ANTIMICROBIAL ACTIVITY OF *Myrtus communis* l. And *Rosmarinus officinalis* l. ESSENTIAL OILS AGAINST *Listeria monocytogenes* IN FRESH CHEESE

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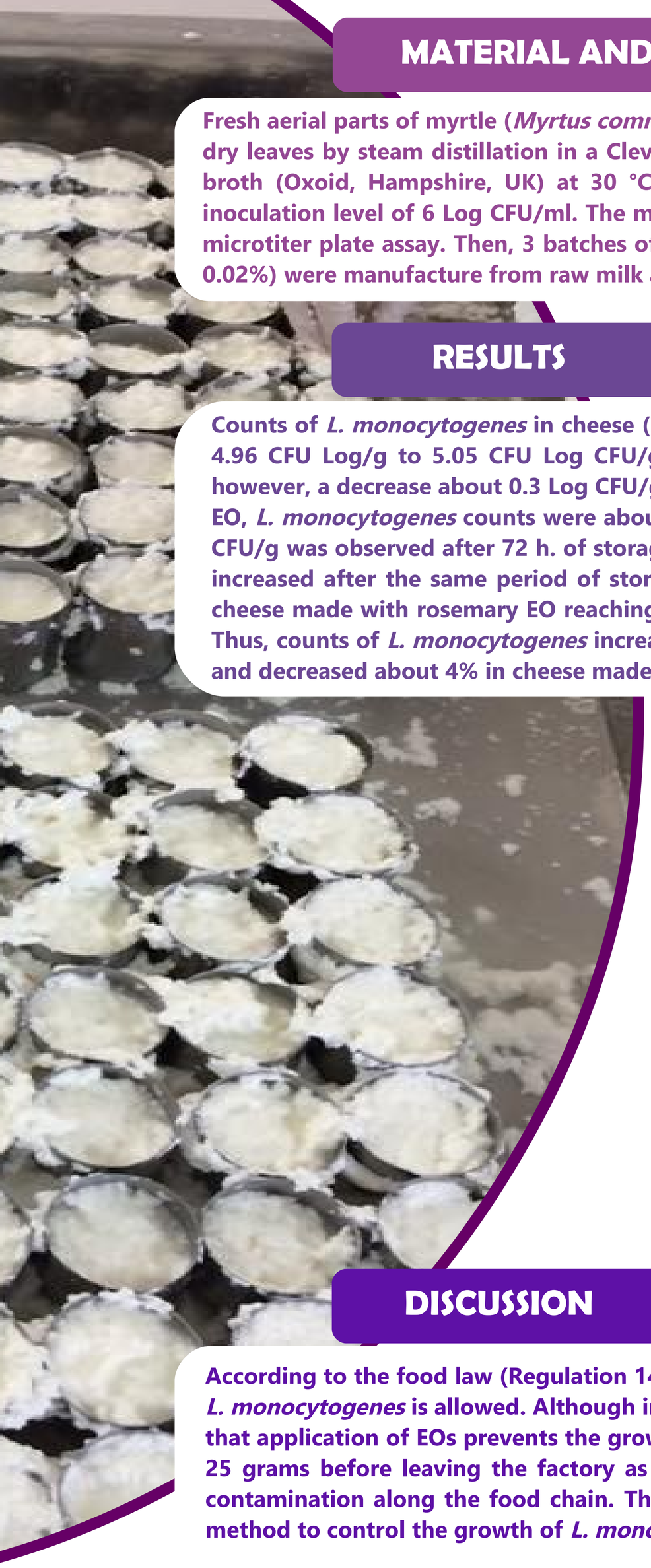
INTRODUCTION

Foodborne outbreaks linked to *Listeria monocytogenes* (LM) in fresh cheese manufacture are usually associated to cross-contamination that may occur at several stages of cheese production and originate from multiple sources from ingredients to facilities. Thus, the ubiquitous nature of *L. monocytogenes* implies the elaboration and implementations of an adequate cleaning and disinfection program to avoid the formation of biofilms. Since the use of essential oils (EO) to control *L. monocytogenes* have been effective is some foodstuffs, the present work asses the antimicrobial effect of myrtle and rosemary EO against *L. monocytogenes* in fresh cheese.

