therapeutics and food industry. L-asparaginase increased enzymatic reaction optimum temperatures with no significant alteration to substrate affinity and reaction velocity. The substrate affinity of the mutant enzyme was calculated by Michaelis-Menten equation. It also provides therapeutically effective and immunologically-distinct, alternative and stable mutated form of L-asparaginase enzyme from a food grade probiotic lactic acid bacterium and also by using site specific mutagenesis.



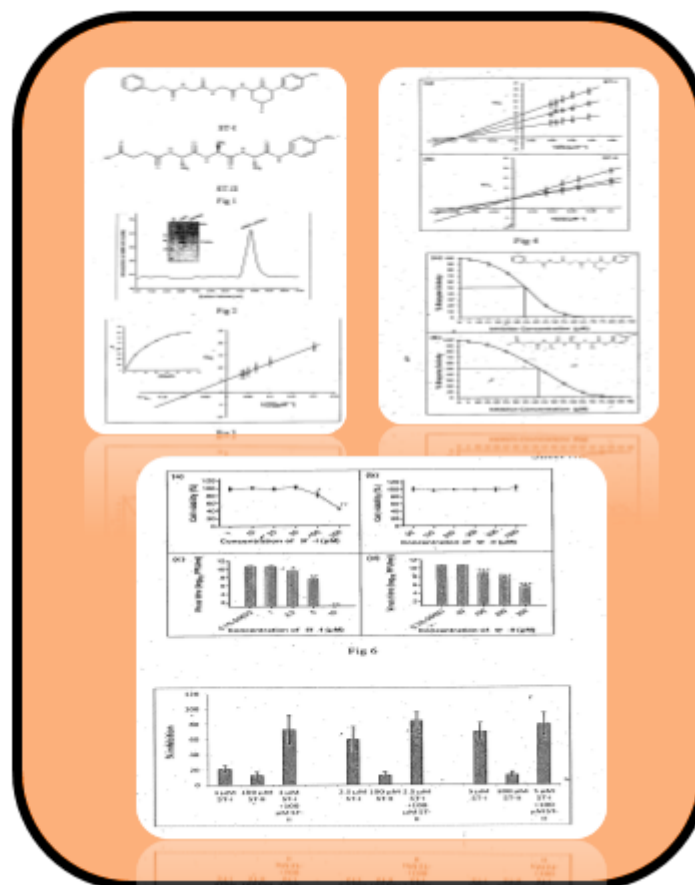
2. **Title:** – Chikungunya virus protease inhibitors and used thereof

Name of the inventor: Shailly Tomar, Pravindra Kumar, Harvijay Singh, Rajat Mudgal (BT)

Application number: 201811022065(IN)

Date of Patent Filing: 13.06.2018

Summary: The invention provides the methods for inhibiting nsP2 protease and Chikungunya viral infections. These protease inhibitor compounds have their inhibitory effects on the purified nsP2 enzyme from Chikungunya virus and these compounds inhibit virus replication in cell culture-based assays.



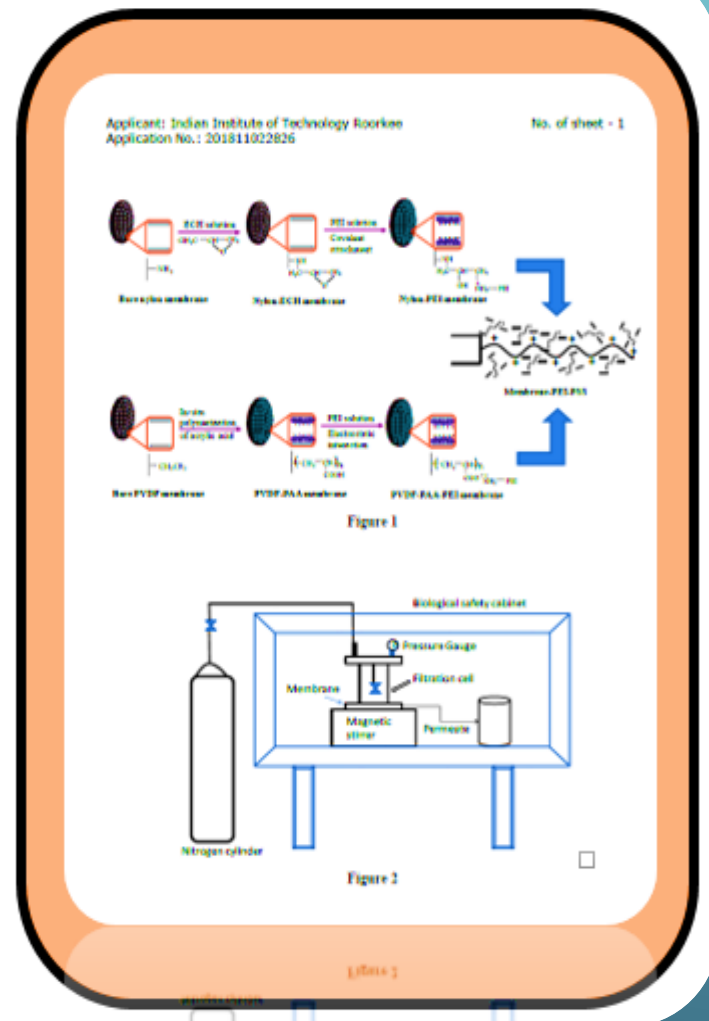
3. Title: A virus removal/recovery membrane and its preparation method

Name of the inventor: Saurav Datta, Ayushi Agarwal and Anju Kumari (BT)

Application number: 201811022826(IN)

Date of Patent Filing: 19.06.2018

Summary: The Invention is in the field of virus filtration. The Invention particularly provides a reusable functionalized highly permeable membrane for virus removal and its method of preparation.



4. Title: A bioconversion process to produce bioactive *Cordyceps* species from food waste

Name of the inventor: Ambatipudi Srinivas Kiran and Aparna Verma (BT)

Application number: 201811023344(IN)

Date of Patent Filing: 22.06.2018

Summary: The present Invention relates to the bioconversion process to produce bioactive *cordyceps* species from food/bakery waste. The Invention provides a process and the valuable bioactives like cordycepin (from *Cordyceps*) produced from bread waste. The Invention, in particular, provides a method to reuse the expired bread to culture *Cordyceps militaris* on bread waste. This method is economic, reduces wastage of expired bread, and cultivates this herb with immense health benefits. The present process is described considering *Cordyceps militaris* as one of the species, however the scope of the Invention is not limited and extends to other species of *Cordyceps* i.e. *Cordyceps sinensis* and others as well. Similarly, the Invention is described considering multigrain brown bread, regular bread, atta bread or combinations of multigrain brown bread, regular bread, atta bread. However, the scope of the Invention is not limited and extends to other bakery waste/food wastes as well



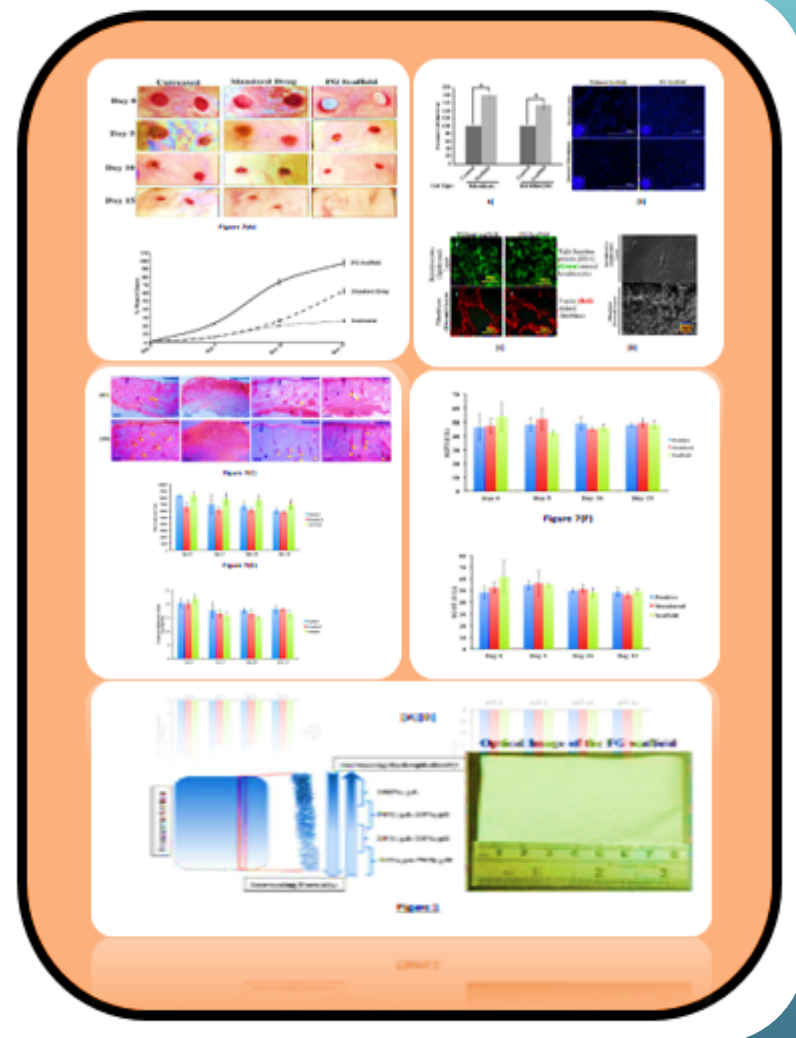
5. Title: A biodegradable skin scaffold for healing deep wounds

Name of the inventor: Debrupa Lahiri, Partha Roy and Swati Halder (MMED, BT, CON)

Application number: 201911007235(IN)

Date of Patent Filing: 25.02.2019

Summary: The present Invention is in the field of Scaffold/s. The Invention, in particular, provides functionally gradient biodegradable skin scaffold, composition for preparing the scaffold and its features engineered to meet its functional requirement of supporting simultaneous regeneration of all the layers of skin.



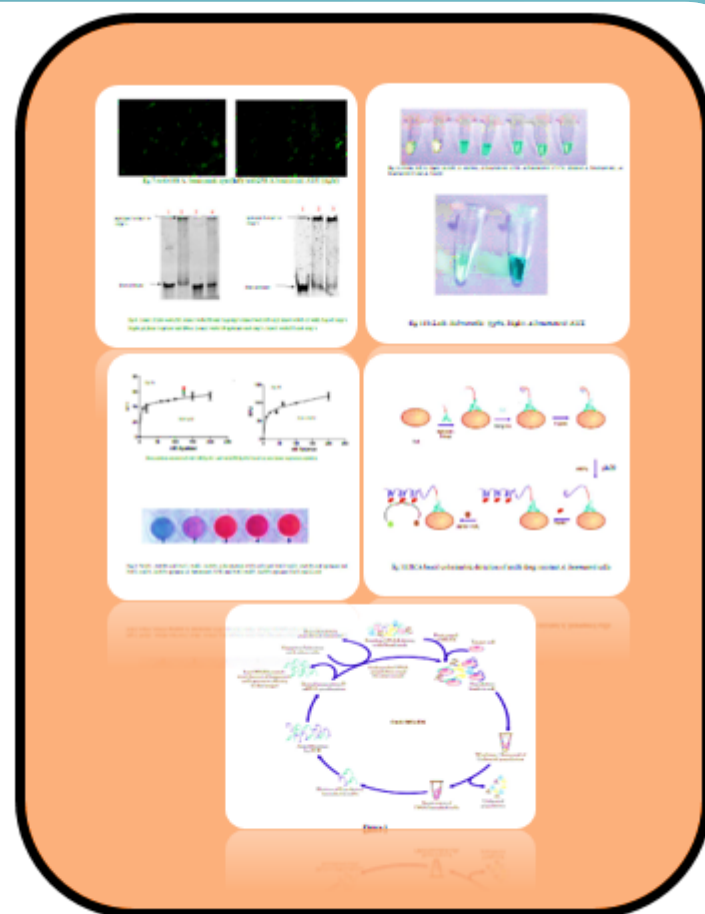
6. Title: Single stranded nucleotides sequences specific for binding to *Acinetobacter baumannii* and uses thereof

Name of the inventor: Naveen Kumar Navani, Shahnawaz Ahmad Baba and Piyush Kumar

Application number: 201911016947(IN)

Date of Patent Filing: 29.04.2019

Summary: The present Invention is in the field of Aptamers with binding affinity to target protein. Particularly, the Invention provides Single Stranded Nucleotides Sequences specific for binding to *Acinetobacter baumannii*.



