Nanotechnology Solutions for COVID-19 and Healthcare Applications

23rd August 2021
Advancing towards 4IR Post-COVID-19

11th Malaysia Plan

12th Malaysia Plan

NANOTECHNOLOGY as a primary mover for economic growth

- Localisation of value and supply chain
- Leveraging on domestic resources
- New high value labour intensive and high technology Ecosystem
- Business Growth and New Opportunities
NanoMalaysia’s Venture Building Model

Project Investment

NANOTECHNOLOGY SOLUTIONS:
- Business Growth
- New Business Creations
- Entrepreneurship & employment Opportunities
- Sustainable Development Goals

Innovation On-site SANDBOX

Gig Innovation Platform

- Societies
- Universities & Research Institutes
- Industries

Projects

- Intellectual Property
- Joint Ventures
- Technology Licensing
- Manufacturing Nanotech Products

Post-COVID19 Economic Recovery & Reform – New Job, Entrepreneurship and Business Opportunities
POST-MOVEMENT CONTROL ORDER:
Reviving the Economy – Movements of People
COVID-19 Mobile Screening Booths

Deployed in May 2020 during early stages of the pandemic to assist frontliners in conducting test and screening to reduce PPE usage and minimize contact between patient and healthcare professional.

1. Key Features :
   - UV-C decontamination
   - +ve/-ve pressure protection
   - UV-C purified ventilation
   - Air conditioned for doctor’s comfort
   - Multiple Isolation protection from patients
   - Intercom communication Automated misting sanitization

2. Customizable to cater hospital SOP
3. Mobile design for easy relocation
4. Multi purpose for future uses (screening of Haj pilgrims, MERS etc.)
Surface and Airborne Virus Inactivation with UV LED

Occupant SAFE, NON-CHEMICAL 24/7 CONTINUOUS SANITIZATION – Suited for high traffic occupied spaces (Hospitals, Restaurants, Malls, Waiting lounges, Buses, Trains, Academic centers, offices & etc.)

- UV LED disinfectant system integrated with fused Nano Silica optics for localized disinfection via an air filtration and circulation system.
- Provide users with non-chemical and non-harmful disinfecting solution.
- Enables air disinfection mechanism that is capable to provide localized, clean air environment that is free from bacteria, viruses and pathogens.
- Patented LED thermal management system.
Air Quality Solutions for Indoor Environments
Sterilization Solutions (coatings + filter) at Hospitals and Government Buildings

Solutions for Air Conditioning Systems

1. Replacing existing filters with Nano-Filters

2. Nano-Coating of existing evaporator/condenser coils

3. Installing Nano-Coated Filters at air outlets.

Solutions for Interior Coatings

4. Coatings for Walls and Surfaces

5. Coatings for Vehicle Interiors (Ambulance, Cars, etc)

Towards a Clean and Sterilised Indoor Environment
Improved Personal Protective Equipment (PPE)

1. **Graphene Enhanced Nanotextile**
   - Graphene material and hybrid derivatives with metal and photocatalyst shows good antimicrobial properties and can be added to masterbatch of fibers or fabrics before extrusion.
   - Graphene provides good heat dissipation from the fabric, enabling cooling effects from PPEs.

2. **Antibacterial and Antiviral Face Mask**
   - Antibacterial; sterilized 99.9% towards potential harmful bacteria and viral.
   - SGS Laboratory Services – **Certified Sterilized bacteria 99.9%** (Report No: RF/2008/81094A).
   - SGS Laboratory Services – **Certified non-toxic and free from banned substance** (Report No: LPCI/18447/08).

3. **Hybrid NanoCoatings**
   - Anti Virus, Anti Fungal, Anti Bacteria properties shown by hybrid nano Ag/TiO2 for at least 6 months.
   - **Antibacterial Test Done** (not limited to Staphylococcus aureus, Listeria monocytogenes, Streptococcus sp., Lactococcus garvieae, Escherichia coli, Klebsiella pneumoniae, etc.)
   - **Antifungus Test Done** (not limited to Aspergillus niger ATCC 9642, Penicillium pinophilium ATCC 11797, Chaetomiun, etc.)
   - Antibacterial; sterilized 99.9% towards potential harmful bacteria and viral.

4. **Graphene Infused Gloves**
   - Anti-bacterial & Anti-Viral properties.
   - Decreased fatigue and Improved comfort for end-users.
   - Increased tensile strength, elongation.
   - Providing biodegradability & sustainability.
Nanosensor Platform

- Features: Non-invasive and sensitive sensor, capable of detecting subnanogram levels in real time.
- Detection platform with viable trials for various diseases such as TB, dengue, etc.
- Clinical trials for TB detection in progress.

Functional Textile

- Antibacterial / odour resistance properties
- Insect repellent properties
- Garment and fabric protection with enhanced protective attributes to clothing.
  - Hygienic clothing

Nanocomposite Healing Gel

- Incorporation of biomass nanomaterials into a biopolymer based healing gel to:
  - Shorten wound healing duration,
  - Reduce scarring,
  - Prevent keloids; and
  - With antibacterial properties.

Garment and fabric protection with enhanced protective attributes to clothing:
- Hygienic clothing

- Kids Wear
- Sports Attire

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Malaysia’s First (Self-Use) RTK-Ag

Developed by MeDKAD at Tech Park Malaysia. Malaysia’s first COVID-19 test kit for self-use. Test results within 15 with a report through the App.

Self-collected saliva swab or nasal swab alone may miss certain detection of viral load. Combining both nasal and saliva swab samples have advantage to increase detection rate.

Every test result is automatically synchronize with MySejahtera app (COVID-19) for further reporting to the Ministry of Health.

Uses immunochromatography technology to detect the presence of the SARS-CoV-2 antigen in human saliva and anterior nasal swab specimens.

Salixium has a sensitivity of 91.23% and a specificity of 100%
NANOVerify Programme – Testing of New Nanotechnology Products Targeted for COVID-19 Applications

1. Development of functionality testing protocol on anti-viral properties specifically against COVID-19, to supplement the existing NANOVerify Programme in collaboration with agencies under the Ministry of Health (MoH) such as National Pharmaceutical Regulatory Agency (NPRA) and Institute for Medical Research (IMR).

2. To increase awareness amongst consumers and industry on the importance of nanotechnology certification.