FRICTION COEFFICIENT OF POLYLACTIC ACID FILMS AFTER THE PLASMA TREATMENT

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Biodegradable polymer materials are widely used in regenerative medicine. One of the interesting materials for medical applications as implants is polylactic acid. The implanted material must withstand the mechanical effects of surgical instruments, and therefore it is useful to know about the tribological characteristics of the polymer implants.

The purpose of this work is to study the coefficient of friction of polylactic acid films after the exposure to low-temperature atmospheric plasma.

The polylactic acid films were obtained from a polylactic acid solution with a molecular weight of Mw = 121000 g/mol (PURASORB® PL 10, the Netherlands). The each side of material was treated with low-temperature atmospheric pressure plasma for 30 s. Friction and wear studies were carried out using the finger-disk scheme under dry sliding friction conditions on a TRIBO technik machine (France) while varying the test duration (10–30 m) and sliding speed (in the range (1.5–5) mm/s). A counterbody was a ceramic ball (diameter = 6 mm).

The friction coefficient of the initial films was in the range of 0.123–0.251, after plasma – 0.122–0.203. The range of the coefficient of friction (initial films) was 0.138–0.192 (1.5 mm/s), 0.127–0.171 (3 mm/s), 0.143–0.177 (5 mm/s). An increase in sliding speed contributes to a slight decrease in the friction coefficient for the initial samples and after exposure to plasma (~1.5 times). Changing the test duration does not lead to a significant change in the friction coefficient.