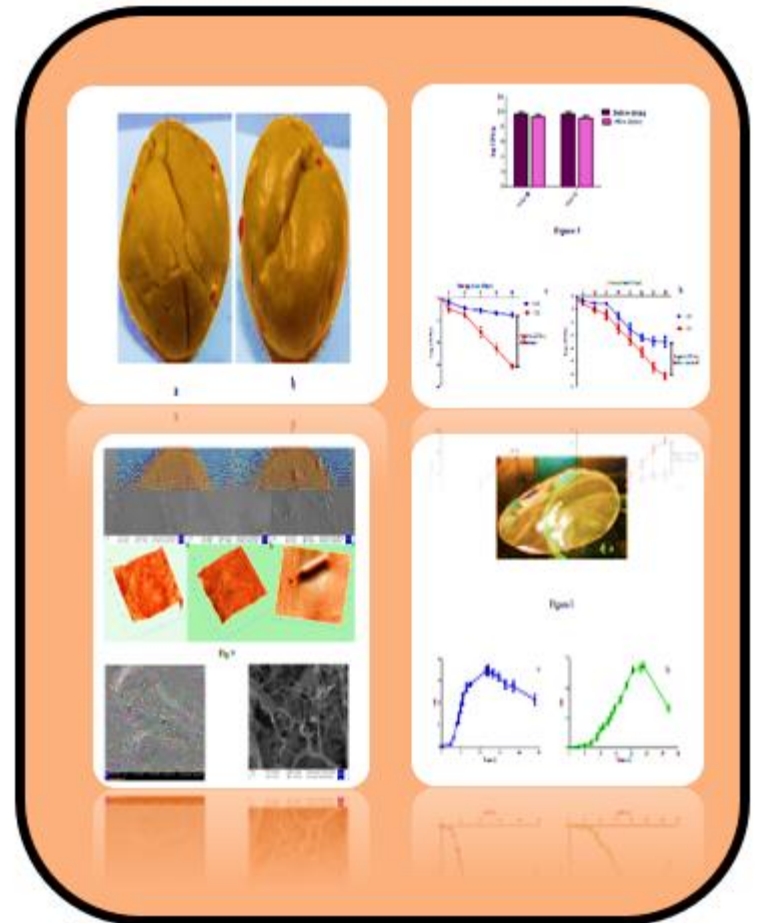
7. Title: Probiotic edible film and method of its preparation

Name of the inventor: Naveen Kumar Navani, Anupama Semwal and Arun Beniwal (BT)

Application number: 201911018180(IN)

Date of Patent Filing: 07.05.2019

Summary: This technology is based on the formation of a probiotic edible film to provide a non-dairy product with combination of two lactobacillus strains. The combination of these two strains is unique and introduction of chia gel for a longer shelf life is an additional feature making the film more useful for a longer time period. This film is stable for 2 months at 4°C



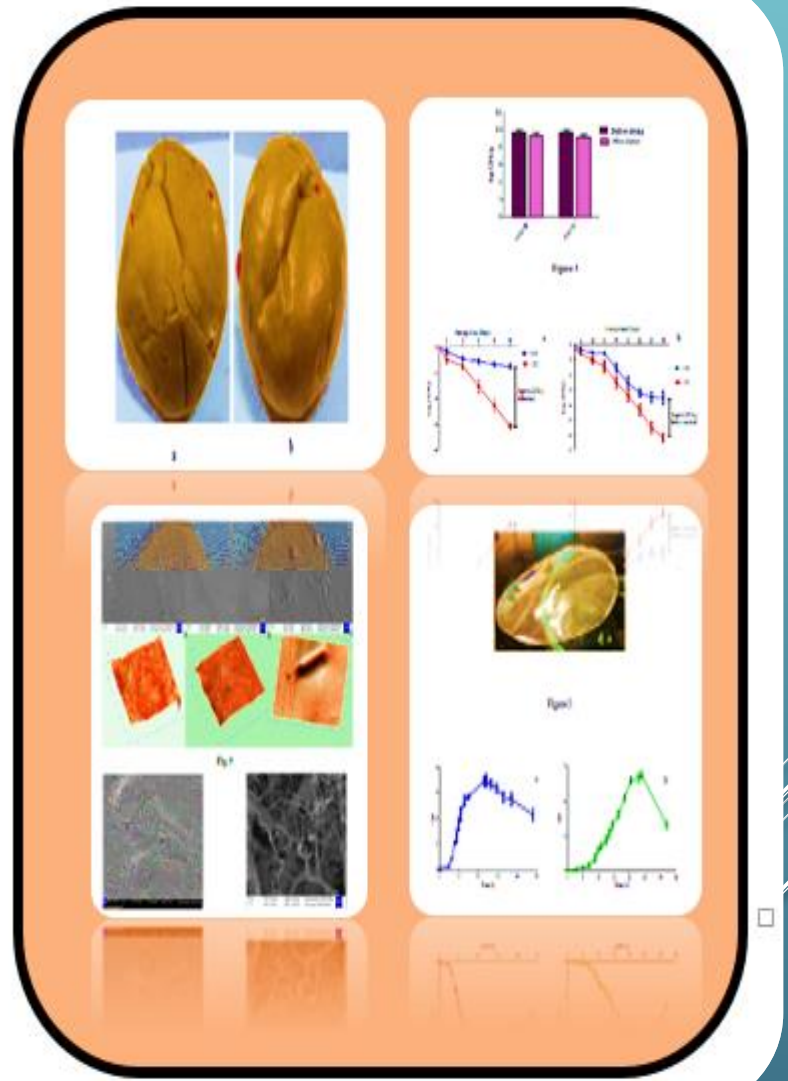
7. Title: Probiotic edible film and method of its preparation

Name of the inventor: Naveen Kumar Navani,
Anupama Semwal and Arun Beniwal (BT)

Application number: 201911018180(IN)

Date of Patent Filing: 07.05.2019

Summary: This technology is based on the formation of a probiotic edible film to provide a non-dairy product with combination of two lactobacillus strains. The combination of these two strains is unique and introduction of chia gel for a longer shelf life is an additional feature making the film more useful for a longer time period. This film is stable for 2 months at 4°C



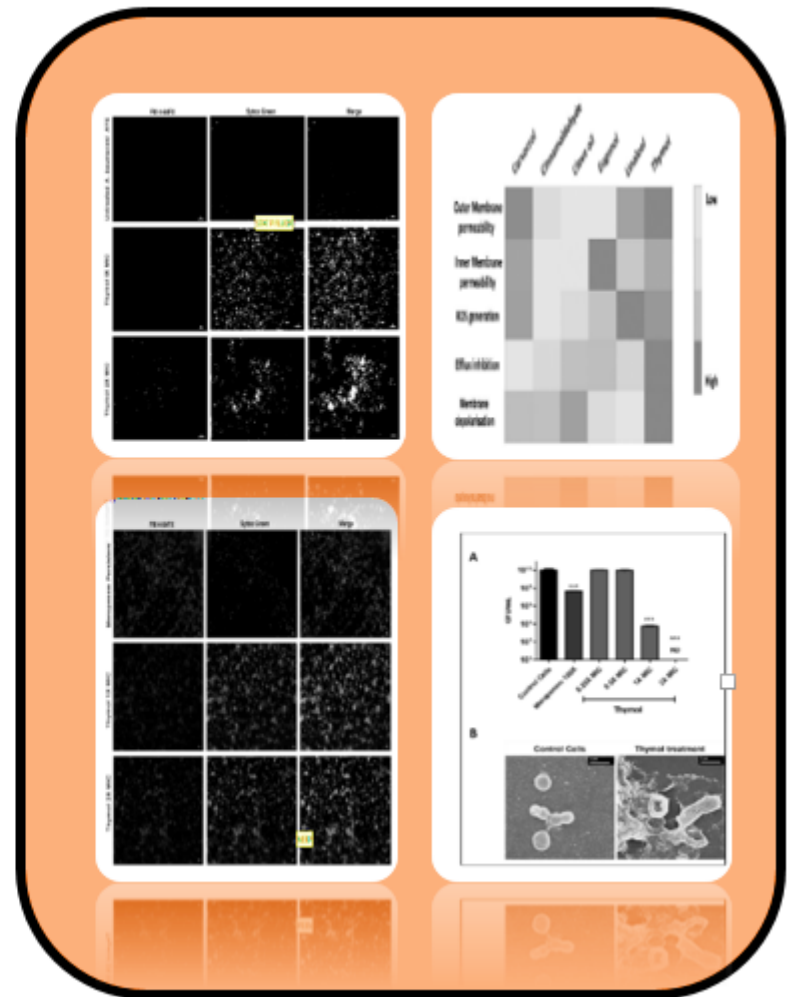
8. Title: *Methods and compositions for identification of novel anti-persister activity of GRAS compounds*

Name of the inventor: *Ranjana Pathania, Timsy Bhando, and Ananth Casius (BT)*

Application number: 201911023795(IN)

Date of Patent Filing: 15.06.2019

Summary: *The present invention relates to the field of a therapeutic composition. Particularly, the invention provides an effective composition based on biguanide derivatives against resistant and persistent bacterial infections.*



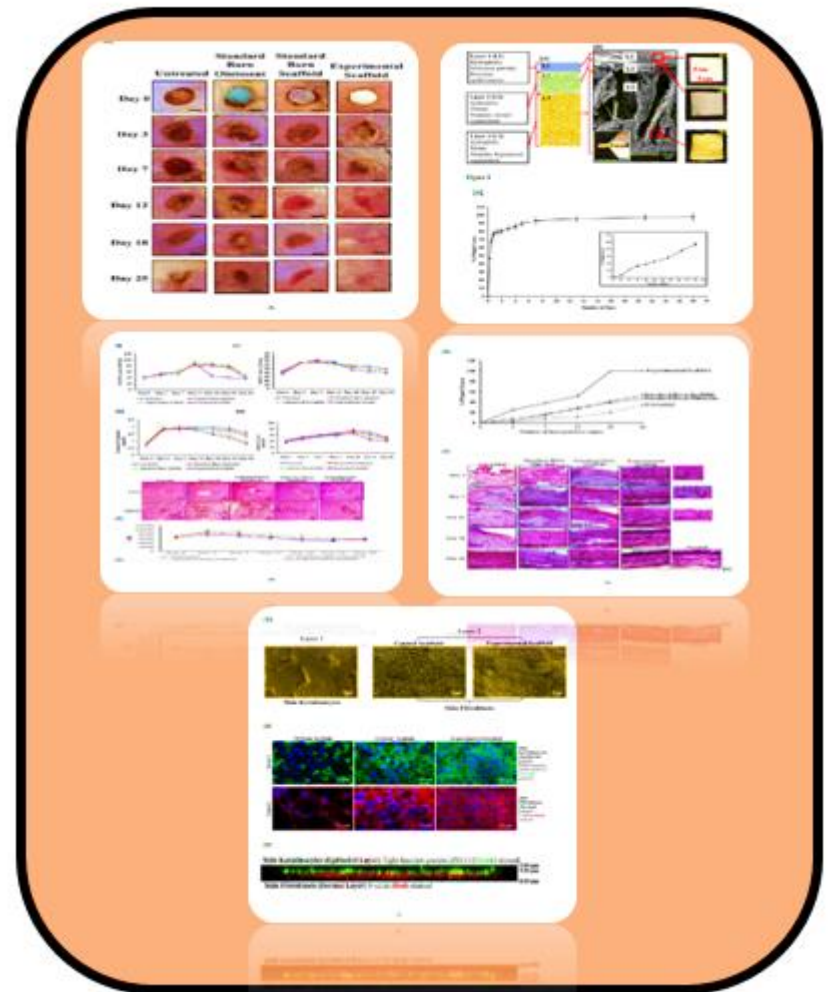
9. Title: Bioengineered regenerative scaffold for burn wound healing

Name of the inventor: Debrupa Lahiri, Partha Roy, Swati Halder, Isha Goel, Souvik Ghosh and Viney Kumar (BT, MMED, CON)

Application number: 201911026834(IN)

Date of Patent Filing: 04.07.2019

Summary: The present invention relates to the field of multi-layered burn wound healing scaffold. Particularly, the Invention provides scaffold for control temporal release of drugs and bioactive agents for wound healing.



