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The Mutation Frequency for Antibiotic Resistance on S. aureus against Azithromycin Alone and Combined with Syzygium cumini Decoctation

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The Mutation Frequency for Antibiotic Resistance on *S. aureus* against Azithromycin Alone and Combined with *Syzygium cumini* Decoctation

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INTRODUCTION

Resistance to antibiotics is the result of adaptive and spontaneous mutations [1,2], which can be suppressed by use of combinatory antibiotics [3]. Synergistic effects between certain plants in combination with antibiotics is known, yet the mutation frequency of such combinations is still unexplored. Therefore, this study aims to measure the spontaneous mutational frequency of S. aureus for Azithromycin (AZM) resistance alone and in combination with Syzygium cumini decocta (SCD), known for its antimutagenic effect.

METHODS

This study uses fluctuation analysis with 39 replicate cultures in selective media using AZM alone, SCD alone, and AZM combined with SCD at 1x MIC and analysing resistant strains based on its growth rate in liquid media in a 24-hour period.

RESULTS AND DISCUSSION

From this study, SCD (100 mg/ml) had a ZOI of 14 mm against S. aureus, and an MIC of 156 mg/L, while AZM (5 mg/ml) had a ZOI of 20 mm and an MIC of 39 mg/L. AZM, SCD and AZM combined with SCD significantly suppressed the maximum growth rate (μmax) of pre-grown S. aureus, with no significant difference between AZM and AZM combined with SCD. Time-point growth comparison at the first 4 hour of growth showed two replicate cultures in AZM selective medium with growth rates at the same level with S. aureus in non-selective medium, indicating resistance to AZM (Figure 1). The spontaneous mutation rate of S. aureus against AZM was estimated to be ≈7.2 x 10-10, while both SCD and AZM combined with SCD had zero mutational events for antibiotic resistance.

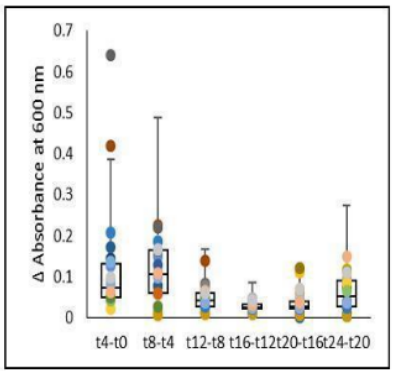

Fig 1. Growth comparison on 4-hour time points (t) of S. aureus grown in Azithromycin (AZM) selective medium, with error bars depicting the upper inner fence (1.5xIQR). Outliers were considered resistant strains.

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