

## Herbal Bioenhancers to Conserve Antibiotic Sensitivity

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**Received:** February 21, 2018; **Published:** March 01, 2018

Persistence of antibacterial drugs for longer period in milk increases chances of development of antimicrobial resistance. Milk is widely consumed in the world (FAO Statistics Division, 2007). But, longer persistence of the antibiotics may cause selection pressure which helps in development of antimicrobial resistance [1]. Milk is a good nutrient rich media for different bacteria to grow and multiply. On the other hand, mastitis is a global problem in livestock. Moreover, mastitis is a common condition that affects up to 33% of the women during lactation. Thus, it is one of the main causes of undesired weaning, depriving the mother-infant pair of the health benefits of breastfeeding, thereby constituting a relevant public health issue [2]. Studies from developed countries, including Australia, have reported sore nipples, breast pain, and mastitis as common issues during breastfeeding [3]. The most common cause of mastitis in women was bacterial infection and *Staphylococcus aureus* was found to be the major cause. But, selection of the antimicrobial agent and maintenance of adequate drug concentration at the site of infection are the most relevant problems in antibiotic therapy that may cause frequent development of antimicrobial resistance. However, new cephalosporins have significant advantages over other antibiotics in terms of beta-lactamase resistance, spectrum of activity and lack of toxicity [4] particularly in lactating animals. So, parenteral administration of some cephalosporins like ceftriaxone and ceftizoxime are often employed for treatment of systemic bacterial infections and mastitis in many countries. But, ceftizoxime persists for a longer period in milk of major milk producing animals like buffalo, cow and goat [5-9] following parenteral administration of ceftriaxone or ceftizoxime. But, some herbal preparations were developed by us as supportive therapy in treatment of mastitis that act as mammary gland protectants. They also returned increased milk alkaline phosphatase and catalase activity in mastitic goats to normal level with maintenance of normal glutathione level and significantly increased lactoperoxidase activity, a natural antimicrobial system in milk [10-12]. We have employed three herbal preparations (*Ocimum sanctum* herbal extract, Bark powder of *Bauhinia variegata* Linn and a commercial polyherbal drug) to increase plasma and milk concentrations of some cephalosporins having clinical importance for sufficient period of time that also act as supportive therapy for successful treatment of bacterial mastitis. *O. sanctum* leaf juice and *B. variegata* bark powder having bio-enhancing, anti-inflammatory and antioxidant activities can be effectively used as supportive therapy. The commercial polyherbal drug can also be successfully used to decrease persistence of these cephalosporins like ceftriaxone and ceftizoxime following their parenteral administration that may also help to reduce frequency of development of antimicrobial resistance to these antibiotics. Thus, these herbal preparations have the potential to enhance bioavailability of the antibiotics and to conserve their sensitivity against susceptible infecting bacteria. The commercial polyherbal preparation may also help to subside persistence of antibiotic residue in milk to minimize public health hazard as milk is widely consumed by people.

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**Volume 6 Issue 4 April 2018**

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