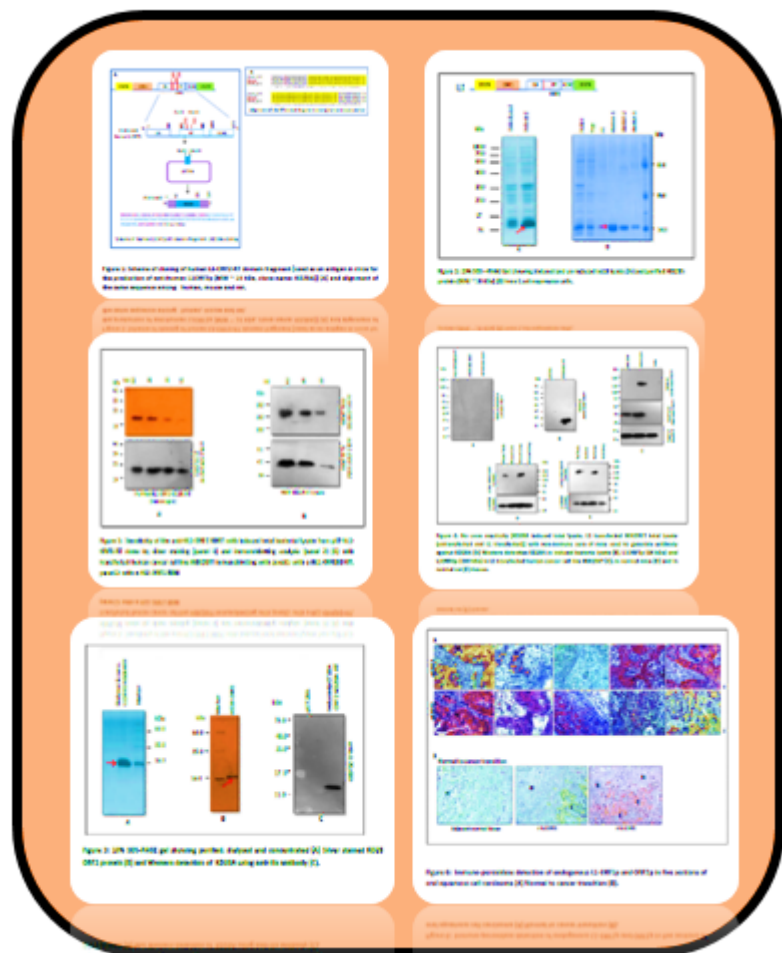
10. Title: Polyclonal human LINE-1 ORF2p antibody and method thereof

Name of the inventor: Prabhat Kumar Mandal, Koel Mukherjee and Debpali Sur (BT)

Application number: 201911028257(IN)

Date of Patent Filing:15.07.2019

Summary: The present invention relates to the field of antibodies as a cancer biomarker. The Invention, in particular, provides anti LINE-1 ORF2p antibody which can detect LINE-1 (L1) retrotransposon activation in tissues and cells.



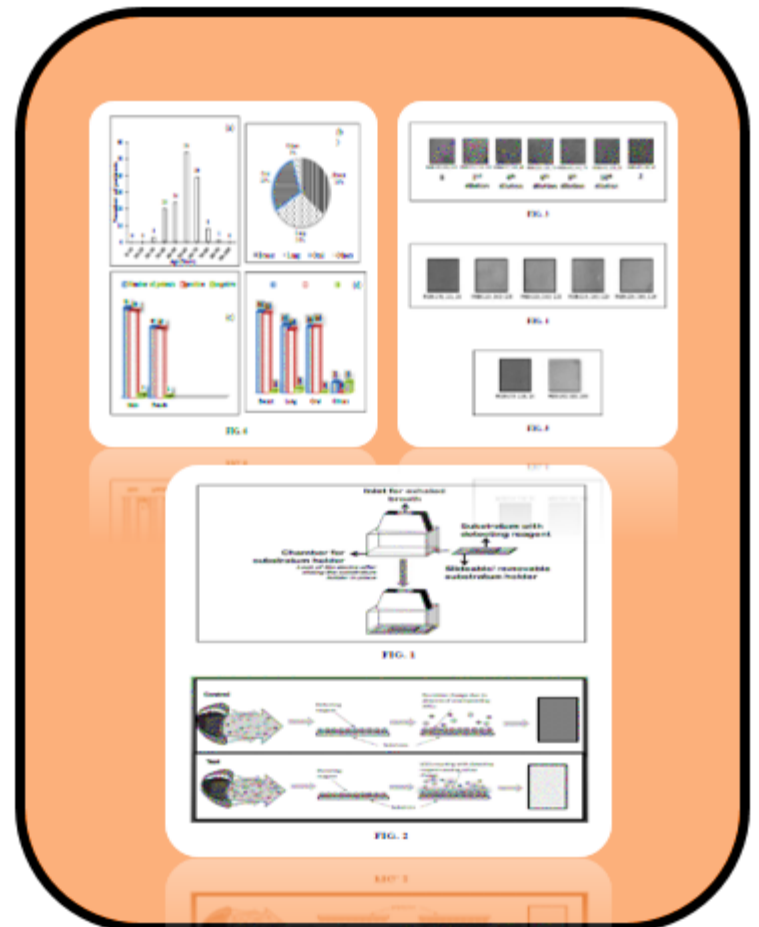
11. Title: Biosensor for detecting cancer using exhaled breath

Name of the inventor: Indranil Lahiri, Debrupa Lahiri, Partha Roy, Siddharth Sharma and Swati Halder (BT, CON, MMED)

Application number: 201911030871(IN)

Date of Patent Filing: 31.07.2019

Summary: The current invention relates to the field of non-invasive early detection of cancer using exhaled breath. The current invention relates to a biosensor and method of early detection of breast, lung and oral cancers by monitoring of volatile organic compounds in the exhaled breath of cancer patients.



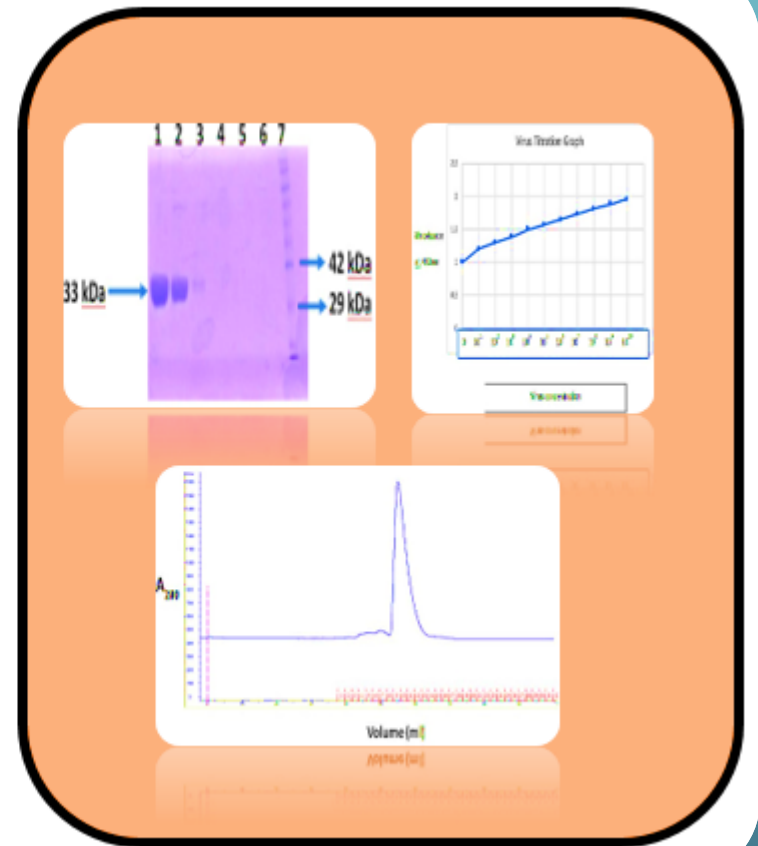
12. Title: Chikungunya virus titration and detection kit

Name of the inventor: ShaillyTomar, Pravindra Kumar, Neetu, Vedita Anand Singh and Shweta Choudhary (BT)

Application number: 201911035044(IN)

Date of Patent Filing:30.08.2019

Summary: The present invention relates to the field of detection and titre determination of chikungunya virus/alphavirus. The invention in particular provides an efficient kit and method thereof.



13. Title: Cell cytotoxicity assay device and method of manufacturing thereof

Name of the inventor: Soumitra Satapathi, Ankit Kumar, Partha Roy and Neeladrisingha Das (BT, PHY)

Application number: 201911036596(IN)

Date of Patent Filing: 11.09.2019

Summary: The present invention provides a device (1) for conducting cell cytotoxicity assay comprising a longitudinally extended, microfluidic channel network (2) integrated with a capillary pump (6) at its distal end, embossed on a PDMS surface, said microfluidic channel network consisting of a substantially equally spaced apart microwell channels (3) each having a sample microwell (7) and a micromixer (4) at its proximal end, the microfluidic channel network being connected to a plurality of sample inlets (9,9') at its proximal end, an outlet (12) at the distal end and a suitably positioned control inlet (11) and control microwell (8) and wherein the said sample microwells are provided with optical sensor adapted to provide signal of cell cytotoxicity to a suitable signal measurement means

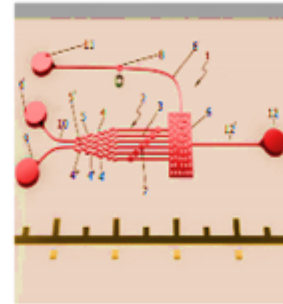


FIG. 1

FIG. 1

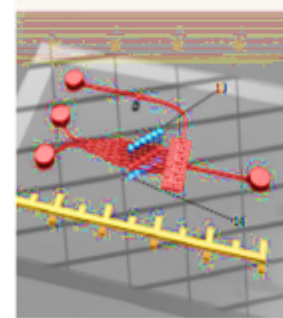
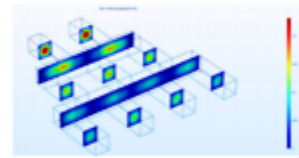


FIG. 2

FIG. 2



FIG. 3



measurement means

signal of cell cytotoxicity to a suitable signal measurement means. The device (1) is provided with optical sensor adapted to provide signal of cell cytotoxicity to a suitable signal measurement means. The device (1) is provided with optical sensor adapted to provide signal of cell cytotoxicity to a suitable signal measurement means.

