

**Short communication****Detection of antibiotics residues in cow raw milk in Bostanabad Region, Iran****Mohammad Hosein Movassagh**

Department of Veterinary Medicine, Shabestar Branch, Islamic Azad University, Shabestar, Iran

Abstract

This study was carried out to screen of antibiotic residues in cows' raw milk in Bostanabad milk collection center. 50 samples of cows' raw milk were collected from April to September 2010 by systematic random sampling method. All samples were examined by Copan milk test (CHR. Hansen, Denmark) for the presence of antibiotics residues. Twelve samples (24%) were positive for antibiotic residues. The study revealed that antibiotic residues in milk were high in Bostanabad region.

Keywords: Antibiotic, Bostanabad, Cow Raw Milk, Residues**Introduction**

A number of antibiotics are used in livestock health care in Iran. Antimicrobial agents are used in treatment of cattle and this may results in the presence of drug residues in milk. Mastitis is the most prevalent disease in cattle which requires antimicrobial treatment (Suhren, 2002, Mohsenzadeh and Bahrainpour, 2008). There are several different groups of antibiotics which are available to treat infected animals. As antibiotic use increases for both animals and humans, bacteria resistant to the drugs used emerge. Moreover, there is evidence that resistance may develop for chemically similar bacteria (Dewdney et al., 1991). Drug residues in milk have a potential hazard for the consumer and may cause allergic reactions and interfere with the intestinal flora populations, enhancing the growth of the resistant bacteria, thereby rendering antibiotic treatment ineffective (Dewdney et al., 1991). Consumers want to be confident that their food supply is free of contamination by herbicides, pesticides, drugs or antibiotics. Many countries regulate the use of antibiotics in food animals, set up the maximum residue limits and monitor their amount in milk (Brito and Junqueira, 2006). In Iran, there is no inspection for antibiotic residues that exceed tolerance levels in milk. Running effective monitoring program requires specific and reliable methods which can detect all antibiotic residues in milk (Ergin Kaya and Filazi, 2010).

Antibiotics have been used in treatment of cows for many years against such common infections as mastitis. For several years there has been an increased pressure on milk producers to increase milk production. This pressure often results in infections, thus increases the use of antibiotics to counter these infections. The beta lactam group of antibiotics is responsible for approximately 95% of all milk antibiotic contamination and their residues in milk cause problems in dairy industries and in human health (Ghidini et al. 2002).

There is no national antibiotic residue program in Iran. So the aim of this study was to screen antibiotic residues on cows' raw milk in Bostanabad region.

Materials and Methods

Fifty sample of cows' raw milk were collected from Bostanabad milk collection centre, located to the south east of Tabriz, the capital of East Azerbaijan province, from April 2009 to July 2009 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 (Nagel et al., 2011). These microplates were especially suited for laboratories applying micropipettes in the daily work. The test was performed similarly to the single test. A minimum of 16 wells were used. After removing the foil and adding 100 µl of milk sample into each well using a

Corresponding author: Mohammad Hosein Movassagh, Department of Veterinary Medicine, Shabestar Branch, Islamic Azad University, Shabestar, Iran

micropipette, the cells were covered with the foil provided in the kit and were incubated for 3 hours at $64 \pm 1^\circ\text{C}$ in a water bath. At the end of incubation period, if the color has changed to yellow, the test is negative and if the color has only changed slightly into yellow-purple, it is partially positive and the concentration of the inhibitory substances is below the sensitivity of the test. If the color remains purple after three hours of incubation, the test is positive (Fig 1 and Fig 2).



Fig 1: Copan milk test kit, the negative is yellow and the positive is purple



Fig 2: Copan milk test kit guide

This Copan milk test kit can detect the residues of Beta-lactams, Tetracyclines, Aminoglycosides, Macrolides, Chloramphenicol, Sulphonamides, Trimethoprim, Tiamfenicol and Dapson. The descriptive statistic, the percentages of positive and negative samples were calculated and illustrated as a pie graph.

