

## DETECTION OF ANTIBIOTIC RESIDUES AND CONCENTRATIONS IN COWS MILK TAKEN FROM LOCAL DAIRY FARMERS IN LEMBANG SUB DISTRICT

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### Abstract

*Antibiotics used on cattle medicine practices in local dairy farmers were unavoidable. These practices allow the antibiotic residues still left on milk. Even the concentrations were low, antibiotic residue consumed can cause health problems such as allergy, intoxication and antibioresistance. Besides that, milk with antibiotic residues cannot be treated with using microorganisms' starter. Antibiotic residues-free milk would increase consumer safety and competitiveness on international trade. Eighteen local dairy farmers from three milk reception places that were members of South Bandung Dairy Farmers Cooperative were selected purposively. Milk samples were taken shortly after milking and qualitatively tested using Beta Star 25. When positives sample found, the test was continued for three days with Frontier Post Test (FPT), using Bacillus subtilis. The results were analyzed descriptively and showed that 5 from 18 samples (27.78%) were antibiotic residue positives and Frontier Post Test result shown the decrease of antibiotic residue concentrations from day 1 until day 3. The average of antibiotic residue concentration from day 1 until day 3 on the pH of 6.0 was  $19.60 \pm 4.62$  mm;  $9.80 \pm 5.22$  mm and  $7.00 \pm 5.20$  mm, while on the pH of 8.0 was  $10.40 \pm 4.34$  mm;  $9.00 \pm 3.81$  mm and  $1.40 \pm 0.55$  mm.*

**Key words:** antibiotic concentrations, antibiotic residues, cows milk

### INTRODUCTION

Along with the Indonesian government's policy planning about self-sufficiency and dairy milk productivity improvement, mastitis control would be need to improved dairy milk productivity so that self-sufficiency can be accomplished. However, there were so many mastitis infections found in Indonesians dairy farm. Mastitis infections almost found in every dairy farm in West Java, Central Java and East Java which is the region that contribute milk production in Indonesia and one of the largest milk producing regions in West Java were Lembang.

High number of mastitis infections causes high number of antibiotics uses among Lembang farmers. Antibiotic were used to medicate dairy cow's that infected by mastitis bacteria. One of the largest uses of antibiotics in dairy production may be for "dry cow" treatment. In the dairy farm practices, the most common infectious diseases in heifers and cows for which

antibiotic therapy can be indicated include mastitis, respiratory illness, lameness, and enteric diseases (Andrews, 2000; Dodd and Booth, 2000; Weaver, 2000). Antibiotic use in dairy farm practices can not be avoided due to maximum production that must be achieved.

Although the concentrations were very low, the presence of antibiotics in milk can cause health problems, primarily at consumers who were antibiotics sensitive. Beside that, milk containing antibiotic can not be used for the manufacture of dairy products like yogurt and cheese. A number of studies were also demonstrated an association between antibiotic use and the occurrence of resistant enteric bacteria in cattle (Alcaine et al., 2005; Berge et al., 2005; Sato et al., 2005).

To avoid the occurrence of residues in produced milk, it would need a close supervision on antibiotic use in dairy farm practices. Withdrawal time and restrictions of drugs types should get more attention in

dairy farm practices. Supervision of antibiotic residues on milk can be done with using microbiology methods by using one of microorganisms species that grown in suitable media. Microorganism grown well in an appropriate medium, but the presence of an antibiotic will inhibit the growth of microorganisms. Inhibition of microorganisms' growth can be shown by halo formation on a sample (Murdiati, 1997).

## MATERIAL AND METHOD

Milk was taken from eighteen local dairy farmers from three milk reception places that were members of South Bandung Dairy Farmers Cooperative were selected purposively. Samples were taken shortly after milking and qualitatively tested using Beta Star 25. When positives sample found, the test was continued for three days with Frontier Post Test (FPT) using *Bacillus subtilis* that incubated 24 hours at 37°C on acid condition (pH of 6.0) to determine the antibiotic residue of Penicillin and Tetracycline groups while alkaline conditions

tests (pH of 8.0) were also done to determine the antibiotic residue of Streptomycin groups (Oka, 1995). Frontier Post Test result was measured and compared with control (Penicillin, Oxytetracycline and Cloaxillin).

## RESULTS AND DISCUSSIONS

Milk was taken from eighteen local dairy farmers from three milk reception places that were members of South Bandung Dairy Farmers Cooperative and then tested with using Beta Star 25. As shown in table 1, the result showed that 5 samples (27.78%) were positive containing antibiotic residue.