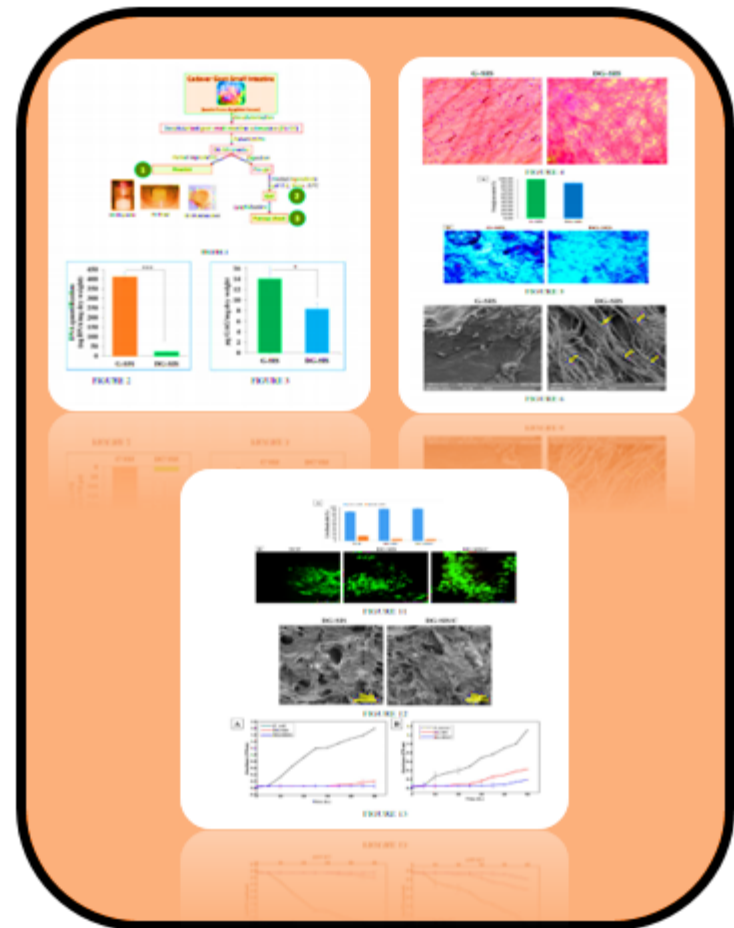
14. Title: Wound healing materials in the form of powered particles, gel and porous sheet

Name of the inventor: N. C. Mishra, Hemant Singh and Shiv Dutt Purohit (PPE)

Application number: 201911037476(IN)

Date of Patent Filing: 17.09 2019

Summary: The following disclosure presents a simplified summary of the invention in order to provide a basic understanding of some aspects of the invention. This summary is not an extensive overview of the present invention. It is not intended to identify the key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some concept of the invention in a simplified form as a prelude to a more detailed description of the invention presented later.



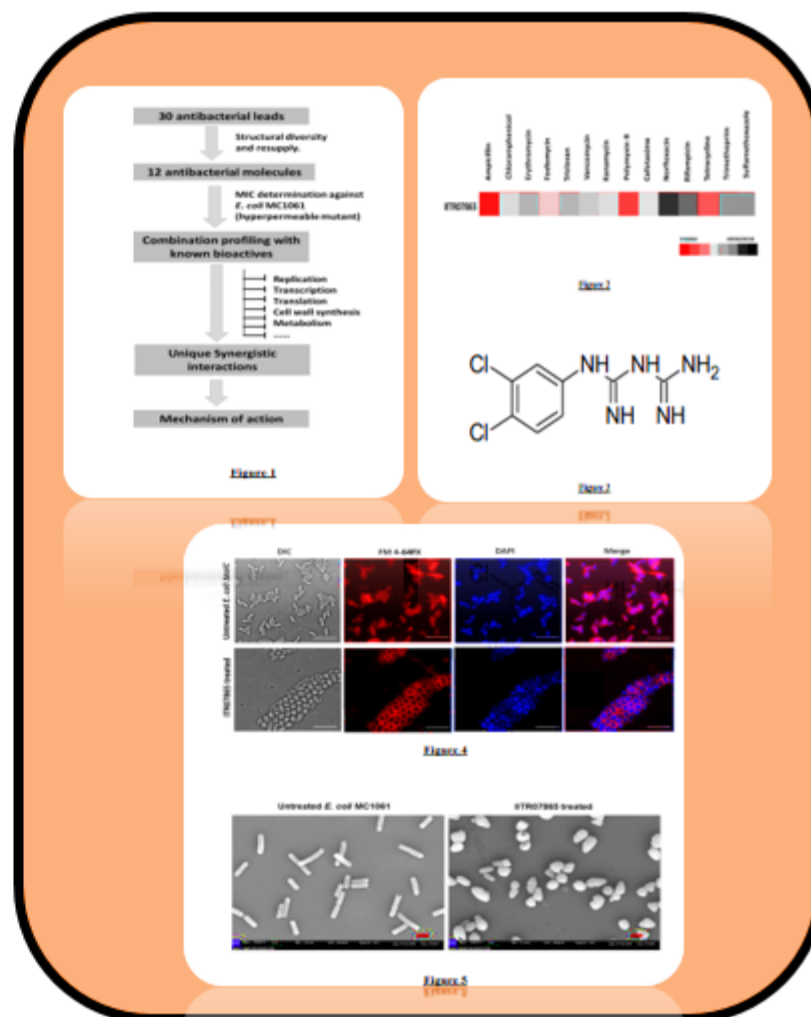
15. Title: A Therapeutic composition for the treatment of resistant and persistent bacterial infections

Name of the inventor: Ranjana Pathania and Timsy Bhando (BT)

Application number:201911043932(IN)

Date of Patent Filing:30.10.2019

Summary: The present invention relates to the field of a therapeutic composition. Particularly, the invention provides an effective composition based on biguanide derivatives against resistant and persistent bacterial infections.



16. Title: A system and method for the detection of physical exhaustion level of human beings

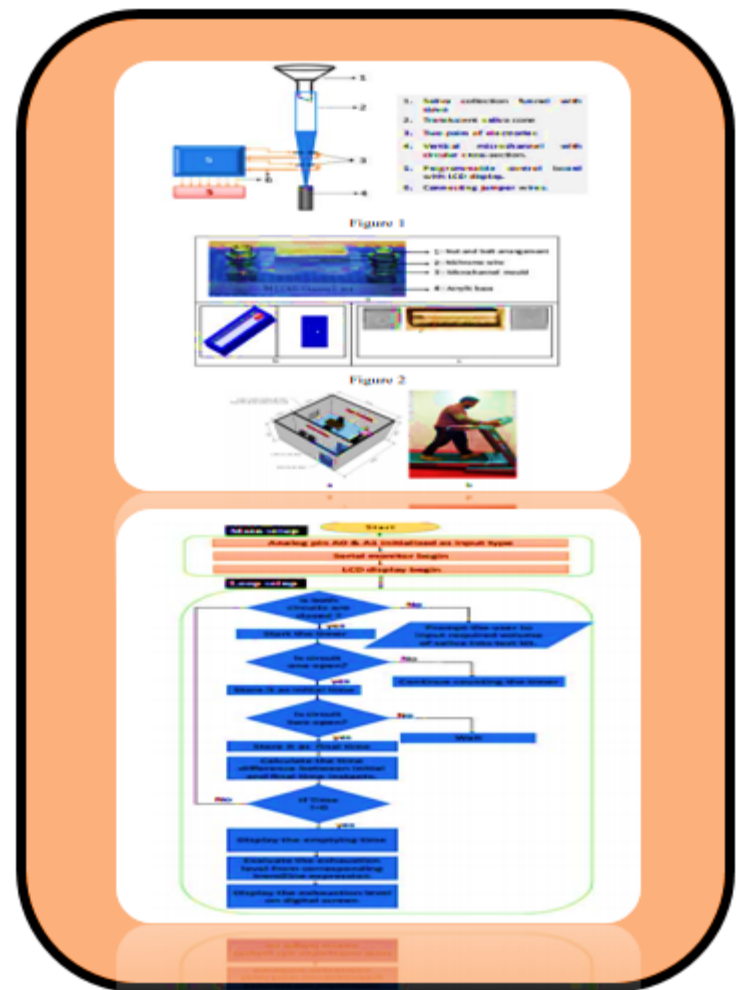
Name of the inventor: Arup Kumar Das, Vikas Kannojiya and Gunipe Prasanth Kumar (MIED)

Application number: 201911047764(IN)

Date of Patent Filing: 22.11.2019

Summary: The present invention provides a system and method for the detection of physical exhaustion level of human beings. The exhaustion level of people is detected by utilizing the rheological changes in saliva with the intensity of exercise. The said device is fast and responsive with increased accuracy of diagnostics. Two pairs of electrodes are inserted into the translucent cone in such a way that they can make the circuit or break the circuit depending on whether they are immersed in liquid or not.

The device fabrication technique is simple yet very efficient in making linear micro channels of circular cross-section. The present method eliminates the mandatory need for developing pattern/mould, hence micro channels can be fabricated at faster rates. It does not need clean environment for fabrication i.e. it can produce dust-free micro channels under any conditions.



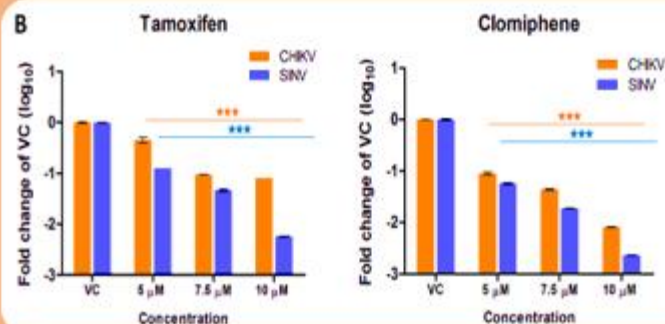
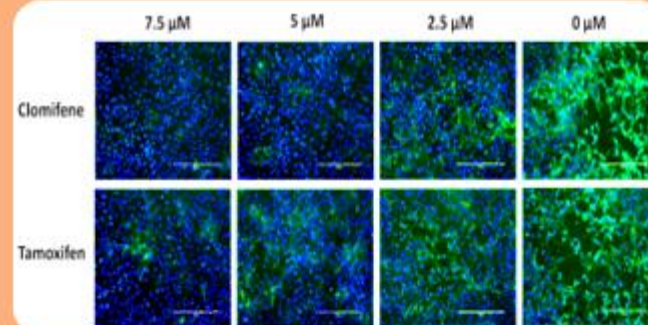
17. Title: An antiviral composition against alphaviruses

Name of the inventor: ShaillyTomar, Rajat Mudgal and Aakriti Dubey (BIO)

Application number: 201911049130(IN)

Date of Patent Filing: 29.11.2019

Summary: The present invention relates to the field of anti-viral composition. The invention in particular provides an effective antiviral composition against RNA viruses and its method of preparation.



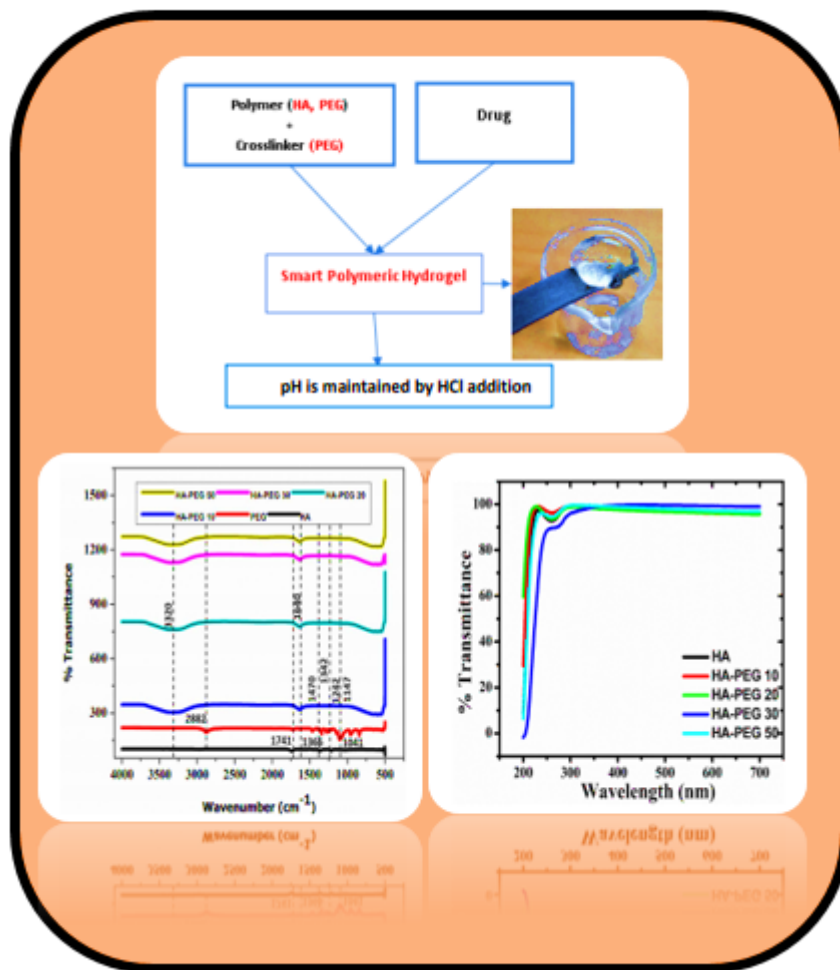
18. **Title:** An in-situ polymer-based drug loaded hydrogel system and method thereof

