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Numerical modelling of process of cleaning potatoes in spiral separator

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Abstract. Cleaning potato tubers from soil and plant residues after their digging from the soil is a topical problem in the industrial production of potatoes. Taking into account the fact that the cleaning spirals are positioned with overlapping and rotate in the same sense, the potato tuber that has landed on the surface of the spiral separator in the trough between two adjacent spirals will perform translational motion towards the output ends of the spirals. As a result of solving the said system of equations, the graphical relations between the values of the normal reactions and friction forces generated during the translation of the potato tuber along the mentioned spirals, on the one hand, and the design and kinematic parameters, on the other hand, based on the requirement of not damaging tubers when performing the said work process of transportation and cleaning, have been obtained. The limitations for the normal reactions and friction forces at the points of contact between the tuber and the surface of the cleaning spiral are set in accordance with the requirement that they do not exceed the force of scraping (damaging) the tuber's external surface permissible for potato tubers. That has provided an opportunity to obtain the rational values of the design and kinematic parameters of the separator's operating spirals, in particular, the value of the angular velocity of the rotating cleaning spirals as well as their radius and helix lead.

Key words: post-harvest processing, potato, rational parameters, surface of the spiral separator.