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SHORT COMMUNICATION

Observations on trials of Potoclean® as a teat-dipping disinfectant

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Özet

Semacan A, Uçan US, Temimhan SM, Çizmeci Ü. Meme başı daldırma dezenfektanı olarak Potoclean®'in denenmesi üzerine gözlemler. **Eurasian J Vet Sci, 2012, 28, 1, 54-56**

Mastitis ve özellikle bulaşıcı patojen kökenli olanları Türkiye'de en sık rastlanan meme enfeksiyonlarıdır. Dezenfektanlar ile yapılan sağım sonu meme başı dezenfeksiyonu uygulamaları, meme hijyeninin sağlanmasına katkıda bulunarak mastitis oluşumunu düşüren uygulamalardır. Bu çalışmada çevre ve kullanıcı dostu yeni bir dezenfektan, Fakülte Çiftliğinde bulunan 10 adet sağmal inekteki yeni mastitis olgularında denendi. Uygulama grubunda çalışma başlangıcında belirlenen 2 subklinik mastitis olgusu, test dezenfektanı kullanılarak yapılan (sağ meme lobları) sağım sonu teat dipping sonunda (60. gün) iyileşmiş idi. Kontrol grubunda (sol loblar) daha fazla mastitis olgusu tespit edildi. Hiçbir meme lobunda deneme sonunda klinik veya mikotik mastitis belirlenmedi. Histo-patolojik olarak incelenmemesine karşın, test dezenfektanının uygulandığı meme başları derisinde 60 boyunca herhangi bir klinik değişikliğe rastlanmadı. Bu ön çalışma niteliğindeki gözlemlerden, test edilen dezenfektanın kontrol ile karşılaştırıldığında mastitisin önlenmesinde koruma potansiyeli olabileceği kanaatine varıldı.

Abstract

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Mastitis, especially caused by contagious mastitis agents is the most prevalent cause of intra mammary infections (IMI) in Türkiye. Contribution to mammary hygiene by post milking teat dipping with disinfectants is evidenced to decrease mastitis. An environment and user friendly disinfectant was observed on new IMI in 10 lactating cows in the Faculty's Farm, Konya, in this study. Two cows with subclinical mastitis at the beginning of the observation were not diagnosed mastitis again after 60 day's post milking teat dipping by the test disinfectant (right quarters). More IMI occurred in the control group (left quarters). No mycotic and clinical mastitis were occurred after trial (by both control and test disinfectants) in any of the quarters. Skins of the quarters to which test disinfectant has been applied did not showed any alterations as evidenced clinically by during the trial, although it was not analyzed histo-pathologically. The test disinfectant by comparison with the control showed that it may have a potential to prevent mastitis as evidenced by this preliminary observation.

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Mastitis is an inflammatory disease of the mammary gland, largely due to an intra-mammary infection (IMI) caused by micro-organisms (Baştan 2010). It is believed to be endemic not only in Turkey but also in the rest of the world. The causatives are most likely bacteria (Yalçın 2008, Radostitis et al 2000, Akan 2010, Alaçam and Küçük 2010). There are two ways of transmission from one cow to another; first through the milking practices and second directly from the environment (Baştan 2010).

Practices on biosecurity and good hygiene practices (GHP), vaccination and dry therapy are the measures to prevent and control the mastitis. To prevent a herd by vaccination against a pathogen is rather complicated and it is especially useful for some known agent that caused mastitis (Alasri 2003, Alaçam and Küçük 2010). Antibiotics are also widely used in fighting mastitis (Dinç et al 1991, Alaçam et al 1994, Uçan and Arslan 2002, Akan 2010). However, antibiotherapy in both dry and lactating cows has some disadvantages such as need for selection of appropriate chemotherapoetic and presence of risc for development of resistance (Alasri 2003, Akan 2010). Furthermore, antibiotherapy should to be an ultimate step to avoid treatment costs and milk production loss. As primary prevention measures, biosecrurity and GHP cover the post milking teat dipping with some other practices like barn and litter disinfection, milking machine cleaning and disinfection etc (Alasri 2003). Many teat dip formulations have been shown to reduce infection rate compared with no postmilking teat sanitation as evidenced by experimental and natural exposure studies (Nickerson et al 1986, Drechsler et al 1993, Boddie and Nickerson 1996). The most common active substances used are iodine and chlorhexidine (Nickerson et al 1986, Drechsler et al 1993, Alasri 2003). However, all the disinfectants in use are chemical-based preparations and would be a reason for environmental pollution. It is projected that Turkey has a population of 11.369.800 cattle and 12.418.195 tones of cow milk production at the end of the year 2010 (Anonymous 2001a). Thus, an enormous amount of disinfectants only for teat dipping purpose are supposed to be used. In terms of living in a safer environment and being far from public health concerns, more common use of water based disinfectants needs to be encouraged. In this study such a disinfectant were observed clinically and bacteriologicaly on new mastitis cases.

