



FOOD NANO-BIOTECHNOLOGY ROADMAP FOR SRI LANKA

By

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DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and to the best of my knowledge and belief, it does not contain any material previously published, written or orally communicated by another person except where due reference is made in the text.

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ABBREVIATIONS

AFM	Atomic Force Microscope
Ag	Silver
CNTs	Carbon Nanotubes
CO ₂	Carbon Dioxide
DDC	Dewey Decimal Classification
CVD	Chemical Vapor Deposition
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administrative
GRAS	Generally Recognized as Safe
ISO	International Organization for Standardization
LCC	Library of Congress Classification
MRI	Magnetic Resonance Imaging
NEMS	Nano Electronic Mechanical Systems
NFMU	Nano Facility Management Unit
NIOSH	United States National Institute of Occupational Safety and Health
NIPO	National Intellectual Property Office (NIPO)
NNC	National Nanotechnology Centre
NNRC	National Nano Resource Center
NNTL	National Nanotech Laboratory
NT	Nanotechnology
PCT	Patent Cooperation Treaty
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals (in European Union)
SiN	Silicon Nitride
SiO ₂	Silicon Dioxide
SLFPI	Sri Lankan Food Processing Industry
SNOM	Scanning Near-field Optical Microscopy
SWCNT	Single-walled Carbon Nanotubes
TCU	Technology Commercialization Unit
TiO ₂	Titanium Dioxide
UK	United Kingdom
US / USA	United States
XRD	X-ray Diffraction

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ABSTRACT

Nanotechnology is a major emerging technology, which can revolutionize food industry by employing special nanoscale properties of matter. It can be applied to food processing and packaging in order to improve quality, safety, varieties and health effects of food products.

Sri Lanka, as a country based on an agricultural economy, has the potential to use this new technology for its socio-economical development. The changing lifestyles and consumption patterns and the increasing global nano food market highlights the opportunities, while the government's support on nanotechnology R&D, positive industrial growth rates and established research facilities for food industrial research being the major strengths for applying this technology to the SLFPI. The Food Nano-biotechnology roadmap proposes mechanisms to eliminate weaknesses such as lack of technological awareness and innovativeness.



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The Food Nano-biotechnology Roadmap is developed to lead the industry, academia and the government towards a nano-based food industry. Thus, national frameworks used in other countries are reviewed and their strengths are absorbed to develop the food nano-biotechnology roadmap for Sri Lanka. The proposed mechanism under the National Nano Center (NNC) is to be supported by the existing university system, government departments and the industry. The 10-year time frame reveals the ability to move towards health, beauty and safety based food processing industry using nanoscale additives and ingredients, nanoencapsulation, nanoemulsions and nanopackaging. The Food Nano-biotechnology roadmap introduces the use of Blue Ocean strategy to enter the global nano food market for success of the business.

