Film coatings based on exopolysaccharides of lactic acid bacteria and their use

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Key message. It is shown that film coatings based on the exopolysaccharides of lactic acid bacteria *Lactococcus lactis* B-1662 and *Streptococcus thermophilus* contribute to the healing of burns in rats.

Keywords: exopolysaccharides, *Lactococcus lactis* B-1662, *Streptococcus thermophilus*, burn, rats

In recent years, polysaccharides, due to their high biological activity in animals and humans, are increasingly used in cosmeceuticals, medicine, and veterinary medicine [1-2]. Among them, bacterial polysaccharides are gaining importance, the advantage of which is climatic independence, simplicity and economy of production, regulation of properties, and among them – exopolysaccharides (EPS) of lactic acid bacteria, since these bacteria have the GRAS status as safe. The aim of the work was to study the effect of film coatings based on the EPS of *Lactococcus lactis* B-1662 and *Streptococcus thermophilus* on the healing of degree IIIa burns in female rats. The study was conducted on rats, divided into 5 groups: group 1 – intact animals (without a burn), group 2 – animals that caused a burn, group 3 – animals that caused a burn, and after the burn, a commercial preparation of 5% dexpanthenol was applied («Pantoderm», JSC «AKRIKHIN», Russia), group 4 – animals that were film-coated after burns created on the basis of EPS of *L. lactis* B-1662, group 5 – animals, which after the burned film-coated films created on the basis of EPS *S. thermophilus*. To create the film coatings, an aqueous EPS solution of *L. lactis* B-1662 or *S. thermophilus*, carboxymethyl cellulose (CMC) (Fluka, Switzerland) and glycerin plasticizer were used. The result was a homogeneous, transparent, gelatinous gel, which, when solidified, formed a film. A degree IIIa burn was simulated on female outbred rats under ether anesthesia on the rat interscapular space with the bottom of a tube containing boiling water for 30 seconds [3]. 5% dexpanthenol and film coatings were applied to the burn site immediately after the burn was reproduced and then daily for 28 days. The healing process of the burn was judged by changing the area of the damaged surface, restoring the coat, wound healing [3] after 1, 3, 5, 7, 10, 14, 21, and 28 days.

In rats, which in the course of the experiment, a film coating created on the basis of the EPS of *L. lactis* B-1662 (group 4) was applied to the wound, the complete healing of the skin was observed on the 23rd day, and the complete restoration of the coat occurred on the 25th day, while in the control group of animals with a burn without treatment (group 2) and in the group of animals treated with 5% dexpanthenol (group 3), complete healing was observed after 28 days.

When applying a film coating created on the basis of EPS of *S. thermophilus* for treating a burn, in animals of group 5, complete healing of the skin was noted already at 21 days and by this time almost complete restoration of the coat was taking place.

Thus, film coatings based on the EPS of *L. lactis* B-1662 and *S. thermophilus* contributed to the healing of burns in rats and the restoration of skin and wool coat earlier than in animals without treatment and using 5% dexpanthenol. The greatest regenerating effect was revealed with respect to the film coating created on the basis of the EPS of *S. thermophilus*.

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