Photodynamic therapy reduces microbiological count in raw milk

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In the milking routine, the application of post-dipping is one of the most common and efficient preventive practices to reduce the contamination of the mammary gland, however, when mastitis is established, curative treatment consists of applying antimicrobials. In this context, Antimicrobial Photodynamic Therapy has been shown to be an efficient option in the treatment of local infections in animals and also appears as a promising alternative for the removal of biofilms and aid in milk quality control. Ten Holstein and Jersey cows were used with an average weight of 500 kg and average production of 20 liters/day, in different stages of lactation (beginning, peak and end). The experiment was carried out in a cross over design being T1: control treatment – application of lactic acid (Ekomilk after gel film) and T2: application of photoactive Sf hydrogel. The animals\' teats were irradiated with green LED lighting (λmax = 520 nm, 12.7 mW cm – 2) coupled to a conventional plastic teatcup for one minute per teat). For the preparation of hydrogel of Sf and F127 (Pluronic®) the proportions of 20.0% F127 and 0.20% Carbopol (C934P) and Sf concentration of 1 mmol L-1 , Peptone water, F127 and C934P were dispersed in 25 mL of distilled water and stored under cooling for 24 hours. Sf was added to the dispersion and solubilized in an ice bath. The hydrogel obtained was transferred to an amber bottle with a lid having the pH adjusted to 7.0 with triethanolamine and stored under refrigeration (4°C). Milk samples were collected at 0, 7, 14, 21 and 28 days of product application for microbiological count: Plate Count Agar (PCA), Agar Sal Mannitol and Pseudomonas Agar Base. When applied as post-dipping in cows, photoactivated Sf did not differ from the lactic acid-based control treatment in relation to bacterial counts in milk (p>0.05), however, there was a reduction in total mesophilic aerobic counts (12.05 %), staphylococci (23.23%) and Pseudomonas (28.85%) during the application period (28 days). TFDa can be a promising alternative to reduce the contamination of milk by Staphylococcus and Pseudomonas, helping to maintain the quality and health of the mammary gland.

Agradecimentos: Agradecemos ao Instituto Nacional de Ciência e Tecnologia para a Cadeia Produtiva do Leite (INCT leite) e ao Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).