Results

As shown in the pie graph (Fig-3), 12 (24%) out of 50 samples were positive for antibiotic residues in cows' raw milk.

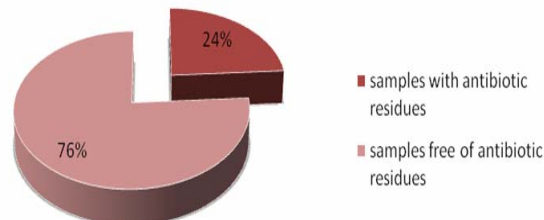


Fig-3: The percentages of milk samples tested for antibiotic residues in Bostanabad region

Discussion

The result showed that the incidence of presence of antibiotic residues in milk was 24% which is high for cow raw milk in Iran. Previously, Movassagh (2011a) reported in cows' milk that 4.66% (ultra-high temperature milk) and 5.33% (raw milk) were positive for beta lactam antibiotic residues in Tabriz, Iran. In Parsabad region of Iran, 14% of cow raw milk samples showed antibiotic residues (Movassagh, 2011b). Movassagh and Karami (2010) reported that 5% of cow raw milk samples were positive for antibiotic residues in Tabriz, Iran (Movassagh and Karami, 2010). Khaskheli et al. (2008) demonstrated that of all samples, 36.5% were contaminated by beta lactam antibiotic residues in cow raw milk in Pakistan (Khaskheli et al., 2008) which is quite higher than the present incidence of antibiotic residues in cow milk in Bostanabad region. In a study in Turkey (Ankara region) Ceyhan and Bozkurt (1987) reported 5.5% positive samples for antibiotic residues. Demet et al. (1992) studied that out of 50 milk samples collected from various dairy farms in Konya region of Turkey, 6 of the milk samples were positive for penicillin G residues. In another study, Aydin et al. (1989) reported 44% antibiotic residues in Turkey. Yamaki et al. (2004) studied on 2686 ewe raw milk samples of which 1.7% was positive for antibiotic residues in Spain. Adesiyun and Webb (1997) studied the prevalence of antimicrobial residues in preprocessed and processed cow milk in Trinidad, and they showed that 10.8% of the samples were positive. Shitandi (2001) showed that 21% of 1109 milk samples were positive for antibiotic residues in Kenya. Sasanya et al. (2008) analyzed 384 cow milk for presence of residues of penicillin G and found that 13% of the samples were positive for penicillin G. Alomirah et al. (2007) noted that 5.4% of imported pasteurized milk samples were positive for antibiotic residues in Kuwait, and Out of the 308 samples analyzed for beta lactams, 62 samples (20.1%) were above the maximum residue level (MRL) (4 ppb).

The degree of contamination of milk and dairy products with antibiotics residues differs, depending on the level of legislation and effectiveness of methods in different countries (Ergin Kaya and Filazi, 2010). The health risk associated with antibiotics residues in milk will continue to exist in Iran until an effective monitoring program is legislated. It is recommended for the milk processing units to undertake a more strict control of the incoming raw milk. It is better to sample the bulk milk at the collection center level and to analyze it for the antibiotic residues. More attention should be paid to the milk supply coming from the population households as it is more susceptible to antibiotic contamination. Farmers should be aware of the correct use of antibiotics, to avoid self-recommended antibiotic treatment of dairy cows, and to follow the rules regarding the required withdrawal time for antibiotic clearing of the animal body.

The study concluded that the degree of incidence of contamination of cows' raw milk in Bostanabad region is high enough to be a health hazard to humans. Legislations for monitoring and control antibiotics treatment of food producing animals should be adopted.

Acknowledgement

The author thanks Jalil Dolgharisharaf and Ali Hemati for laboratory assistance.

