

Determination of Antibiotic Residues in Bovine Milk in Tabriz, Iran

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Abstract: Antibiotics have been isolated and purified for use to control disease-producing bacteria. Drug residues in milk have a potential hazard for the consumer. One hundred cow raw milk samples were collected from Tabriz suburb and Sarab milk collection centers from March 2010 to November 2010 by systematic random sampling methods. All samples were examined by Copan milk test (CHR. Hansen, Denmark). Of all samples 5(5%) were positive for antibiotic residues in cow raw milk in the northwest region of Iran. This study showed that the effective monitoring program must be run in the northwest region of Iran for control of antibiotic residues presence in milk.

Key words: Antibiotic • Residues • Bovine Milk • Tabriz

INTRODUCTION

Antibiotics have been isolated and purified for use to control disease-producing bacteria. Several of hundred antibiotics have been isolated from various sources. Antimicrobial agents are used in treatment of cattle and cause the presence of drug residues in milk. Mastitis is the most prevalent disease in cattle which requires antimicrobial treatment [1,2]. Drug residues in milk have a potential hazard for the consumer and may cause allergic reactions, interference in the intestinal flora and resistant populations of bacteria in the general populations, thereby rendering antibiotic treatment ineffective [3]. Consumers want to be confident that their food supply is free of contamination by herbicides, pesticides, drugs or antibiotics.

Approximately 5-10 percent of the populations is hypersensitive to Penicillin at a concentration as low as 1 ppb or other antibiotics and suffers allergic reactions (skin rushes, hives, asthma, anaphylactic shock). Concentration of 1 ppb delay starter activity during butter and yoghurt making. Antibiotics also decrease the acid and flavor production associated with butter manufacture and they reduce the curdling of milk and cause improper ripening of cheese [4].

This is the first report, as far as we are aware, of antibiotic residues in milk in the northwest region of Iran. We were unable to find reports in our search of the literature.

MATERIALS AND METHODS

One hundred cow raw milk samples were collected from Tabriz suburb milk collection centers from April 2010 to September 2010 by systematic random sampling methods. All samples were examined by Copan milk test (CHR. Hansen, Denmark). Copan test is based on inhibition of *B.stearothermophilus* by antibiotic residues in milk. This is very sensitive, economical and very simple in use. The microplates are especially suited for laboratories applying micropipettes in the daily work. The test is performed similarly to the single tests. A minimum of 16 wells can be used. After Removing the alufoil and add 100 μ l of milk sample into each well by using a micropipette, the cells was covered with the foil provided in the kit and incubate for 3 hours at 64 \pm 1 $^{\circ}$ C either in a water bath or a dry block heater.

At the end, if the colour has changed to yellow, the test is negative; if the colour has only changed slightly being yellow-purple, it is partially positive but the concentration of the inhibitory substances is below the sensitivity of the test, if the colour remains purple after three hours of incubation, the test is positive (Table 1).

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Table 1: Copan test detection limit and maximum residue limit for antibiotic residues in milk in European Union

Antibiotic	Copan Test Detection limit (ppb)	MRL (EU) ppb
Beta-lactams		
Penicillin G	1-2	4
Ampicillin	<2	4
Amoxicillin	2-4	4
Cloxacillin	10-15	30
Dicloxacillin	10-15	30
Tetracyclines		
Chlortetracycline	250-500	100
Oxytetracycline	250-500	100
Tetracycline	250-500	100
Sulfanamides		
Sulfathiazol	50-100	100
Sulfamethazine	100-200	100
Sulfadoxine	100-200	100
Aminoglycosides		
DH-Streptomycin	<1000	200
Neomycin	500-2000	500
Streptomycin	<1000	200
Gentamycin	100-500	100
Macrolides		
Erythronycin	>200	40
Tylosin	50-100	50
Other antibiotics		
Chloramphenicol	>5000	-
Dapson	2-4	0

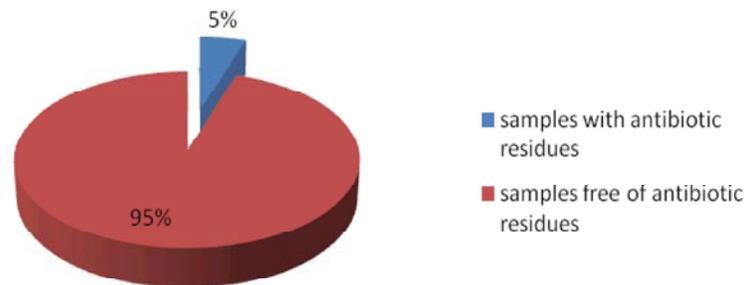


Fig. 1: Percent of positive samples for antibiotic residues in cow raw milk in the northwest region of Iran

RESULTS

Of all samples 5(5%) were positive for antibiotic residues in cow raw milk in the northwest region of Iran (Fig. 1).

DISCUSSION

The result showed that antibiotic residues in milk was 5 percent which is high for cow raw milk in Iran. Since this is the first report on antibiotic residues in cow raw milk in the northwest region of Iran, It could be follow by other research in all of the country. In 2006, Khaskheli *et al.* [5] showed that of all samples 36.5% were contaminated by beta lactam antibiotic residues in cow raw milk in Pakistan.

In Turkey, there are only a limited number of antibacterial residues studies in milk. In a study by Ceyhan and Bozkurt from a total 200 milk samples collected from Ankara region, 5.5% was positive for antibiotic residues [6,7].

Aydin *et al.* [7] in 204 raw milk samples, 44% was positive for antibiotic residues in Turkey. Yamaki *et al.*[8] in 2686 ewe raw milk samples, 1.7% was positive for antibiotic residues.

Adesiyun *et al.*[9] studied the prevalence of antimicrobial residues in preprocessed and processed cow milk in Trinidad and showed that 10.8% of all samples were positive . Shitmadi [10] showed 21% of 1109 milk samples were positive for antibiotic residues in Kenya.

In a 1988 study 71% of test samples from farms tested positive for antibiotics residues in the united states[11].

In addition to allergic reaction there is some indication in the science literature to suggest that antibiotics can induce cancer and other non-cancerous hazardous effects on the body.

This study showed that the effective monitoring program must be run in the northwest region of Iran for control of antibiotic residues presence in milk.

ACKNOWLEDGMENT

This study was funded by Islamic Azad University, Shabestar Branch, as the research project (Research project code: 51955880611005).

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