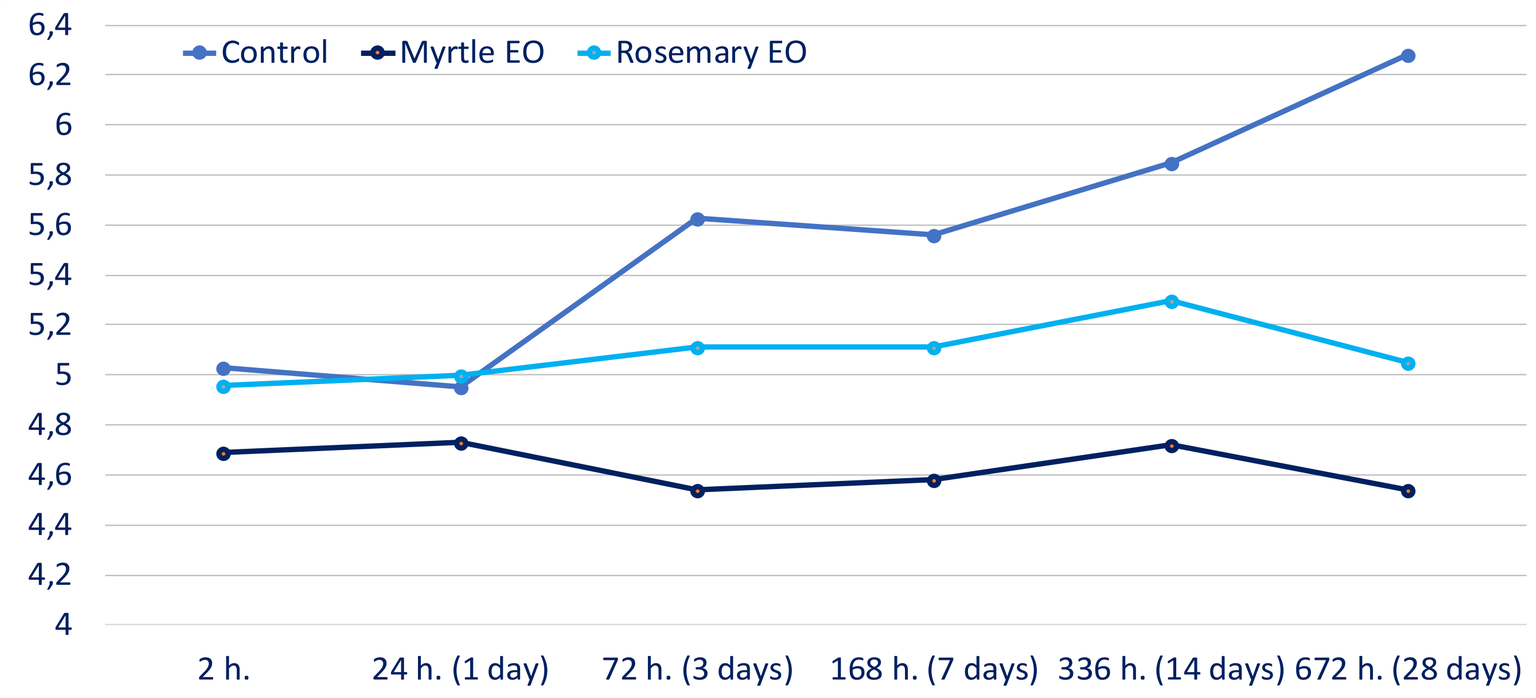


MATERIAL AND METHODS

Fresh aerial parts of myrtle (*Myrtus communis* L.) and rosemary (*Rosmarinus officinalis* L.) were used. The EOs were extracted from dry leaves by steam distillation in a Clevenger-type apparatus. *L. monocytogenes* strain NTCC 679 was cultured in tryptone soya broth (Oxoid, Hampshire, UK) at 30 °C for 18h, adjusted by optical density at 600 nm and diluted to achieve the required inoculation level of 6 Log CFU/ml. The minimum inhibitory concentration and minimal bactericidal concentration were studied by microtiter plate assay. Then, 3 batches of sheep fresh cheese (control, cheese with myrtle EO 0.02% and cheese with rosemary EO 0.02%) were manufacture from raw milk according to the traditional recipe. All of them were contaminated at the curd stage.

RESULTS

Counts of *L. monocytogenes* in cheese (Fig. 1) made with rosemary EO presented a slight increase along the storage period from 4.96 CFU Log/g to 5.05 CFU Log CFU/g (about 2%). After 14 days of storage, *L. monocytogenes* achieved the higher counts however, a decrease about 0.3 Log CFU/g is observed from this point until 28 days of storage. Regarding cheese made with myrtle EO, *L. monocytogenes* counts were about 0.5 log CFU/g less than cheese made with rosemary EO. Also, a decrease about 0.2 Log CFU/g was observed after 72 h. of storage in contrast as observed in cheese with rosemary EO in which *L. monocytogenes* counts increased after the same period of storage. However, the growth pattern of listeria after this point was similar as observed in cheese made with rosemary EO reaching the highest counts after 14 days of storage and decreased until the 28th day of storage. Thus, counts of *L. monocytogenes* increased about 25% fresh cheese without addition of EO, 2% in those made with rosemary EO and decreased about 4% in cheese made with myrtle EO.



DISCUSSION

According to the food law (Regulation 1441/2007), a maximum level of 2 Log CFU/g in RTE products able to support the growth of *L. monocytogenes* is allowed. Although in the present work the level of inoculation was higher than defined by law, it was observed that application of EOs prevents the growth of *L. monocytogenes*. Since dairies must guarantee an absence of *L. monocytogenes* in 25 grams before leaving the factory as defined by law, the use of EOs may control a potential listeria growth in case of cross contamination along the food chain. The addition of myrtle EO or rosemary EO during the cheese manufacture was an effective method to control the growth of *L. monocytgenes* along the storage period.