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ANTIMICROBIAL ACTIVITY OF PROPOLIS NANOPARTICLES AGAINST SOME COMMON MEAT CONTAMINATION BACTERIA

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Raw meat is a highly perishable product that requires a great amount of care, from its handling to the conservation conditions at low temperatures. The reduction of microbial proliferation in meat is necessary to achieve an increase of shelf life, food safety, while maintaining product features.

For this reason, a technology based on natural antimicrobial agent may offer a potential alternative to protect and control the proliferation of microorganisms on food products.

Propolis is a natural resinous substance collected from the leaf buds of different tree species by honeybees and known for its biological properties (antibacterial, antifungal, antioxidant) (Koo et. al, 2000).

The aim of this work was to evaluate the antimicrobial activity of propolis nanoparticles in comparison with ethanol-propolis extract against some common meat contamination bacteria.

The ethanol-propolis extract was obtained from green propolis resin, in absolute ethanol under agitation during 15 days. To obtain the propolis nanoparticles, ethanol-propolis extract at 13.75% (w/v) was mixed with polyvinyl-alcohol solution at 0.1% (w/v).

Antimicrobial activity of propolis nanoparticles and ethanol-propolis extract was tested against 8 microorganisms typically present in meat. Minimum inhibitory concentrations (MIC) of both solutions were evaluated by agar-well diffusion method; all strains were susceptible and MIC values ranged from 0.57 to 2.29% (w/v) for propolis nanoparticles and from 0.68 to 6.88% (w/v) for ethanol-propolis extract. The MIC of propolis nanoparticles for *Escherichia coli*, *Staphylococcus aureus*, *Salmonella thompson*, *Listeria monocytogenes*, *Enterococcus faecalis*, *Enterobacter helveticus*, *Lactobacillus buchneri* and *Leuconostoc mesenteroides* was 1.15%, 0.57%, 2.29%, 1.72%, 1.72%, 2.29%, 2.29%, 1.72%, respectively, and the MIC for ethanol-propolis extract to the same species was 3.44%, 0.68%, 3.44%, 3.44%, 3.44%, 6.88%, 6.88%, 3.44%, respectively.

The shown antimicrobial activity of propolis nanoparticles is of potential interest for food applications (e.g. in edible coatings formulation). Therefore, results obtained in this study, set the bases for future studies, using films as support for propolis nanoparticles, for application in meat products.

References

Koo, H.; Gomes, B.P.F.A.; Rosalen, P. L.; Ambrosano, G.M.B.; Park, Y. K.; Cury, J. A. (2000) In vitro antimicrobial activity of propolis and *Arnica montana* against oral pathogens. **Archives of Oral Biology** **45**: 141–148.