

The Effectiveness of Lysozyme in Decreasing the Minimum Inhibitory Concentration against Amoxicillin-Resistant *Streptococcus pneumoniae*

Efektifitas Lisozim pada Penurunan Kadar Hambat Minimum Amoksisilin terhadap *Streptococcus pneumoniae* Resisten Amoksisilin

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Background: *Streptococcus pneumoniae* is a gram-positive bacterium that causes various types of respiratory diseases such as pneumoniae, sinusitis, otitis, bronchitis and meningitis. Amoxicillin is a class of penicillin β -lactam antibiotic which works to inhibit cell wall synthesis of gram-positive bacteria such as *Streptococcus pneumoniae*. Lysozyme is an enzyme that has a role in killing gram-positive bacteria by lyses the peptidoglycan cell wall.

Research Aims: To determine the effectiveness of lysozyme in reducing Amoxicillin minimal inhibitory levels against the bacteria *Streptococcus pneumoniae*.

Research Method: This research is experimental laboratory. Materials used include: Local *Streptococcus pneumoniae* strains, Amoxicillin, lysozyme (sigma), Tryptone Soya Agar (TSA) and Brain Heart Infusion (BHI) media. Determination of the combination of minimal lysozyme and Amoxicillin combination with a liquid dilution series method (tube dilution series).

Research Results: Based on the KHM examination with the dilution method, the following results are obtained: KHM lysozyme against *Streptococcus pneumoniae* $> 300 \mu\text{g} / \text{ml}$, MIC Amoxicillin against *Streptococcus pneumoniae* $166.67 \mu\text{g} / \text{ml}$, and a combination of lysozyme and Amoxicillin against *Streptococcus pneumoniae* $12,34 \mu\text{g} / \text{ml}$. The results of data analysis using One Way Anova were obtained $p < 0.05$ for MIC combination of lysozyme and Amoxicillin. This proves that the addition of lysozyme can reduce the rate of MIC in Amoxicillin against Amoxicillin-resistant *Streptococcus pneumoniae*.

Conclusion: Lysozyme with levels of $300 \mu\text{g} / \text{ml}$ does not have an antibacterial effect on Amoxicillin-resistant *Streptococcus pneumoniae*. The combination of lysozyme and Amoxicillin was able to reduce Amoxicillin minimal inhibitory concentration against Amoxicillin-resistant *Streptococcus pneumoniae*.

Key words: Amoxicillin, Lysozyme, *Streptococcus pneumoniae* Resistant to Amoxicillin, Minimum Inhibitory Level.