

Materials chemistry and applications

Antimicrobial activity of fruit packages coated with nanomaterials based in metal-ions zeolites

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The transport and storage of fruits is frequently compromised by microbial contaminations, especially during the delivery of these perishable foods to the public. The development of smart packages against microbial contaminations is an alternative of great interest to help controlling post-harvest diseases. The incorporation of nanomaterials, such as metal-ions zeolites with antimicrobial properties¹, in the semi-rigid alveolar structure for fruits transport/storage could allow the preservation of fruit with safety and quality, by inhibiting/reducing the growth of microorganisms^{2,3}.

In this work, metal-ions zeolite nanomaterials were incorporated on the packaging material and the antibacterial activity was tested against *Escherichia coli* and *Staphylococcus aureus*. The package material exhibited good antimicrobial activity against the two bacteria (Figure 1), which are promising results for industrial application.

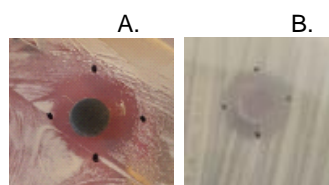


Figure 1: Antimicrobial effects of packaging discs with the incorporated metal-ions zeolites against *E.coli* (A) and *S. aureus* (B).

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References:

1. Ferreira, L. et al. *Colloids and Surfaces B: Biointerfaces*, **2016**, 142, 141-147.
2. Akbar, A.; Anal, A.K. *Food Control* **2014**, 38, 88-95.
3. Azlin-Hasim, S. et al. *Innov. Food Sci. Emerg. Technol.* **2015**, 27, 136-143.