Name of the inventor: N.C. Mishra, Indus Yadav, Shiv Dutt Purohit, Hemant Singh and Sakchi Bhushan (PPE)

Application number: 201911049671(IN)

Date of Patent Filing: 03.12.2019

Summary: The present invention relates to a field of drug loaded hydrogel system. The Invention in particular provides Hyaluronic acid/Polyethylene glycol-based drug loaded hydrogel system and method thereof



19. Title: 3-D Porous scaffolds for bone tissue engineering
Name of the inventor: P. Gopinath and Sarim Khan (BT, CON)

Application number: 202011003365(IN)

Date of Patent Filing: 24.01.2020

Summary: The present invention provides a synthesis process for 3-D porous scaffolds of SF/n-HAP/PCL with enhanced mechanical and biological properties which could serve as a template in clinical settings for bone tissue regeneration. The composite scaffold is blended with surface treated Sisal Fibers to increase the interfacial adhesion with the Polycaprolactone polymer matrix. The addition of 5 % (w/w) sisalfiber to n-HAP/PCL scaffold increased the compressive modulus of the scaffold from 2.23 MPa to 5.33 MPa. The porosity of the scaffolds increased with increase in the SF concentration in the scaffold. The scaffolds with SF blended in them proved to be innocuous to the MG-63 cell attachment and their proliferation on the surface. The scaffold with 5 % SF and 30 % HAP had the highest cell proliferation both at Day 3 and Day 7. From the FESEM images, it was observed that the cell attachment at Day 3 was in the advance stage. The scaffolds are synthesized using freeze drying techniques. The scaffold employs eco-friendly SF which are cheap and abundant in nature. The overall cost of the scaffolds produced from the process is very less in comparison to the industry standards in the orthopaedics industry

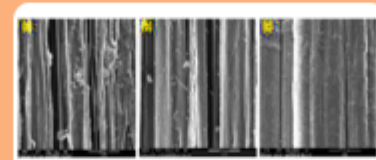


FIGURE 1

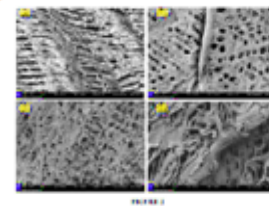


FIGURE 2

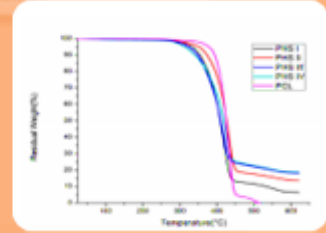
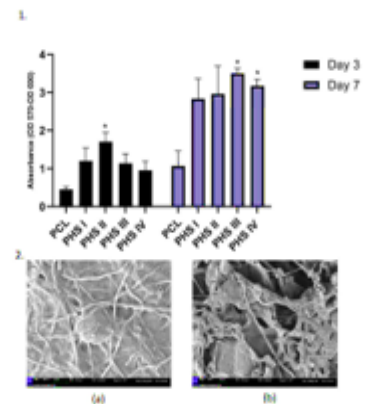


FIGURE 3



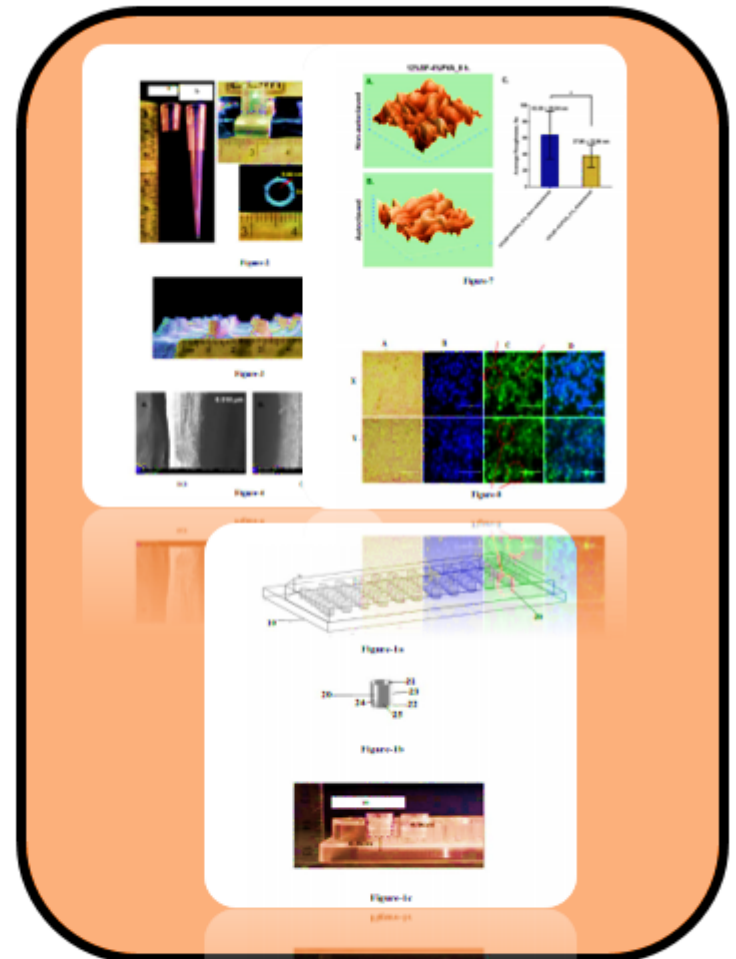
20. Title: Low-cost, autoclavable and multifunctional biomaterial based nanofibrous permeable hanging cell culture insert and fabrication thereof

Name of the inventor: P. Gopinath, Vinay Kumar and Soumyadeep Basak (BT)

Application number: 202011003619(IN)

Date of Patent Filing: 27.01. 2020

Summary: The present invention relates to an autoclavable, reusable, low-cost multifunctional biomaterial-based nanofibrous hanging permeable cell culture insert and fabrication thereof. It also relates to a process of fabrication of the biomaterial-based nanofibrous hanging permeable cell culture insert. The hanging cell culture insert of the present invention which employs a nanofibrous biomaterial-based membrane is low-cost, varying pore sizes and is easy to manufacture by a simple process involving few steps and using low-priced starting materials. The insert can be utilized in a wide variety of applications such as co-culture studies, tri-culture studies, cell migration and adhesion, toxicity testing, in-vitro model of angiogenesis, cell invasion assay and tissue engineering applications.



21. Title: Impedimetric sensors for cytotoxicity analysis

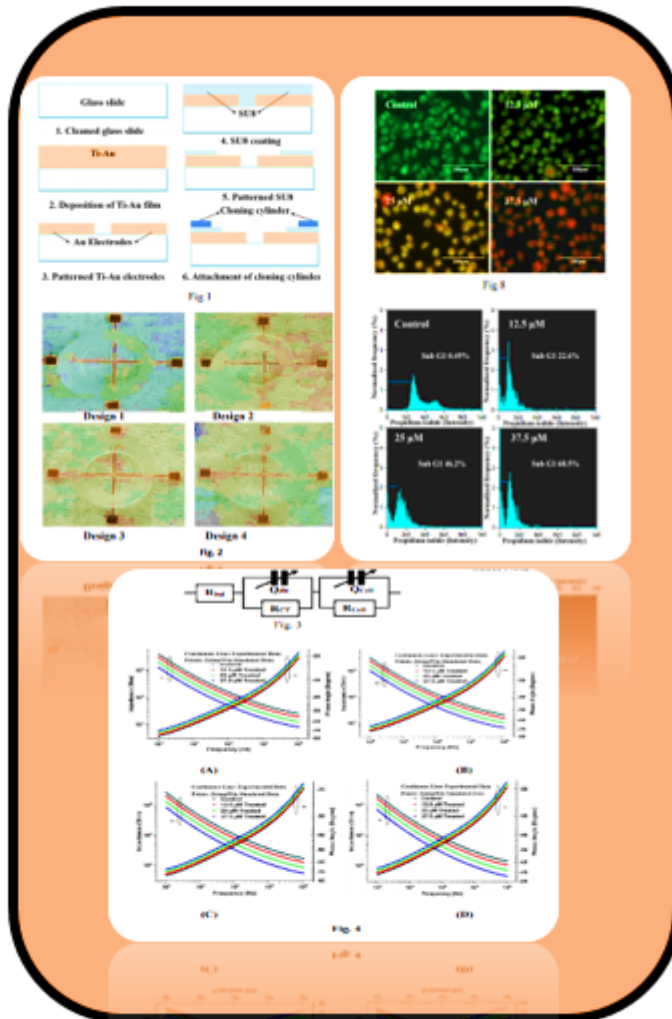
Name of the inventor: Sanjeev Manhas, Rangadhar Pradhan, P. Gopinath and Ashish (BT, ECE, CON)

Application number: 202011003839(IN)

Date of Patent Filing: 29.01.2020

Summary: The present invention relates to an electric cell-substrate impedance sensing (ECIS) system and method that helps in determining the changes in the electrical as well as physiological properties of cells. ECIS is an in-vitro methodology that senses the real-time cellular activities via electrodes. The system provides a non-invasive current flow between the electrodes cultured with live cells on the electrode surfaces. Current flows unchecked in the absence of cells, while its flow is impeded once cells start to grow, leading to provide an insight into the behaviour of cells at different frequencies. The changes in current are measured as impedance. The method is rapid, inexpensive, accurate, and highly reproducible to understand the drug delivery processes that affect cellular mechanism. This real-time cell sensing technology makes it more efficient than microscopic imaging or observation. ECIS technique has been employed to understand the cytotoxic effects of tamoxifen on the HeLa cells. This impedance monitoring of cytotoxic effects of tamoxifen on HeLa cells have not been carried out till date in any other study. The present study depicts responses of HeLa cells upon exposure to various doses of tamoxifen.

This impedance biosensor indicated that tamoxifen caused a significant reduction in the number of HeLa cells in a dose-dependent manner. The restraining activity of tamoxifen over the growth and proliferation of HeLa cells was studied by using impedimetric biosensor. Thereby it may be safe to say that there is indeed a positive correlation of cytotoxicity of tamoxifen impedance values and other proven assays indicates the arrival of a novel biosensor to evaluate cytotoxicity of anti-cancerous drugs.



