

Improving the efficiency of the process of meat cutting by the grinder knife improvement

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Introduction. Meat grinding efficiency by mincers is largely determined by applying a more rational form of cutting instruments with account of original state of raw meat and technological requirements for finished products. Operating efficiency of cutting mechanisms and equipment in general depends on adequate construction solutions, in this respect geometric parameters of cutting instruments, the forms of cutting edges and mincer turns make a decisive influence on both cutting quality and energy cost.

Materials and method. The presented conclusions and recommendations are based on the analysis of modern scientific literature.

Result and discussion. On the basis of theoretical studies the criterion for estimating the cutting ability of a knife-meat grinder plate pair is first obtained. It characterizes the geometric ratio of design parameters of a knife and a meat grinder plate taking into account the slip coefficient, the total length of the cutting edges, the inclination angle of the face surface of the cutting tool tooth, and the structural features of the knife grinder plate. The criterion makes it possible to evaluate the influence of the structural features of knives and meat grinder plates on the quality of grinding of meat raw materials and energy consumption taking into account the laws of sliding cutting [1].

A design model of rotating knife for the whole standard series of mincers is developed, which enables to interconnect geometric parameters of knives with the work spent on the technological process of primary raw meat processing. It is determined that the inclined arrangement of the front surfaces of the knife teeth with shifted cutting edge against the center of rotation increases the efficiency of the machine by 15-20% at the same time noticeably improving the quality of grinding.

The design of the cutting mechanism worked out on the basis of theoretical research allows to significantly (up to 20%) increase machine productivity while improving the quality of grinding by using sliding cutting and reduce the specific energy consumption for the technological process of raw meat processing.

Graphical and calculated dependencies obtained according to the results of experimental research allow to assess the degree of influence of the design parameters of the machine on the quality of the processed raw materials in the grinding process and the specific energy consumption.

References

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