The positives sample found were continued tested for three days with Frontier Post Test (FPT) using *Bacillus subtilis*. Tests were done in acid condition (pH of 6.0) to determine the antibiotic residue of Penicillin and Tetracycline groups while alkaline conditions tests (pH of 8.0) were also done to determine the antibiotic residue of Streptomycin groups (Oka, 1995).

Table 1 The result of antibiotic residue test of eighteen local dairy farmers

Samples Code	Beta Star 25 Result	Samples Code	Beta Star 25 Result
1	-	10	-
2	-	11	-
3	-	12	-
4	+	13	-
5	-	14	+
6	-	15	-
7	+	16	-
8	-	17	+
9	+	18	-

Frontier Post Test result on Table 3 showed that diameter of halo on the first day was 14-26 mm on the pH of 6.0 and 4-16 on the pH of 8.0. If we compared it with the control (Table 2) on acid conditions, all the samples had an antibiotic residue more than 1 mg/kg except B samples with diameter of halo of 14 mm. If the antibiotic that used were Penstrep, allegedly the antibiotic residue concentration was 0.5 mg/kg. But if the used antibiotic were Vet-Oxy or Cloxalak, allegedly the concentration of antibiotic residue was 1 mg/kg.

Meanwhile alkaline conditions test results showed that all the samples had an antibiotic residue less than 1 mg/kg except A samples with halo diameter of 16 mm. On the pH of 8.0, B samples shown halo diameter of 4 mm which was Indonesian National Standard qualified. The average of halo diameter on the first day was  $19.60 \pm 4.62$  mm on acid condition and  $10.40 \pm 4.34$  mm on alkaline conditions.

The results on the second and third day had shown decreasing of antibiotic residue concentrations. On the second day, the

average of halo diameter was decrease until 6-18 mm on acid condition and 3-13 mm on alkaline conditions. On acid conditions, the lowest halo diameter of 6 mm was shown by A and E samples and 7 mm of halo diameter were also shown by D samples. The result was indicating that the antibiotic residue concentrations on second day were less than 0.05 mg/kg and Indonesian National Standard qualified. As well as alkaline

conditions tests, the result shown decrease in the second day and the lowest halo diameter of 3 mm (less than 0.05 mg/kg) was shown by B sample which was qualified for Indonesian National Standard, while other samples were still varied on 8-13 mm (0.05-1 mg/kg). Given the results was still varied, milk on the second day should not be consumed.

Table 2. Control of antibiotic residue tests

Concentration of Control Residue (mg/kg)	Diameter of Halo (mm)					
	Penstrep (Penicillin)		Vet-Oxy (Oxytetracycline)		Cloxalak (Cloxacillin)	
	pH of 6.0	pH of 8.0	pH of 6.0	pH of 8.0	pH of 6.0	pH of 8.0
0.05	12	9	12	9	8	8
0.10	13	11	13	10	10	9
0.50	14	12	14	12	12	12
1	15	13	15	13	14	14

Table 3. The result of Frontier Post Test (FPT)

Samples Code	Diameter of Halo (mm)					
	Day 1		Day 2		Day 3	
	pH of 6.0	pH of 8.0	pH of 6.0	pH of 8.0	pH of 6.0	pH of 8.0
A	17	16	6	13	4	2
B	14	4	12	3	3	1
C	26	10	18	8	16	1
D	22	10	7	10	6	2
E	19	12	6	11	6	1

Third day result showed that diameter of the halo were decrease until 3-16 mm on acid conditions and 1-2 mm on alkaline conditions. On the pH of 6.0, all the samples except C samples gives halo diameter of 3-6 mm which mean the antibiotic residues concentrations were less than 0.05 mg/kg that Indonesians National Standard qualified. The C samples shown 16 mm diameter of halo that mean the antibiotic residues concentrations was more than 1 mg/kg. Different with acid conditions, alkaline condition tests has shown a great decrease trend on the halo diameter until 1-2 mm. That mean, antibiotic residues concentrations of all samples were less than 0.05 mg/kg that Indonesians National Standard qualified. But if we combined the result between acid and alkaline conditions tests, it shown the milk that taken from cow with antibiotics treatment were not safe to consumed until 3 days.

## CONCLUSIONS

Qualitative test of antibiotics residue with using Beta Star 25 showed that 5 from 18 samples (27.78%) were positives containing antibiotic residues and Frontier Post Test result shown the average of antibiotic residue concentration from day 1 until day 3 on the pH of 6.0 was  $19.60 \pm 4.62$  mm;  $9.80 \pm 5.22$  mm and  $7.00 \pm 5.20$  mm, while on the pH of 8.0 was  $10.40 \pm 4.34$  mm;  $9.00 \pm 3.81$  mm and  $1.40 \pm 0.55$  mm. The results shown that milk from treated cows should not be consumed until more than three days.

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