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POTENTIAL TEST AND COMPARATIVE TEST OF AMOXYCILLIN ANTIBIOTICS USED IN THE TREATMENT OF CASES OF RESISTANCE IN TASIKMALAYA, INDONESIA

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ABSTRACT

Objective: ARI is an acute infection of any part of the respiratory tract including the paranasal sinuses, middle ear and pleural cavity caused by viruses, bacteria, rickettes. Amoxycillin is one of antibiotics to overcome the disease ARIs. Ineffective use of antibiotics may lead to resistance. The potential value of antibiotics determines the effectiveness of an antibiotic. This study aims to determine the potential value and comparative test of amoxycillin antibiotics as a quality evaluation. **Methods:** Test the antibiotic potency with diffusion method to use 3 doses with using antibiotic samples. Comparative test of antibiotic testing by comparing samples with standard against *E. coli* ATCC 25922 test bacteria. **Results:** The potential value obtained was 96.16%, and comparative test was 1 : 1,01. **Conclusion:** The results of testing the potential of amoxycillin in accordance with the requirements contained in Indonesia Pharmacopeia. The comparative test results show that antibiotic samples used had good bacterial killing ability.

KEYWORDS: Amoxycillin, antibiotic resistence, potential test, comparative test, agar diffusion.

INTRODUCTION

The mortality rate is very high in infants, children and the elderly, especially in countries with low and middle income per capita.[1] In the city of Tasikmalaya, the main causes of infant and under-five mortality are ARI, in this case pneumonia so that prevention and control of ARI is a top priority for health development in the Tasikmalaya region.[2]

ARI is an acute infection of any part of the respiratory tract including the paranasal sinuses, middle ear and pleural cavity.[3] As a result of viral infection there is damage to the mucociliary mechanism, which is a protective mechanism in the respiratory tract against bacterial infections so as to facilitate pathogenic bacteria found in upper respiratory tracts such as Streptococcus pneumoniae, Haemophilus influenzae and Staphylococcus aureus to attack the damaged mucosa.[4]

Testing the potential of antibiotics aims to determine the biological activity of an antibiotic in inhibiting microorganisms, which cannot be determined chemically or physically.[5] Testing the comparative value of antibiotic activity aims to determine the comparison of antibiotic activity with standard samples against clinically sensitive bacterial isolates.[5]

In this study will be tested potential test of amoxycillin which is also an important data to determine the quality of antibiotics used in the health center of Tasikmalaya City. The requirements of antibiotic levels should be in accordance with Indonesia Pharmacopeia.

MATERIALS AND METHODS

Test Materials

McFarland standard No. 0.5, and physiological saline 0.9% (Merck), test bacteria used to test the potential of amoxycillin antibiotics is *E. coli* ATCC 25922.

Bacterial Growth Media

Bacteria growth medium used was Mueller Hinton Agar (Merck) with a concentration of 43 g/L and Mueller Hinton Broth (Oxid, Basingstoke, UK) at a concentration of 21 g/L, Mueller Hinton Agar (Merck, USA) with a concentration of 43 g/L.

Method

The antibiotic potency test was performed by agar diffusion method. Determination of antibiotic potency using 3 doses done calculation by formula

$$I = \log \frac{Dt}{Dm} = \log \frac{Dm}{Dr}$$

$$E = \frac{1}{4} x\ [(St - Sr)] + \ [(Bt - Br)]$$

$$b = \frac{E}{\log 2}$$

$$F = \frac{1}{3} x\ [(St + Sm + Sr)] - \ [(9Bt + Bm + Br)]$$

$M = \frac{F}{b}$

Potency = antilog M x 100%.[6]

Testing the comparability of amoxycillin antibiotics using sample and standard antibiotics with 4 variations of concentration, namely 200 µg/mL, 100 µg/mL, 50 µg/mL, and 25 µg/mL.[6]

RESULT AND DISCUSSION

Testing Potential Antibiotics

The potential test of amoxycillin antibiotics according to IV Pharmacopoeia Indonesia (1995) was used *E. coli* ATCC 25922 bacteria. The experimental pattern of the agar diffusion method used is the 3 + 3 pattern where one comparison standard is used and one sample with 3 dose variations. The doses used were high doses (100 µg / mL), medium doses (50 µg / mL), and low doses (25 µg / mL) (7).

