

Effects of short term aging on antibacterial activity of young red wine

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INTRODUCTION

Important biological property of wine is its potent antimicrobial activity including human foodborne, medical and oral pathogens. Although the exact mechanisms responsible for the antimicrobial activity of wine are not fully understood, organic acids, ethanol, low pH and wine phenolics have been proposed to play a major role. Production technology and wine aging may influence its biochemical properties and biological effects, including antibacterial activity.

MATERIALS AND METHODS

The organisms studied included standard *Escherichia coli* American Type Culture Collection (ATCC 25922) and *Salmonella enterica* serovar *Enteritidis* (ATCC 13076). Aliquots of 200 μ L of the bacterial suspension were added to 3.8 mL of red wine yielding an initial concentration of 10^5 to 10^6 colony forming units/ml. 0.01 mL of that suspension was then at fixed times inoculated on blood agar. Plates were incubated for 24 hours at 35°C at ambient atmosphere. Bacterial growth was determined as the number of colonies seen with the naked eye. The test wine was 17 and 21 months old, Plavac mali SYRTIS, "Vinogradi Volarević" winery.

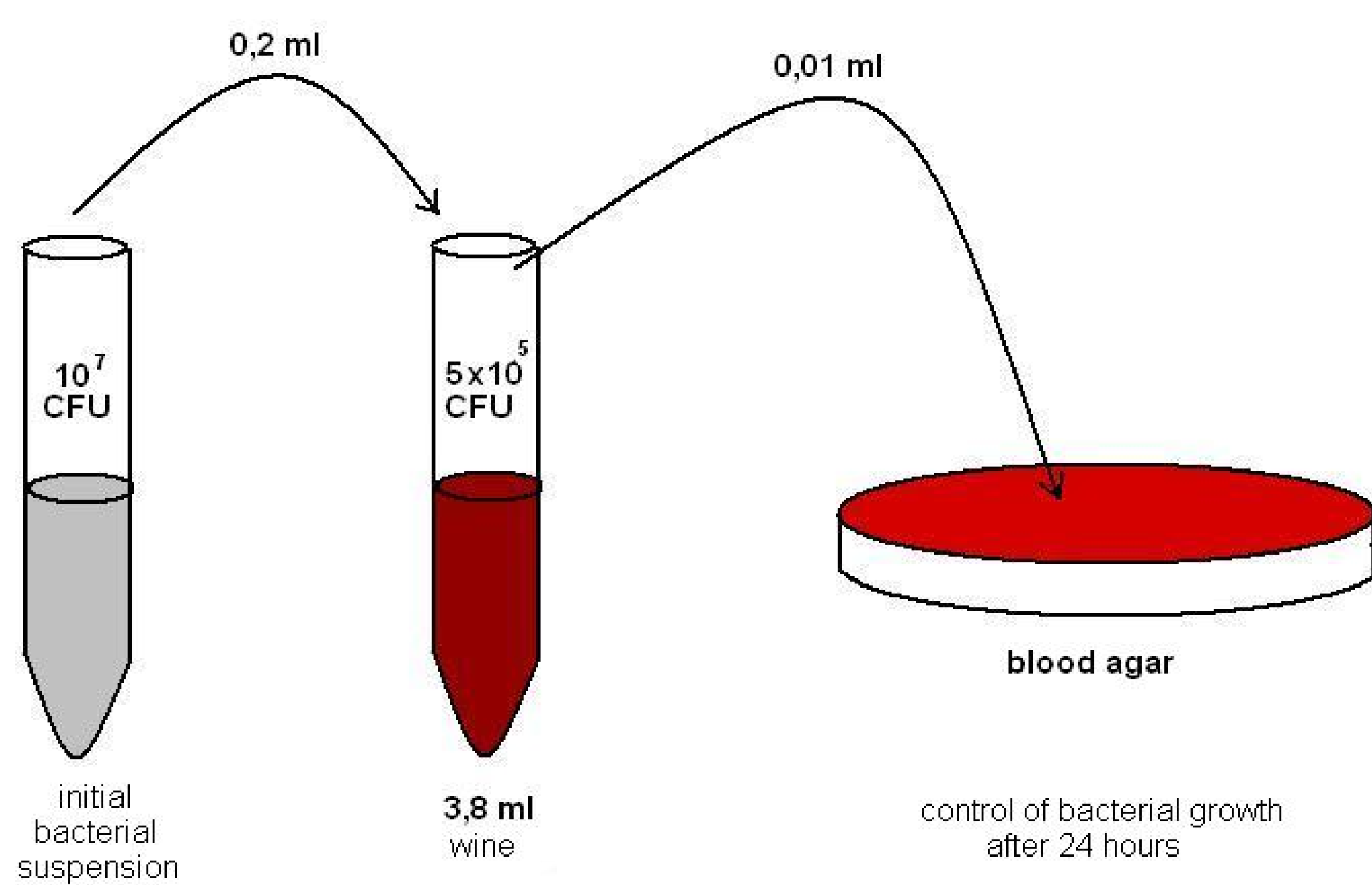


Figure 1. Illustration of method for determination antibacterial activity of wine on blood agar. Control of bacterial growth is made 24 hours after the inoculation.

