Supplementary Material

Application of Essential Oils to control the biodeteriogenic microorganisms in archives and libraries

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Set-up of EO nebulization process

Set-up of EO nebulization was conducted on non-inoculated paper sheets (6x6 cm) to determine the optimal spraying distance and the number of sprays. Figure S1(A) shows the diameter of the wet area as a function of the spraying distance: considering the square paper area, the optimal spraying distance was 12 cm, and a wet area diameter between 7.9 and 8.6 cm was obtained.

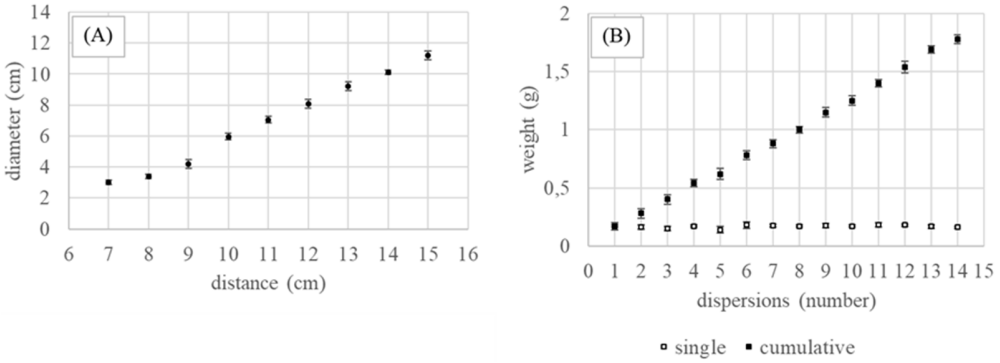

Figure S1. Diameter of the wet area as a function of the spraying distance (A); amount of nebulized EO as a function of the number of sprays (B).

In Figure S1(B), the amount of nebulized EO as a function of the number of sprays was reported. Considering the amount of EO dispersed in each single spray from the cumulative curve, Figure S1(B) the optimal number of sprays was 13 or 14. In this way, the same volume of EO (1.7 ml) added in the test tubes was nebulized on the paper sheet. However, such a volume was not completely absorbed by the paper sheet, therefore the number of sprays was reduced to 10. The following test on agar and paper sheets was performed with the optimized set-up parameters.

Table S1. CFU/ml values for *S. epidermidis* and *R. mucilaginosa* in the presence of *Thymus vulgaris*.

	***S. epidermidis* (cfu/ml)**		***R. mucilaginosa* (cfu/ml)**	
EO % (v/v)	**Thyme**	**Oregano**	**Thyme**	**Oregano**
0,750	0	$7x10^3 \pm 2x10^2$	0	$2x10^3 \pm 5x10^2$
0,375	$6x10^3 \pm 4x10^2$	$5x10^4 \pm 1x10^3$	$6x10^2 \pm 1x10^2$	$2x10^4 \pm 1x10^3$
0,188	$2x10^4 \pm 2x10^3$	$8x10^5 \pm 4x10^4$	$2x10^3 \pm 4x10^2$	$6x10^4 \pm 6x10^3$
0,094	$3x10^5 \pm 4x10^4$	nc	$4x10^4 \pm 2x10^3$	nc
0,047	nc*	nc	nc	nc

*= not countable