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Viability of free and encapsulated Lactobacillus acidophilus incorporated to cassava starch edible films and its application to Manaba fresh white cheese

Stalin Santacruz , Francisco Quiroz and **Marlon Castro**
ULEAM, ECUADOR

Lactic acid bacteria (LAB) confer health benefits to the host. However, many studies showed that LAB are sensitive to adverse environments and survival rates are poor in food products. Therefore, encapsulation may be used to protect LAB against harsh environmental conditions. Previous studies show the presence of pathogen microorganisms in cheese from different countries. Manaba fresh white cheese (Manaba cheese) is an Ecuadorian artisanal cheese with good acceptance among consumers. Unfortunately, processing and commercialization conditions do not fulfill regulations leading to the presence of microorganism like *Salmonella*. The present work studies the viability of free and encapsulated L. *acidophilus* at 25°C (temperature of cheese commercialization). Additionally, utilization of free and encapsulated *Lactobacillus acidophilus* incorporated to cassava starch edible films on the physico-chemical and microbiological properties of Manaba cheese stored at 4°C were studied. Results showed that encapsulated L. *acidophilus* showed higher viability than free cells during storage at 25°C. Coated cheese with starch together with encapsulated L. *acidophilus* had lower acidity and weight loss than uncoated cheese after 30 days of storage. Both coated cheese samples containing either free or encapsulated cells had lower viable counts than uncoated samples along the whole storage time at 4°C.

stalin.santacruz@gmail.com

Carica papaya leaf: Potent source of antimicrobial nanoparticles

Ratika Komal and **Vedpriya Arya**
Guru Nanak Girls College, Punjab, India

The field of nanotechnology is one of the most active areas of research in modern materials science. Nanoparticles exhibited completely new or improved properties based on specific characteristics such as size, distribution and morphology. The use of environmentally benign materials like plant leaf extract, bacteria, fungi and enzymes for the synthesis of silver nanoparticles offers numerous benefits of eco-friendliness and compatibility for pharmaceutical and other biomedical applications as they do not use toxic chemicals for the synthesis protocol. The synthesis of metal nanoparticles using biological systems is an expanding research area due to the potential applications in nanomedicines. In the present study, *Carica papaya* leaf extract were treated with the 25 to 100 µm solution of silver nitrate. They resulted into the formation of silver nanoparticles of about 60 nm diameter. The silver nanoparticles were then centrifuged and a thin film is prepared for TEM evaluation which showed presence of silver nanoparticles. The UV-Vis spectrophotometer analysis also showed the presence of silver nanoparticles by showing absorption peak on 450 nm that is due to the SPR (Surface Plasmon Resonance) of silver nanoparticles. Using Agar disc method, 20-25 ml of crude extract of Carica papaya leaf using hot percolation method was used against clinically isolated pathogens. On other hand, 2.5-4.5 µl of silver nanoparticles obtained from crude extract *Carica papaya* leaf on subjection to different reaction conditions show clear 14 mm zone of inhibition against clinically isolated pathogens.

Ratika.komal@gmail.com

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