

In vitro assessment of the antimicrobial activity of ultrasound-assisted extracts of aromatic plants by-products against microbiota isolated on selective media from spoiled vacuum packaged cooked meat.

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Objective: One of the most common causes of food-spoilage and their short shelf-life is related to microbiological origin. On the other hand, the consumer trend for fewer artificial food additives is well recognized. Therefore, systematic scientific efforts are carried out to find alternative methods to inhibit both pathogenic and spoilage microorganisms. The antimicrobial activity of ultrasound-assisted extracts of aromatic plants by-products was tested against selected bacteria isolated from spoiled vacuum-packed cooked meat on selective media.

Methods: Spoiled vacuum-packed pork meat was microbiologically analyzed, and the dispersion was spread plated on the selective agar plates that were incubated under the proper conditions. The majority of isolated colonies belonged to species *Lactiplantibacillus plantarum*, *Latilactobacillus sakei*, *Brochothrix thermosphacta* and *Carnobacterium divergens*. The antimicrobial efficacy of the extracts was evaluated in a microplate spectrophotometer at 600 nm over 24 h at 30 min intervals. The final concentration of the extracts was 4%, 2% or 1% v/v and the initial population of the target strains was approx. 10⁴ cfu/mL. The Baranyi and Roberts growth model was applied and the lag phase was calculated. The inhibitory activity was estimated in comparison to that of the control samples. The longest the lag phase, the stronger the inhibitory effect.

Results: Results showed that the *Origanum vulgare* extract had the highest inhibitory activity compared to *Rosa Damascena* extract. The 4% v/v oregano extract caused 78%, 53%, and 22% increase of the lag phase of *Lactiplantibacillus plantarum*, *Latilactobacillus sakei* and *Carnobacterium divergens*, respectively while no change was observed in the case of *Brochothrix thermosphacta*. The 2% v/v oregano extract obtained an increase of the lag phase equal to 44% and 25% for *Lactiplantibacillus plantarum* and *Latilactobacillus sakei*. Regarding the extracts of rose petals (at 4% v/v) an inhibitory activity was observed only against *Lactiplantibacillus plantarum*, *Latilactobacillus sakei*.

Conclusion: The use of aromatic plants by-products can inhibit species of bacteria that participate in the spoilage microbiome of vacuum-packed cooked meat. Nonetheless, in contrast to pathogenic bacteria, it is not necessary to completely inhibit the target microorganisms; the purpose is to delay their growth to extend the shelf-life of the product.