Potoclean® is a water-based and highly electrochemically and biologically active, disinfectant used in many areas. It is produced by the technique membrane electrolysis and has a redox potential of 1300 mV. It is also called "active water" because its environment friendly nature (Anonymous, 2011b). As a teat dip formulation, it was observed for efficacy against natural infection for a limited period in the Faculty's Dairy Farm, Selçuk University. The trial was approved by the Ethical Committee of Veterinary Faculty, Selçuk University. Numbers of the lactating cows were 10. A split-udder design was used. The trial was approved by The Ethical Committee of Veterinary Faculty, Selcuk University. Treatment groups were balanced for lactation number, stage of lactation, CMT and SCC status of quarters (data not shown). The mastitic status of mammary quarters was determined at the initiation of trial by CMT, SCC and culture of milk samples. Determination of SCC of the milk samples were made by the De Laval Cell Counter (Sweden) at the Department of Gynecology and Obstetrics Laboratory. Intra mammary infection (IMI) was confirmed by the criteria that organism was isolated from a quarter at a concentration of ≥ 500 cfu/mL. Prior to quarter milk sampling, to remove excessive dirty the ventral surfaces of udders and teats were washed by a handheld nose and dried with paper towels. Then, three streams of foremilk were discarded. Post-milking teat dipping with the test disinfectant and benzalkonium chloride (0.5%) were made for 5-10 seconds, twice a day all the observation duration for approximately 2 months. Milk samples were collected and analyzed for bacteria and fungi monthly. The samples were collected in sterile tubes and transferred to laboratory in 10 minutes. Bacteriological and mycological analyses were conducted on all milk samples as described before (Dinç et al 1991, Alaçam et al 1994, Uçan and Arslan 2002, Uçan and Erganiş 2005). Samples (0.1 mL/each plate) were plated on Blood Agar Base, Mac Conkey Agar or Sabaurraud Dextrose Agar and incubated aerobically at 37 ^{0}C for 48 h or 22 ^{0}C for a week, respectively. Identification of the bacterial colonies was made as before (Alaçam et al 1994, Arslan et al 2005, Uçan et al 2005, Uçan and Erganiş 2005).

All the quarters had been post-milking teat dipped by the chemical benzalkonium chloride as a part of GMP in the Farm until when this observation started. On day 0, the udders on the right were begun to be treated by the test disinfectant and the left quarters were carried on as before after first sampling achieved. No mycotic agent was isolated from any of the udders. As seen in the Table, at the initiation of the observation, 5 right quarters (n=5) were isolated with some bacteria while those from left (n=3) showed less isolations. During 60 day observation no clinical mastitis occurred from any of the lactating cows. Furthermore, quarters from the right side treated with the test disinfectant were not produced any sign of IMI except the cow 8 from which two quarters sampled in third time (day 60) were isolated with S. aureus and Klebsiella ssp. showing an infection. The quarters on the left showed more infection evidences by comparison with right quarters as a whole. On the beginning as only 3 quarters on the left produced signs of IMI while each of 3 quarters was isolated bacteria by day 30 and 60. Quarters which teat dipped with the test disinfectant has not showed any re-isolation on 2nd and 3rd samplings except the cow 8. This suggests that the

Table 1. Distribution of IMIs before and after teat dipping with two agents.

	Quarters sampled			
Cow No	Right Front	Right Hind	Left Front	Left Hind
1	-	-	CNS_1 + Klebsiella $ssp._1$	Streptococcus $ssp._2$
2	*S. aureus*$_1$	*S. aureus*$_1$	-	-
3	-	-	*S. aureus*$_{1,3}$	-
4	-	-	-	*S. aureus*$_2$
5	-	-	*S. aureus*$_2$	*S. aureus*$_3$
6	-	*S. aureus*$_1$	*S. aureus*$_1$	-
7	CNS_1	*S. aureus*$_1$	-	-
8	*S. aureus*$_3$	Klebsiella ssp_3	-	-
9	-	-	*S. aureus*$_3$, Coryn.ssp_3	-
10	-	-	-	-

Subscripts; isolation from samples $_1$: at the time of observation started. $_2$: on day 30. $_3$: on day 60. Right quarters were treated with Potoclean® and left quarters with chlorhexidine CNS: Coagulase Negative Staphylococci.

test disinfectant has efficacy as a teat-dipping agent in somehow. The isolated bacteria were mostly *S. aureus* suggesting that problem with the occurrence of mastitis in the herd is caused by contagious pathogens rather environmental pathogens.

Mastitis is one of the main health issues in dairy production. Subclinical mastitis caused total milk loss from quarters has been estimated to be between 10-26%. This means that approximately 25% of the economic loss from subclinical mastitis is considered by the expenses other than loss of milk production (Radostitis et al 2000). Since teat dipping is very effective tool for controlling subclinical mastitis, to use cheaper and user friendly disinfectants would reduce such expenses in udder health monitoring.

A variety of germicides are incorporated into teat dip products and include chlorhexidine, iodine, sodium hypochlorite, chlorine and others (Radostitis et al 2000, Baştan 2010). Effects of these disinfectants on the mammary skin are known. Although present observation did not check out skin or mucosal effects of Potoclean® all the alterations that would likely be caused by Potoclean® would be determined by future work. Despite preliminary nature of and limited results obtained from this observation it suggests that test disinfectant (Potoclean®) might be a promising agent for teat-dipping.

In conclusion, to verify its efficacy *in vivo* and *in vitro*, a more detailed work with a herd-split planning should be conducted and last for at least 6 months.

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