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## Performance of Nanocellulose fibre reinforced starch biopolymer composites incorporated with essential oil for food packaging

The demand of antimicrobial active packaging is escalating due to the needs of improving quality and shelf life of food. Recently, many scientists and polymer engineers have been working on eco-friendly materials for starch-based food packaging purposes, which are based on biopolymers, due to the health and environmental issues caused by the non-biodegradable food packaging. However, to maintain food freshness and quality, it is necessary to choose the correct materials and packaging technologies. On the other hand, the starch-based film's biggest flaws are high permeability to water vapor transfer and the ease of spoilage by bacteria and fungi. One of the several possibilities that are being extensively studied is the incorporation of essential oils (EOs) into the packaging material made from nanocellulose fibre reinforced starch biopolymer composites. The EOs used in food packaging films actively prevent activity of bacteria and fungi and have a positive effect on food storage. This work intended to present their performance of anti-microbacterial agent incorporated into nanocellulose fibre reinforced starch biopolymer composites for extending product shelf life. The increasing of essential oils such as cinnamon oil and tea tree oil would cause the reduction of the cohesion forces of polymer chain, creating heterogeneous matrix and subsequently lowering the tensile strength and increasing the elongation (E%) of the films. The present review demonstrated that the use of essential oil represents an interesting alternative for the production of active packaging and for the development of eco-friendly technologies.

### Biography:

S.M. Sapuan is a professor of composite materials at Universiti Putra Malaysia (UPM). He earned his B.Eng degree in Mechanical Engineering from University of Newcastle, Australia in 1990, MSc from Loughborough University, UK in 1994 and Ph.D from De Montfort University, UK in 1998. He is currently Head of Advanced Engineering Materials and Composites Research Centre, UPM. His research interests include natural fiber composites, materials selection, biobased packaging and concurrent engineering. To date he has authored or co-authored more than 1300 publications in international journals (over 700 papers), books (17), edited books (15), chapters in books (110) and conference proceedings/seminars (over 600 papers). S.M. Sapuan received Rotary Research Gold Medal Award, Alumni Award, University of Newcastle, NSW, Australia, 5 Star Role Model Supervisor, UPM and Khwarizmi International Award (KIA). S.M. Sapuan was recognized as the first Malaysian to be conferred Fellowship by the US-based Society of Automotive Engineers International (FSAE).