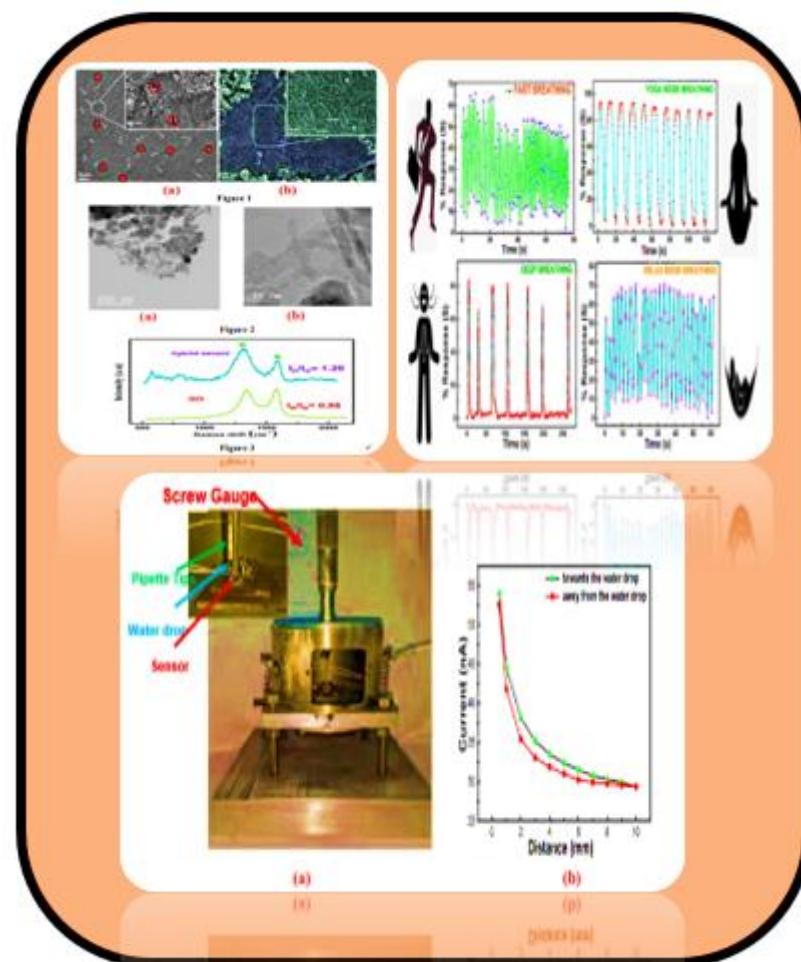
22. Title: Ultrafast smart resistive type room temperature humidity sensor based on γ -Fe₂O₃-rGO Nano hybrids and its multifunctional applications

Name of the inventor: Atul Kumar, Anil Kumar and G.D. Varma (CY)

Application number: 202011007304(IN)

Date of Patent Filing: 20.02.2020

Summary: The present invention relates to a system and method of ultrafast resistive type humidity sensor based on nanohybrids. The present sensor can record different breathing patterns as well as has the ability to detect breathing at different rates. It senses the water contents from the human finger (dry/wet) including the sweating in human being. The reduced graphene oxide based nanohybrids has been synthesized for sensing of humidity. Nanohybrids have been developed using carbon nanostructure(s). In an embodiment, metal oxide base nanohybrids such as without limitation ZnO/Fe₂O₃/TiO₂/SnO₂/based nanohybrids has been synthesized. The present sensor is of high sensitivity, ultrahigh response and recovery time.



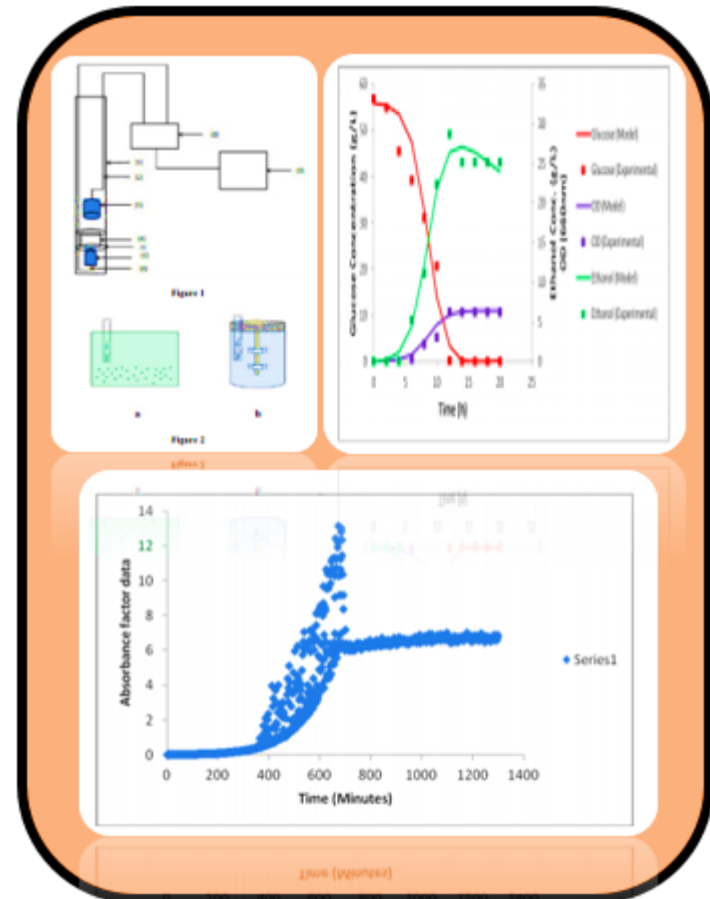
23. Title: Real time in-situ single optical density probe for biomass, substrate and product dynamics measurements in photobioreactor/bioreactor

Name of the inventor: Sanjoy Ghosh and Shaliendra Singh Khichi (BT)

Application number: 202011007734(IN)

Date of Patent Filing: 24.02.2020

Summary: The present invention relates to a spectrophotometer/biomass monitor based on the modified Lambert-Beer law. In this modified Lambert-Beer model differential absorption is applied and coupled with the biomass, substrate and product kinetic equation of the microorganism. This probe measures biomass, substrate and product dynamics in photobioreactor/fermentor in real time. In an embodiment, the data acquisition system (consists of control circuit loop and integrated circuit) is developed to capture the real time light dilution data as a function of microalgae growth, substrate and product profiling prediction.



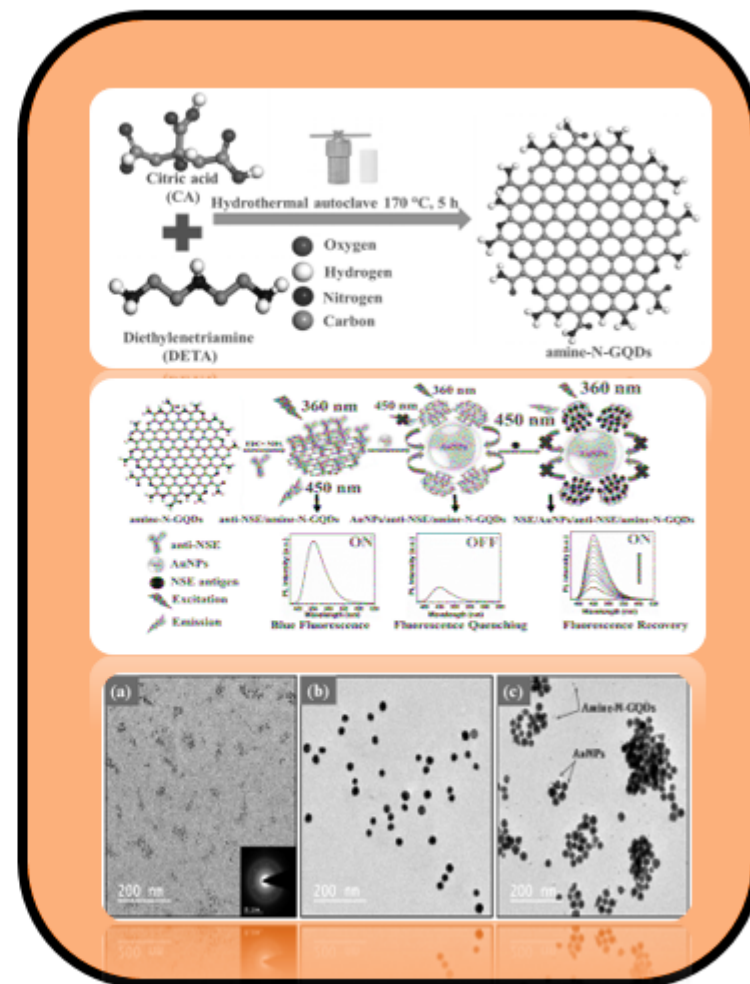
24. Title: Fluorescence based cost-effective rapid diagnostic kit for detection of cancer biomarkers

Name of the inventor: P. Gopinath, Ashish and Rangadhar Pradhan (BT, CON)

Application number:202011010110(IN)

Date of Patent Filing: 09.03.2020

Summary: The present invention relates to a fluorescence based rapid diagnostic kit for highly sensitive detection of cancer cell-specific biomarkers utilizing biofunctionalized graphene quantum dots as donor and gold nanoparticles as acceptor in a fluorescence-based assay. The invention discloses a kit for detection of cancer biomarkers, more specifically, of small cell lung cancer biomarker by using anti-neuron specific enolase antibody conjugated to amine functionalized nitrogen doped graphene quantum dots. The invention is directed to methods and compositions for making the diagnostic kit. The novel process discloses one-pot, low temperature, and the bottom-up hydrothermal route for the synthesis of in-situ amine-functionalized and nitrogen-doped graphene quantum dots.



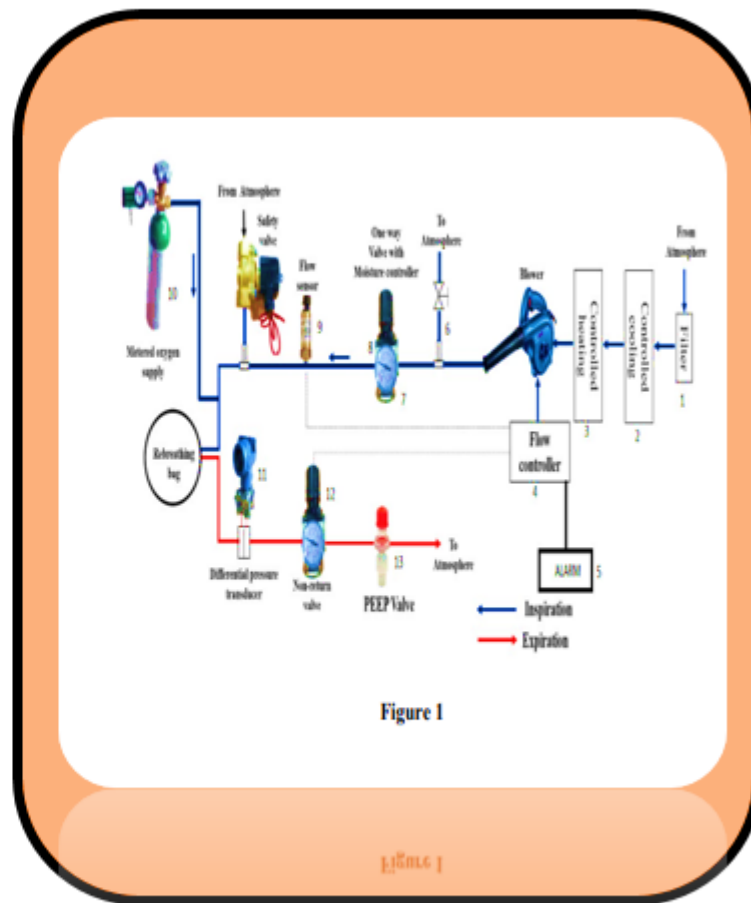
25. Title: A low-cost portable mechanical ventilator with feedback control and respiratory monitoring with remote interface.

Name of the inventor: Akshay Dvivedi, Arup Kumar Das, Maran R., Lokesh Rohilla, Darshan M B, Avik Saha, Vikas Kannojiya, Tanmay Tiwari, Anuj Vtas, Sandeep Kumar, Subramanian G., Navin Chandra Rai, Gajan and Saini, Yashpal Singh, Sahwez, Debendra Kumar Tripathi and Abhishek Sehgal (MIED, EE, ECE, Tinkering Lab and AIIMS, Rishikesh)

Application number: 202011015014(IN)

Date of Patent Filing: 04.04.2020

Summary: The present invention relates to a low-cost portable mechanical ventilator with feedback control and respiratory monitoring with remote interface. The system comprises a particulate filter, a thermoelectric module and cartridge heater and control unit with communication interface to communicate with hand held device raise alarm and control the ventilator accordingly. The mechanical ventilator works on time triggered operation of prime mover along with pressure triggered and volume triggered mode.



