



## Antimicrobial and physico-chemical effects of essential oils on fermented milk during preservation

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### ABSTRACT

**Objectives:** Milk and milk products are known to be the good media for development of many microorganisms. Some essential oils are known to have antimicrobial activities against bacteria, mould and fungi. With the aim of contributing to the preservation of the fermented dairy products, the present study explored the use of essential oils for biopreservation in food pathogen control. The objectives were to study the effect of two essential oils extracted from local plants *Xylopiæ aethiopicæ* (Dunal) A.Rich. and *Pimenta racemosa* (Mill.) J.W. Moore on the physico-chemical, microbiological and organoleptic characteristics of the fermented milk.

**Methodology and Results:** At the first level, essential oils were extracted from the leaves of plants and the minimum inhibitory concentration (MIC) of each one was detected using the serial dilution method and Muller Hinton Broth medium. The references strains used were *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922. Based on the MICs determined, essential oils were added to fermented milk and determination of its physicochemical characteristic, evolution of the microbial flora (meophilic flora, lactic flora, coliforms, *Staphylococcus aureus*) were done during two weeks of preservation. The results showed that *Xylopiæ aethiopicæ* had a lowest minimum inhibitory concentration. After fifteen days of preservation, a decrease of mesophilic flora and lactic bacteria was observed and a disappearance was noticed for coliforms, thermotolerant coliforms and *Staphylococcus aureus* during the same time. These results prove the efficiency of those essential oils in fermented milk preservation. Moreover, microorganisms' inhibition was more pronounced with *Xylopiæ aethiopicæ* essential oil than the *Pimenta racemosa* one.

**Conclusion and applications of findings:** The study results showed a possible way of using essential oils as an alternative to chemical additives used for preservation of food products. As there are natural products, there could take an important part in the food safety policies.

**Key words:** Essential oils, biopreservation, fermented milk