Application of Biolog methodology for the evaluation of terpenoids influence on lactic acid bacteria

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Introduction

Terpenoids are plant metabolites with many biological properties, including a possible antimicrobial activity. Biolog methodology for metabolic characterization of microorganisms has been found suitable for the evaluation of antimicrobial activity of different plant components against bacterial consortia. With such methodology it is possible to ascertain the initial duration of the antimicrobial activity (if present) and its resulting effect on microorganisms' viability, so allowing a precise screening of different substances vs. different microorganisms.

Aim of the work

The aim of this work was to evaluate the effect of some oxygenated terpenoids at different concentrations that could be normally found in raw milk, against a wide number of lactic acid bacterial strains, isolated from raw milk in previous researches and belonging to the usual physiological and metabolic groups of such microorganisms (thermophilic and mesophilic rods and cocci, homo- and hetero-fermenting)

Materials and Methods

Settings of Biolog parameters:

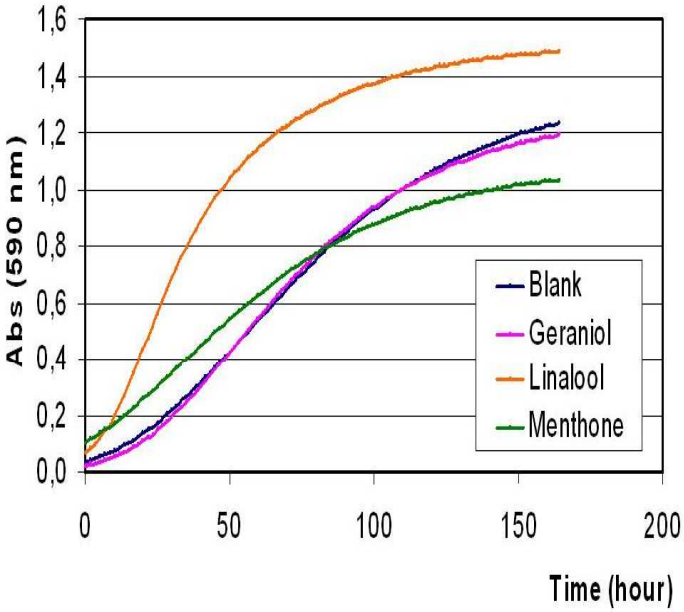
- **Terpenoids:** a-terpineol, linalool, geraniol, terpinen-4-ol, carvone, menthone
- **Terpenoids concentrations:** 0.1 and 1 mg/L
- **Strains:** homo- and hetero-fermenting, mesophilic and thermophilic cocci and rods
- **Strains concentrations:** 10^3 and 10^4 cells/mL
- **Incubation temperature:** 25 and 40 C
- **Blanks:** without terpenoids
- **Number of replications:** 3
- **Absorbance wavelenght:** 590 nm

Modelling of experimental curves with Gompertz's modified equation by TableCurve 2D software

$$y = A \exp\left\{ -\exp\left[\frac{\mu_m e}{A}(\lambda - t) + 1\right]\right\}$$

λ = duration of lag-phase
μ_m (μ) = velocity in the exponential growth phase
A = maximum growth value

Results



Temporal evolution of *Enterococcus* sp. strain at 10^4 cells/ml (mean of 3 replications) without terpenoid (blank) and with geraniol, linalool and menthone.

Conclusions

Initial results confirm the suitability of the adopted methodology for screening purposes, indicating that among the different groups tested various types of lactic acid bacteria responses to the presence of the same terpenoid can be detected. Therefore the Biolog methodology adopted proved to be suitable to study the relation between LABs and terpenoids.