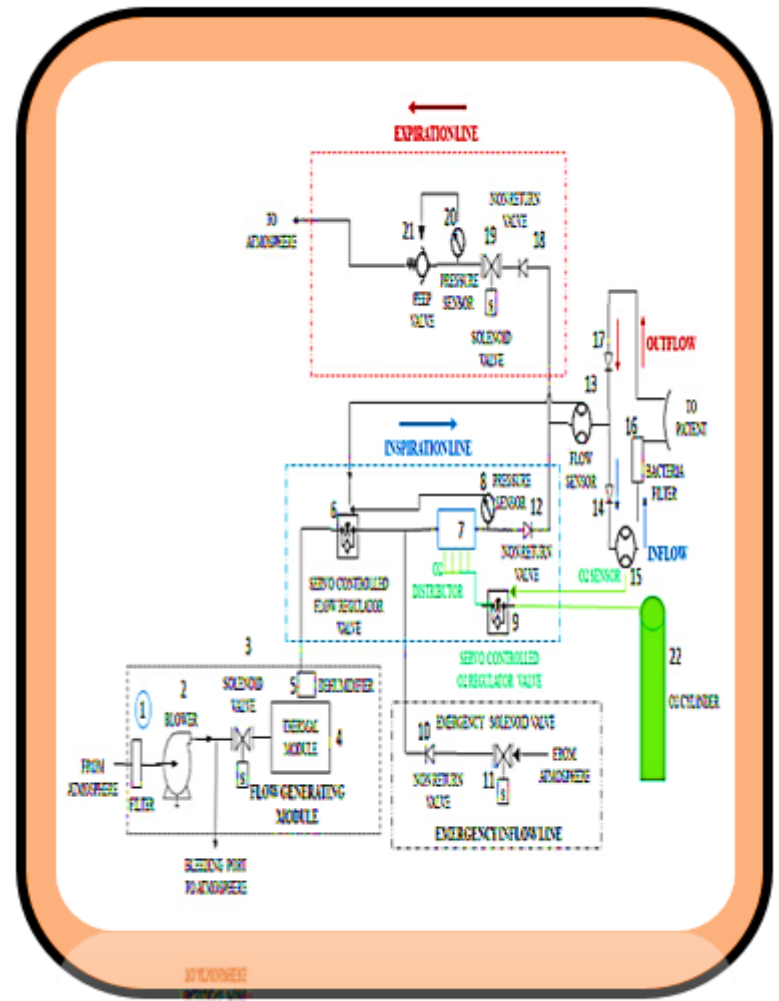
26. Title: A low cost portable mechanical ventilator with feedback control and respiratory monitoring with remote interface.

Name of the inventor: Akshay Dvivedi, Arup Kumar Das, Maran R., Lokesh Rohilla, Darshan M B, Avik Saha, Vikas Kannojiya, Tanmay Tiwari, Anuj Vtas, Sandeep Kumar, Subramanian G., Navin Chandra Rai, Gajan and Saini, Yashpal Singh, Sahwez, Debendra Kumar Tripathi and Abhishek Sehga (MIED, EE, ECE, Tinkering Lab and AIIMS, Rishikesh)

Application number: 202011019016(IN)

Date of Patent Filing: 04.05.2020

Summary: The present invention relates to a low cost portable mechanical ventilator with feedback control and respiratory monitoring with remote interface. The system comprises a particulate filter, a thermoelectric module and cartridge heater and control unit with communication interface to communicate with hand held device raise alarm and control the ventilator accordingly. The mechanical ventilator works on time triggered operation of prime mover along with pressure triggered and volume triggered mode. It has achieved all necessary modes for advanced mechanical ventilator.



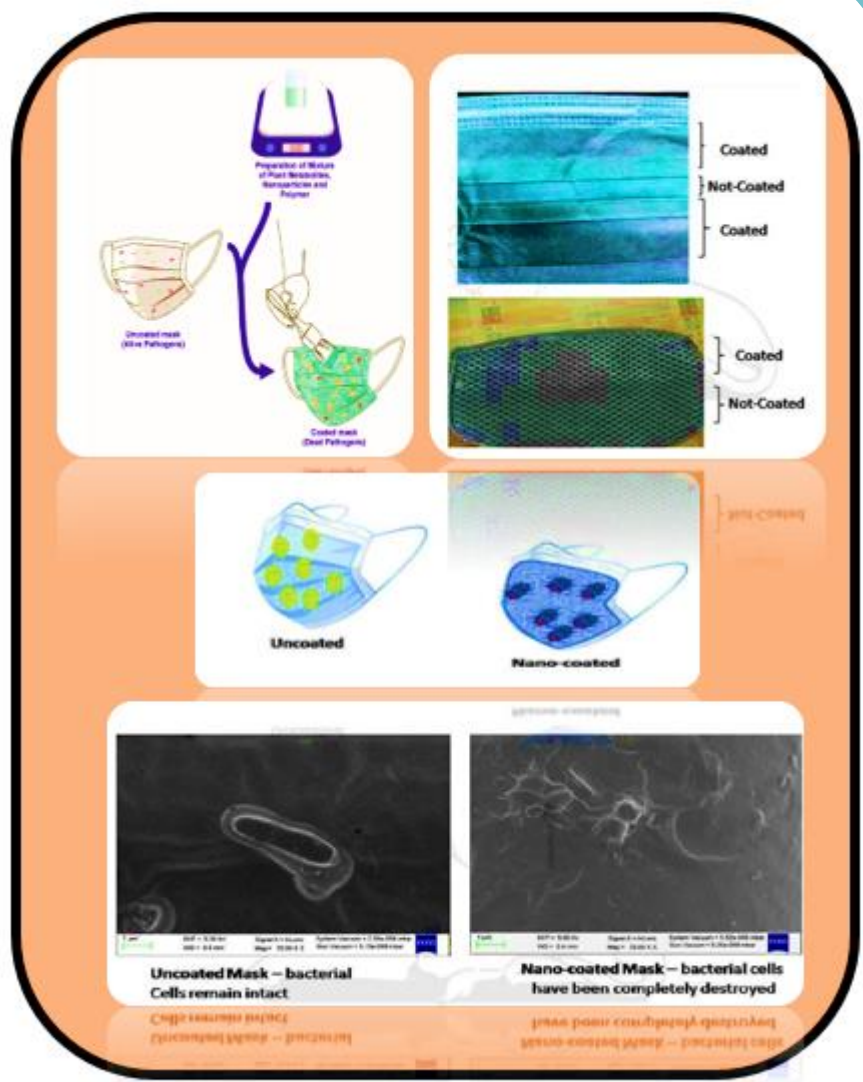
for advanced mechanical ventilator. It has achieved all necessary modes

27. Title: Antimicrobial coating system and method thereof

Name of the inventor: Naveen Kumar Navani, Pardeep Kumar, Arun Beniwal and Ajmal Hussain (BT)

Application number:202011021477(IN)
Date of Patent Filing: 21.05.2020

Summary: The present invention relates to the field of anti-microbial coating composition. The antimicrobial composition comprises combination of lethal bactericidal agents, essential oils, silver nanoparticles and detergent.



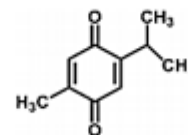
28. Title: *A prophylactic and therapeutic antiviral composition and method thereof*

Name of the inventor: Shailly Tomar, Pravindra Kumar, Debabrata Sircar, Ravi Kumar, and Vedita Anand Singh (BT)

Application number:202011023131(IN)

Date of Patent Filing: 02.06.2020

Summary: The present invention relates to the field of anti-viral composition. The invention in particular provides an effective antiviral composition against RNA viruses and its method of preparation.



Thymoquinone

Figure 1

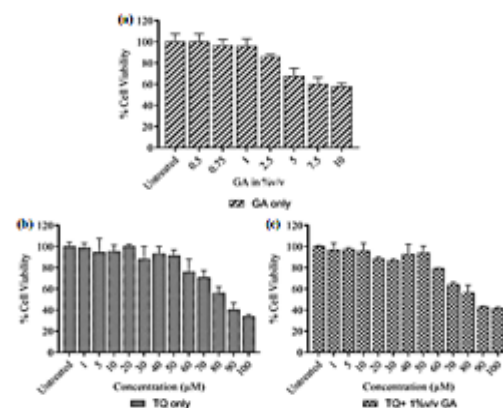


Figure 2

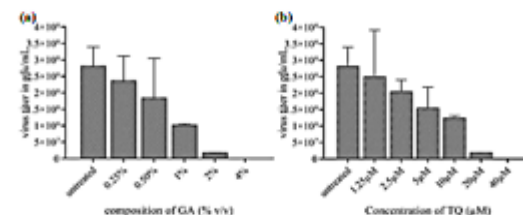


Figure 3

FIGURE 2

29. Title: Probiotic formulation for growth enhancement of livestock and method thereof

Name of the inventor: Naveen Kumar Navani, Ajmal Hussain, Krishna Shankar, Rekha Sharma and Arun Beniwal (BT)

Application number: 202011024018(IN)

Date of Patent Filing: 08.06.2020

Summary: The present invention provides a probiotic formulation for growth enhancement of livestock. The Invention in particular provides composition comprising probiotic *Lactobacillus fermentum*.

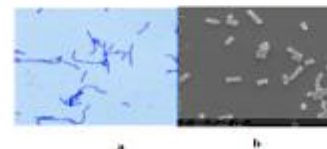


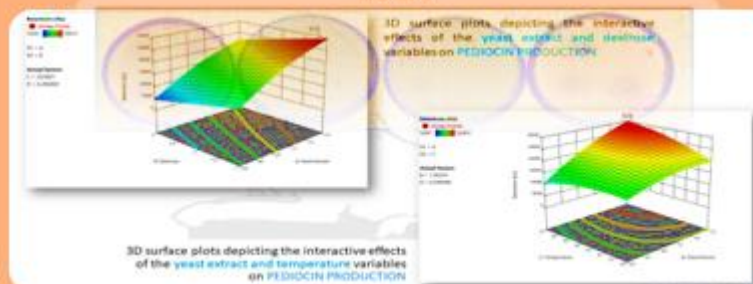
FIGURE 1



FIGURE 2



FIGURE 3



3D surface plots depicting the interactive effects of the yeast extract and temperature variables on PEDIOCIN PRODUCTION

3D surface plots depicting the interactive effects of the yeast extract and temperature variables on PEDIOCIN PRODUCTION

30. Title: A universal portable disinfectant chamber against wide spectrum microorganisms for sterilizing personal belongings

Name of the inventor: Soumitra Satapathi, Prathul Nath PP, Naveen Kumar Tailor, Tejaswini Sharma, Anshu Kumar, Neeladrisingha Das and Partha Roy (BT, PHY)

Application number: 202011026417(IN)

Date of Patent Filing: 23.06.2020

Summary: The present invention relates to a universal portable disinfectant chamber against wide spectrum microorganisms for sterilizing personal belongings. The chamber contains two UVC lights for 360° exposure of ultraviolet light to the subject enabling complete sterilization of all surfaces. The spherical cavity inside the chamber and reflective aluminium coating allows uniform and quick exposure on all surfaces. The chamber also has metal oxide nanoparticles based antiviral/antibacterial coating inside the spherical cavity to make sure that microorganisms do not sustain in the surface when the UVC light is not operating. The chamber is fully sealed, weighing less than 5kg and can be easily moved. A touch screen panel with Arduino based programming help to control the exposure time of UVC depending on the substrate making it possible to sterilize all kinds of belongings

sterilize all kinds of belongings

31. Title: Continuous flow (pass-through) ultraviolet light illuminated disinfection system

Name of the inventor: Vimal Chandra Srivastava and Navneet Kumar (CHED)

Application number: 202011028601(IN)

Date of Patent Filing: 06.07.2020

Summary: Present invention relates to development of a 'continuous flow ultraviolet light illuminated disinfection system' for killing microorganisms. The system consists of a UV illuminated chamber equipped with a moving conveyor, which can effectively be used for disinfecting our daily used electronic gadgets (mobiles, watches, wireless gadgets, etc.) and other accessories (wallets, keys, spectacles, arms, bags, etc.). The system also composed of inlet and outlet chambers which help in carrying the object in and out of the UVC chamber. The UV light absorbing material used in the system is metal-oxide based (TiO_2 , ZnO , WO_3 or their combination) or non-metallic in nature. The system is used for disinfecting/sterilizing surfaces/objects made of glass, metals (steel, copper, bronze, etc.), plastic materials (acrylic, PVC, PPE material etc.), cloth (rayon, nylon, cotton), etc. Further, the system is used at different public places such as airports, hospitals, government offices, municipal corporations, etc.; and industries such as food and meat processing industries.

