

## Development of sodium alginate - guar gum silver nanocomposite films for inactivation of food pathogenic bacteria

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### Abstract

The main objective of this investigation was to develop sodium alginate - guar gum-silver nanocomposite films (AG-Ag<sup>0</sup> NCs) to inhibit the growth of foodborne pathogens. The silver nanoparticles were generated in sodium alginate - guar gum blend matrix through reduction by basil leaves (Tulasi). The AG-Ag<sup>0</sup>NCs were characterized using UV – Vis spectroscopy, Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM) and transmission electron microscopy (TEM). The water uptake and mechanical properties of the films were also studied. Nano-sized silver modified sodium alginate and guar gum showed enhanced mechanical properties i.e. the introduction of Ag leading to both strengthening and toughening of AG matrix. The AG–silver nanocomposite films offered excellent antimicrobial activity against various microorganisms. Thus, the developed films have a potential to be used for various antibacterial applications in food packaging.

**Keywords:** Sodium alginate, Guar gum, Silver nanocomposite films, Basil leaves, Food packaging