ABSTRACT

Prevention of new intra mammary bacterial infections in dairy cows during the "dry period" using sustained release intra-mammary administration of chlorhexidine

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The Israeli dairy industry leads on high milk yield worldwide, due to technological development and genetic enhancement. Nevertheless, the high milk yield increases the risks of mastitis. Mastitis is caused mainly by microorganism infection of the mammary gland. The inflammation affects the cow's welfare, causes a decrease in milk production and quality, leading to significant economic losses. The common practice nowadays to prevent mastitis is Dry Cow Therapy (DCT), which includes intra-mammary administration of antibiotics at the beginning of the dry period, 6 weeks before calving, and needs to be effective for approximately 60 days. Most dairy farmers use Selective Dry Cow Therapy (SDCT), i.e. only infected glands are treated, but some still use Blanket Dry Cow Therapy (BDCT), that may promote antibiotics resistance in bacteria. This resistance has a major effect on public health. Thus, effective alternatives for antibiotic DCT are needed to treat both current and new infections. A formulation containing chlorhexidine as a non-antibiotic antimicrobial agent and poloxamers as a thermal stabilizer for slow-release administration was developed. The objective of the present study was to evaluate the efficacy of this formulation *in vitro* and its safety *in-vivo*. Several *in-vitro* experiments were performed including measurement of bacterial growth inhibition on agar plates, saline and milk solutions and determination of the minimum inhibitory concentration (MIC) against common mastitis pathogens. The results indicate good efficiency of the chlorhexidine slow-release formulation in comparison to antibiotics and to previous research. *In-vivo* experiments showed that the intra-mammary formulation was safe to the cow as well as for people. Organs that were checked for residues of chlorhexidine included: liver, kidney, fat, muscle, udder and teats. Pathological and histological examination of the udder was done in order to find out whether there is any kind of damage by the device. According to our finding there was no any harm to

the udder. The concentrations of chlorhexidine in the organs and tissues were found to be neglectable. It seems that the developed formulation is safe for use in dairy cows during the dry season.