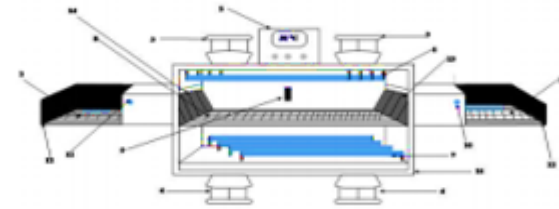


Figure 1

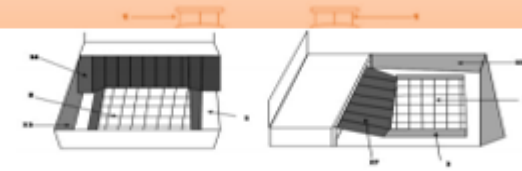
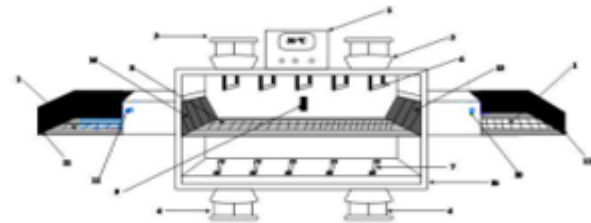


Figure 3

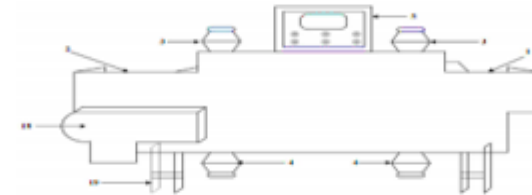


Figure 4

Figure 4

32. Title: Hybrid biofilm-suspended photobioreactor for high density algae cultivation

Name of the inventor: Sanjeev Kumar Prajapati and Mohit Singh Rana (HRED)

Application number: 202011028602(IN)

Date of Patent Filing: 06.07.2020

Summary: The present invention relates to a hybrid biofilm-suspended photobioreactor for high-density algae cultivation. The transparent dome-shaped photobioreactor consists of regularly spaced baffles inside the reactor. The baffles are composed of non-woven fabric material and equipped vertically availing riser and downcomer zone inside the PBR. A provision for air/CO₂ gas mixer inlet is provided in the riser zone at the bottom of the reactor. The gas outlet section is designed at the top of the reactor. Further, conical-shaped passive plastic light pipes are intruded, keeping a little portion above the dome surface. Additionally, iron nanoparticle assisted nutritional support is provided.

provided
iron nanoparticles assisted nutritional support is

33. Title: *In-situ charging system for implantable pacemaker*

Name of the inventor: *Indranil Lahiri, Siddharth Sharma, Debrupa Lahiri and Partha Roy MMED (BT)*

Application number: *202011038412(IN)*

Date of Patent Filing: *05.09.2020*

Summary: *The present invention relates to a self-rechargeable battery system consisting of nanaomaterials incorporated piezoelectric system as nanogenerator and a rechargeable battery to replace the classical non-rechargeable batteries used in the pacemakers. The piezoelectric system is essentially a piezoelectric polymeric mat attached to a full-wave bridge rectifier and a voltage multiplier. The rectified and modulated voltages from the piezoelectric system are fed to the rechargeable battery. Nanomaterials are incorporated as second phase reinforcement material to the piezoelectric system converts mechanical energy arising from the movement of the heart electrical energy and concomitantly generate voltage to replenish charge of the battery used in operating the pacemaker.*

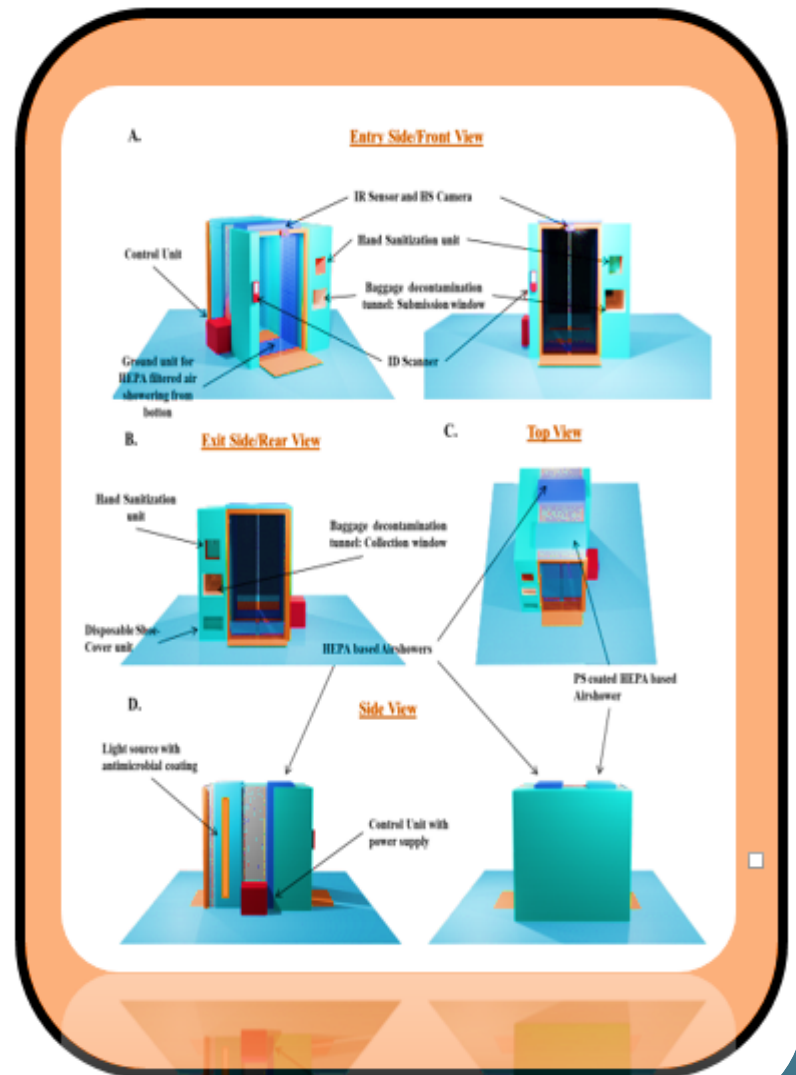
34. **Title:** Non-contact patient registration and monitoring system in multiple languages

Name of the inventor: P. M. Pathak and Ian Wilfred Noronha (MIED)

Application number: 202011042436(IN)

Date of Patent Filing: 30.09.2020

Summary: Present invention provides a system for non-contact registration of patients in hospital for reducing the spread of contagious diseases. This non-contact system is fully autonomous and is able to initiate conversation with users on detecting his/her presence. The system consists of a camera for capturing the picture of the patient, a display to display the collected data on screen in real time, a microphone to capture the spoken information of the patient, an Infrared (IR) sensor to detect presence of user to trigger the program from the standby state, an IR Temperature Sensor to record the patient's temperature. A microcontroller is used to process the speech and image data, generate the receipt of the patient, and automatically take any actions needed as per input data and sensor readings.



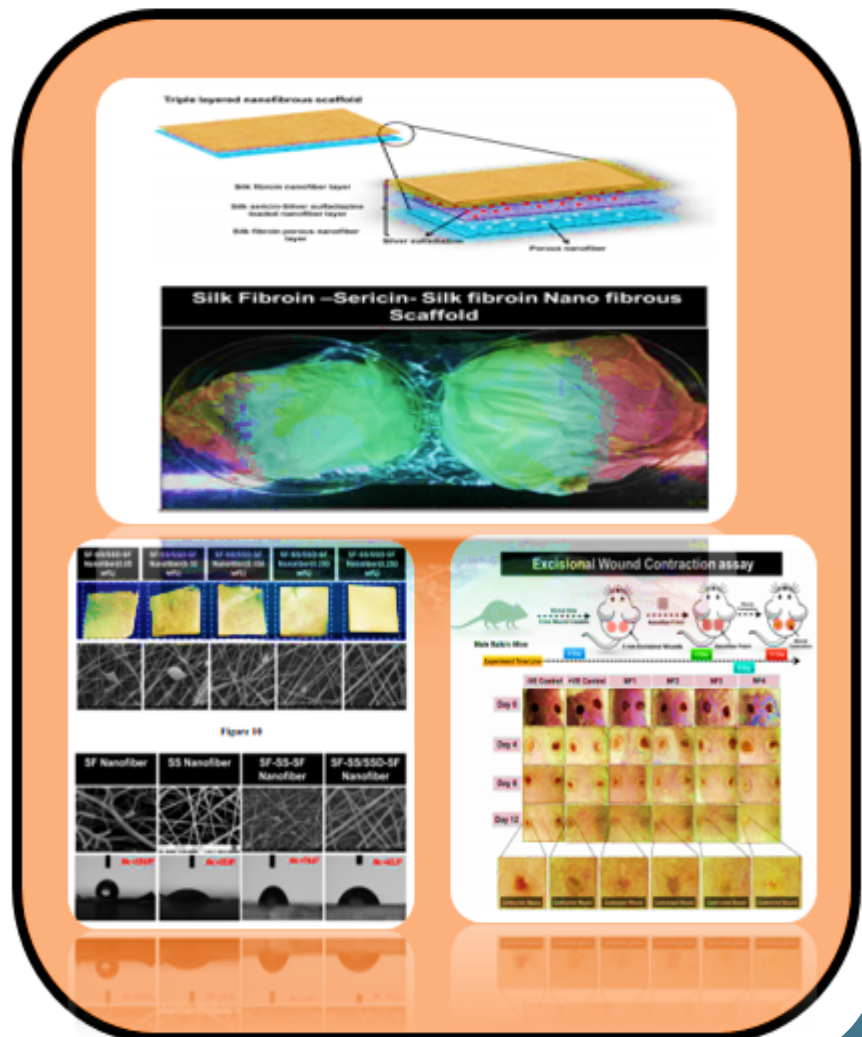
35. **Title:** Photosensitizer based antimicrobial tunnel device for disinfection

Name of the inventor: P. Gopinath and Soumya Deep Basak (BT)

Application number: 202011043894(IN)

Date of Patent Filing: 08.10.2020

Summary: The present invention relates to a photosensitizer based antimicrobial tunnel device to be at the entry sites of railways, airports, hospitals, offices, and commercial establishments to decontaminate the person and the belongings associated with him. Based on the mechanism of photodynamic inactivation, the proposed antimicrobial tunnel would be an easy to use device which deactivates the microbes non-selectively. The proposed antimicrobial tunnel would be based on HEPA-filtered air showers, that would carry the reactive oxygen species generated upon photoexcitation of the photosensitizer molecules in the nanocoating. The tunability of the photosensitizer concentration in the nano-coating makes it a suitable choice for multipurpose use. Additionally, two hand sanitization unit, one baggage decontamination tunnel, one show covering unit, a camera, and an ID scanning device would make the proposed antimicrobial tunnel apt for use in several different scenarios.



36. Title: *Fabrication of biodegradable triple layered nanofibrous bandages and applications thereof*

Name of the inventor: *P. Gopinath and Vinay Kumar (BT)*

Application number: *202011049934(IN)*

Date of Patent Filing: *17.11.2020*

Summary: *The present invention relates to a biocompatible and biodegradable triple-layered biomaterial-based nanofibrous scaffold or bandages comprising a top layer made up of silk fibroin, a middle antibiotic layer made up of silk sericin; and a porous bottom layer made up of silk fibroin for wound healing applications. It also relates to the process of fabrication of a triple-layered biomaterial-based nanofibrous scaffold. The additional advantage of using silk is its inherent antimicrobial property. Thus, this nanofibrous scaffold /bandage can be used with/without any therapeutic agents. The number of layers can be increased or decreased depending on the nature of the wound as a personalized medicine. Also, a combination of therapeutic agents can be loaded to synergize the therapeutic effect or to overcome the resistance by microbes. The nanofibrous scaffold of the present invention exhibits the antibacterial, scar free, self-adhesive and blood clotting properties. Hence, this biomaterial-based nanofibrous scaffold or bandages can be utilized in a wide variety of applications, not limited to skin regeneration, acute and chronic wound healing applications.*