RESULTS

The minimal incubation time of the bacterial suspension with the 17 month old wine, necessary for prevention of bacterial growth, was 50 min and 30 minutes for *E. coli* and *Salmonella*, respectively. The suspension time needed for prevention of the bacterial growth with the same wine 4 months later, markedly shortened to 15 and 7 minutes for *E. coli* and *Salmonella*, respectively.

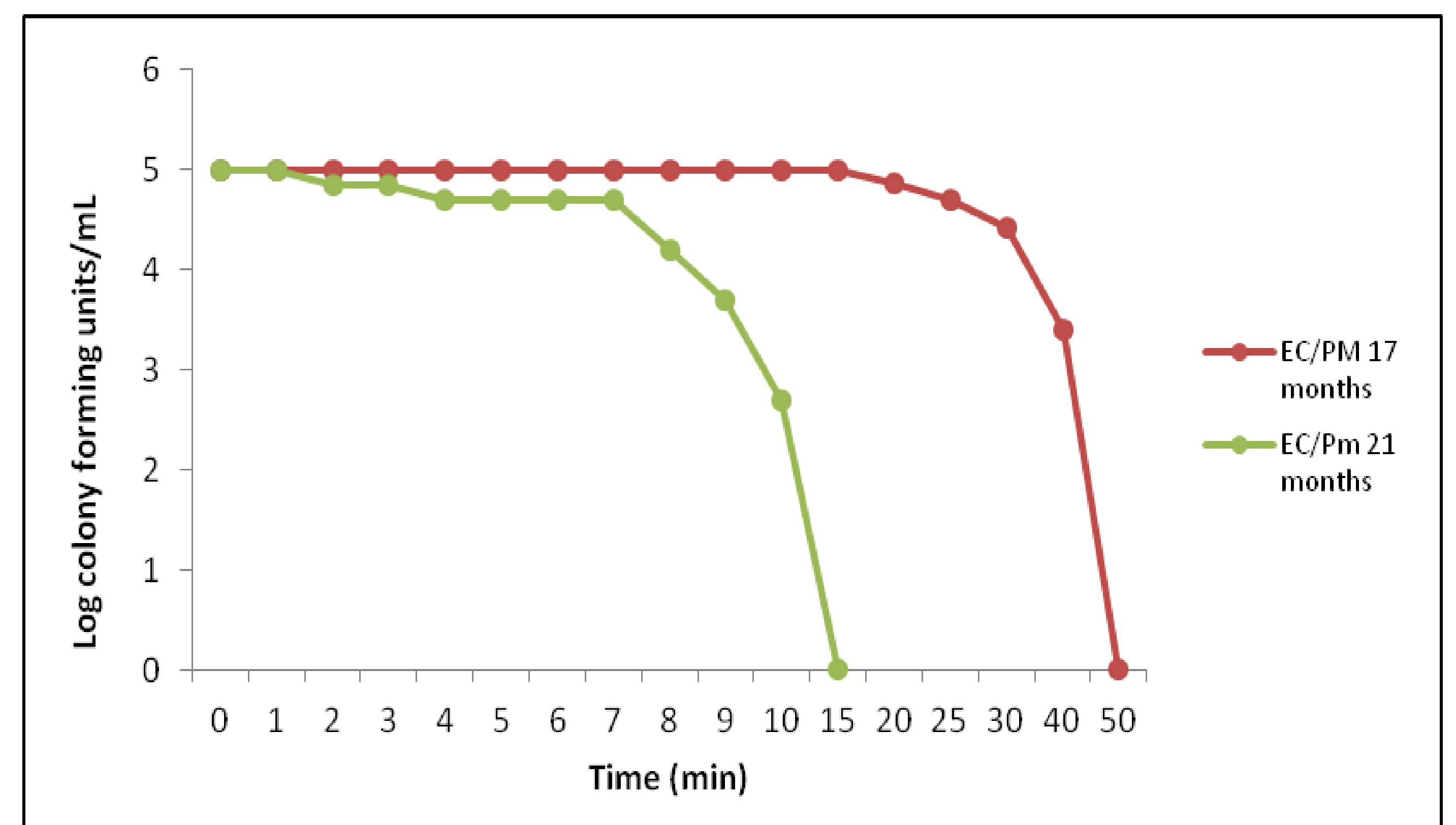


Figure 2. Time-kill curves for standard *E. coli* (ATCC 25922) following incubation with Plavac mali 17 months and 21 months old wine. Data are averages of at least three independent experiments.