References

- Adesiyun, A.A. and Webb L.A. 1997. Prevalence of antimicrobial residues in preprocessed and processed cow's milk in Trinidad. *Journal of Food Safety*, 16: 301-310.
- Alomirah, H., Almazeedi, H., Alzenkee, S., Alaati, T., Alotaibi, J., Albatel, M. and Sidhu, J. 2007. Prevalence of antimicrobial residues in milk and dairy products in the state of Kuwait. *Journal of Food Quality*, 30: 745-763.
- Aydin, N., Cambazoglu, M. and Ayhan, H. 1989. Interest yöntemi ile sütteki antibiyotiklerin ve diğer inhibitör maddelerin saptanmasd üzerine çaldşmalar. *Etlik Veteriner Mikrobiyoloji Dergisi*, 6: 11-22.
- Brito, R.B. and Junqueira, R.G. 2006. Determination of beta lactams residues in milk by HPLC. *Brazilian Archives of Biology and Technology*, 49: 41-48.
- Ceyhan, I. and Bozkurt, M. 1987. Ankara piyasasında satılan sutlerde penicillin arastirmasi. *The Turkish Bulletin of Hygiene and Experimental Biology*. 44: 1-5.
- Demet, O., Acet, A., Tras, B., Bas, L. and Egilmaz, I. 1992. Determination of penicillin G, ampicilline and penicillin V residues in milk samples collected from various dairy farms and creameries in Konya. *Selçuk Univ Vet Fak Derg*, 8, 33-35.
- Dewdney, J.M., Maes, J.P., Raynaud, F. and Scheid, J.P. 1991. Risk assessment of antibiotic residues of beta-lactam and macrolides in food products with regard to their immunoallergic potential. *Food and Chemical Toxicology*, 29: 477-483.
- Ergin kaya, S. and Filazi, A. 2010. Determination of antibiotics residues in milk samples. *The Journal of the Faculty of Veterinary Medicine, University of Kafkas*, 16, S31-S35.
- Ghidini, S.M., Zanardi, E., Varisco. G. and Chizzolini, R. 2002. Prevalence of molecules of beta-lactam antibiotics in bovine milk. *Annali Della Facolta Di Medicina Veterina Del Studi Di Parma* . 22: 245-252.
- Khaskheli, M., Malik, R.S., Arain, M.A., Soomro, A.H. and Arain, H.H. 2008. Detection of beta-lactam antibiotic residues in market milk. *Pakistan Journal of Nutrition*, 7: 682-685.
- Mohsenzadeh, M. and Bahrainpour, A. 2008. the detection limits of antimicrobial agents in cow milk by a simple yoghurt test. *Pakistan Journal of Biological Sciences*, 11: 2282-2285.
- Movassagh, M.H. and Karami, A.R. 2010. Determination of Antibiotic Residues in Bovine Milk in Tabriz, Iran. *Global Veterinaria*, 5: 195-197.
- Movassagh, M.H., 2011a. Detection of beta lactam antibiotics residues in Iranian ultra high temperature milk by Beta star test. *Annals of Biological Research*, 2: 95-98.
- Movassagh, M.H. 2011b. Study of Antibiotics Residues in Cow Raw Milk by Copan Milk Test in Parsabad Region, Ardabil province, Iran. *Annals of Biological Research*, 2: 355-359.
- Nagel, O., Molina, P. and Althus, R. 2011. microbial system for identification of antibiotic residues in milk. *Journal of Food and Drug Analysis*, 19:369-375.
- Sasanya, J.J., Ejobi, F., Enyaru, J., Olila, D. and Sengoye, G. 2008. Public health perspectives of Penicillin G residues in cow milk and edible bovine tissues collected from Mbarara and Masaka districts, Uganda. *African Journal of Animal and Biomedical Sciences*. 3: 35-40.
- Shitandi, A. 2001. Detection of antimicrobial drug residues in Kenyan milk. *Journal of Food Safety*. 21: 205-214.
- Suhren, V.G. 2002. Inhibitors and residues of veterinary drugs in milk legal basis, detection methods and detection systems. *Kieler Milchwirtschaftliche Forschungsbericht*. 54: 35-71.
- Yamaki, M., Berruga, M.I., Althus, R.L., Molina, M.P. and Molina, A. 2004. Occurrence of antibiotic residues in milk from Manchega Ewe Dairy Farms. *Journal of Dairy Science*. 87, 3132-3137.