**Reversible imines for the stabilization and smart release of antifungal trans-2-hexenal from chitosan polymer**

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Chitosan is a biopolymer which has been widely employed to carry and release several antimicrobial volatiles by means of their physical entrapping in the polymer matrix (Flórez et al., 2022)1. A novel approach for the employment of chitosan as a carrier of active volatiles is based on the use of reversible covalent linkages. These kinds of bonds allow active molecules to be covalently incorporated to the polymer matrix, whereas their release is provoked by the cleavable of the bond when is required.

The objective of this research has been the application of reversible imine linkages for the stabilization and smart release of food grade antimicrobial trans-2-hexenal using chitosan in the form of films. Imine links can be hydrolysed under mildly acidic conditions allowing the release of the volatile. Therefore, trans-2-hexenal was covalently attached to primary amine groups of chitosan films by means of the formation of imine bonds. The reaction was carried out in solid/liquid medium, and main reaction parameters such as trans-2-hexenal:chitosan film ratio, temperature and the use of HCl as catalyst were optimized by employing response surface methodology (RSM) in order to obtain films with adequate antimicrobial activity. The release of trans-2-hexanal from the films was also studied in different acidic media, and their antimicrobial activity evaluated against *P. expansum*.

It was conversely observed that reaction without catalyst and temperatures below 25 °C resulted in films with high volatile release and therefore, great antifungal properties. Whereas, mild reaction temperatures and the presence of a catalyst gave rise to crosslinked chitosan films and low release of the volatile. Additional conjugated Michael addition of amino groups of chitosan to the ɑ,β-unsaturation of trans-2-hexenal together with formation of imines led to a highly crosslinked structure under specific reaction parameters.

*References:*

1 Flórez, M., Guerra-Rodrígez, E., Cazón, P., Vázquez, M. (2022). Chitosan for food packaging: Recent advances in active and intelligent films. Food Hydrocolloids, 124. https://doi.org/ 10.1016/j.foodhyd.2021.107328