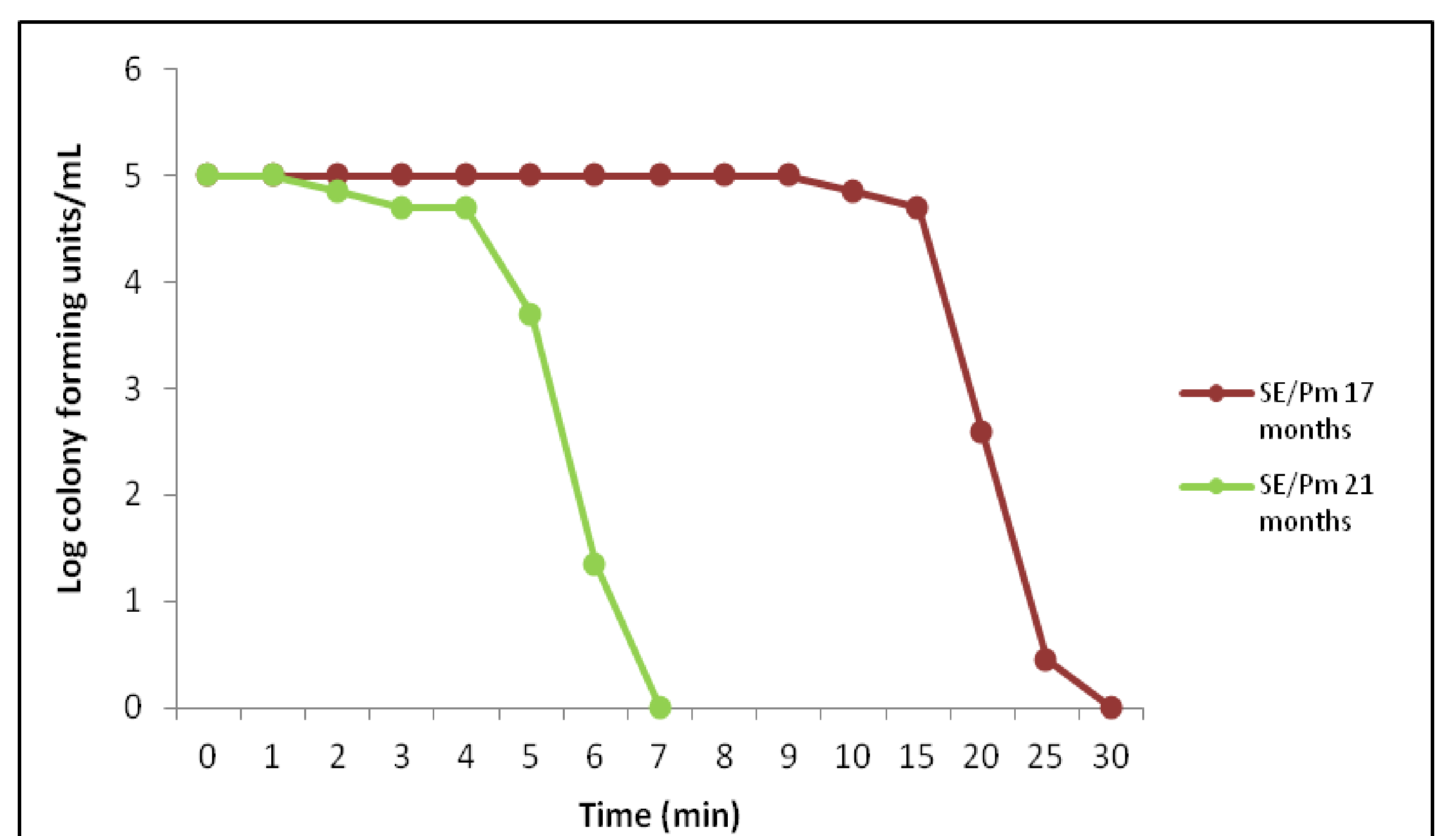


Figure 3. Time-kill curves for standard *Salmonella* (ATCC 13076) following incubation with Plavac mali 17 months old wine and 21 months old wine. Data are averages of at least three independent experiments.

CONCLUSION

Our results indicate that even short periods of aging of young immature red wine may alter its antibacterial activity.

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