The inhibition diameter obtained from the test for the potential of amoxycillin antibiotics can be seen in Table 1.

Table 1: Inhibition Diameter of Potential Test Results.

Inhibition Diameter (mm)					
$S_{td}H$	$S_{td}M$	$S_{td}L$	$S_{sm}H$	$S_{sm}M$	$S_{sm}L$
16.6	13.9	10.6	16.30	13.80	10.50

Table Descriptions

$S_{td}H$: High Dose Standard
$S_{td}M$: Middle Dose Standard
$S_{td}L$: Low Dose Standard
$S_{sm}H$: High Dose Samples
$S_{sm}M$: Middle Dose Medium
$S_{sm}L$: Low Dose Samples

The results of antibiotic potency testing of amoxycillin with a three-dose pattern obtained for 96.16% These results indicate that amoxycillin antibiotics used in Tasikmalaya city health centers still meet the requirements listed in the Indonesia Pharmacopeia.[6]

Antibiotic Comparison Test

The comparative test of antibiotic activity aims to be resistant to antibiotics using resistant clinical isolate bacteria. The result of this treatment is for patients with respiratory infection.[8] Testing the comparability of amoxycillin antibiotics using sample and standard

antibiotics with 4 variations of concentration, 200 µg/mL, 100 µg/mL, 50 µg/mL, and 25 µg/mL.[7] The graph of the sample and standard antibiotic appellate values can be seen in Figure 3.[9]

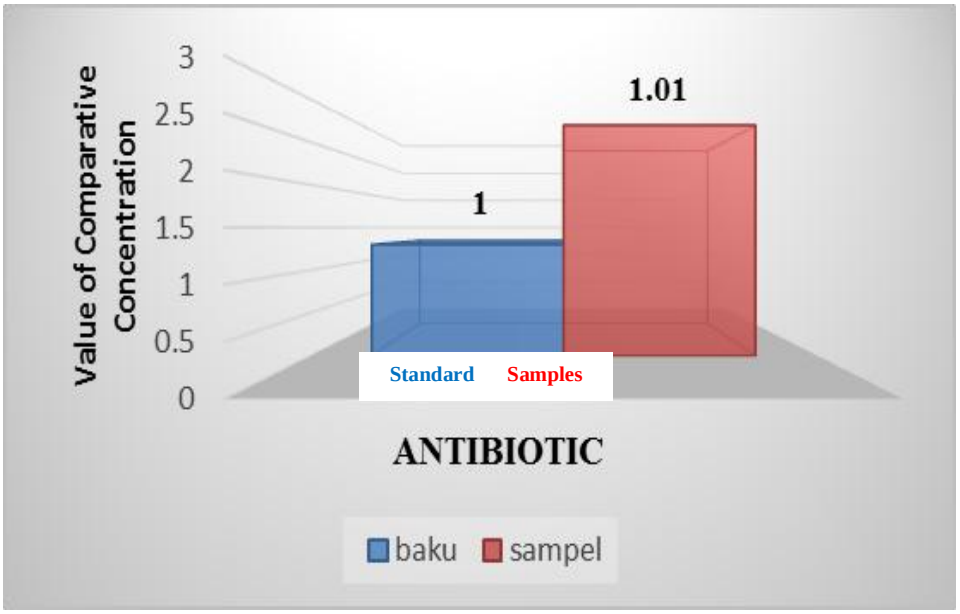

Figure 3: Comparative test values of antibiotic samples and standards.

The comparative value of amoxycillin antibiotics obtained is 1: 1.01, this value indicates that the concentration needed by the antibiotic sample is not much different from the standard antibiotic comparison.[9]

CONCLUTION

The antibiotic potency of amoxycillin used in Tasikmalaya City Health Center is 96.16 %. Results were still within the range required by the Indonesia Pharmacopeia. The results of comparative antibiotic activity testing showed that the antibiotics used had slightly better activity than the standard with the value 1: 1.01.

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