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«Engineering of constructive parameters of vibroaspiration separator
of oil-containing grain seeds»

Authors:

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Problem statement

The aim of the research is experimental substantiation of design parameters of developed vibroaspiration separator of seed grain material during storage under conditions of effective fractionation of loose mass particles. In order to achieve the set goal, the following objectives have been provided:

- development of an experimental model of vibroaspiration separator, which due to the creation of a movable central pipe of separation channel and the addition of elastic elements into the construction, increases the driving force of the process of separating the seed material into fractions;
- development of method for experimental evaluation of the main design parameters of vibroaspiration separator of the investigated bulk environment;
- obtaining graphical dependencies, illustrating the change of main structural parameters of the developed separator from the mass, speed and trajectory of seed of the investigated technological environment.



Solution methods

Figure 1. Experimental model of the developed vibroaspiration seed separator

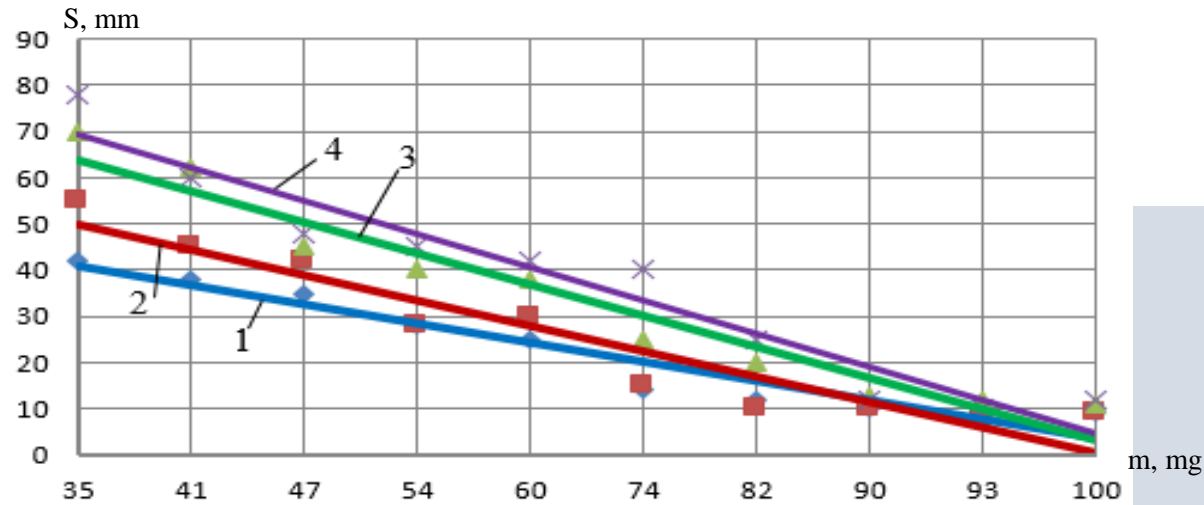


Figure 2. Dependence of the distance of splitting the vertical trajectory of sunflower seeds on its mass at different speeds: 1 – flow velocity 4.0 m/s; 2 – flow velocity 4.5 m/s; 3 – flow velocity 5.0 m/s; 4 – flow velocity 5.5 m/s.

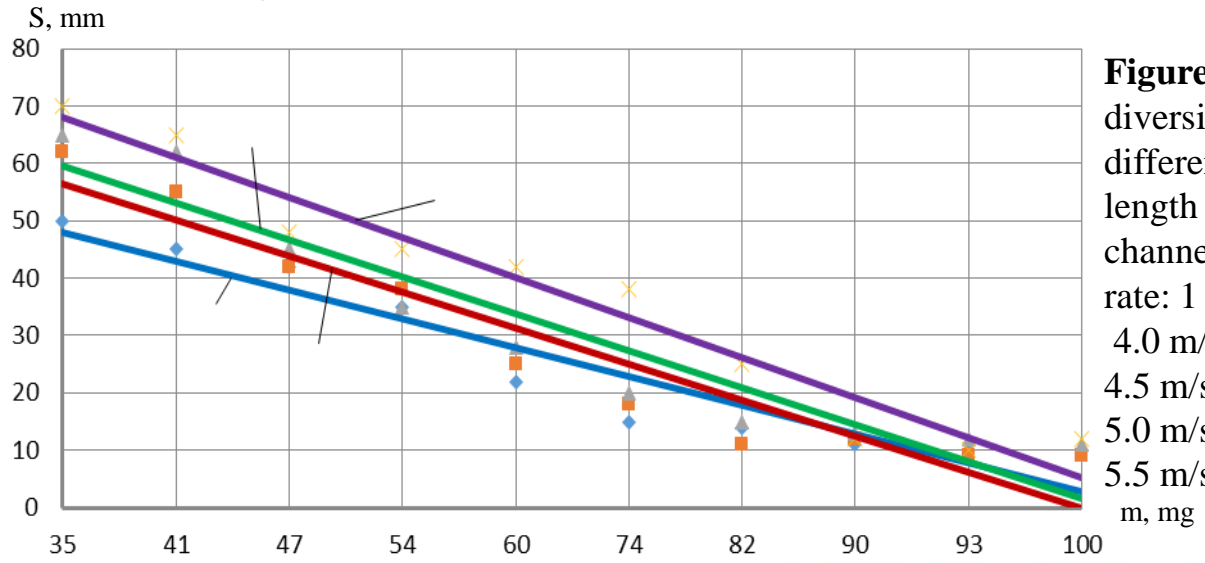


Figure 3. Dependence of the diversity of ten seeds of different masses on the length of the aspiration channel at a rational air flow rate: 1 – flow velocity 4.0 m/s; 2 – flow velocity 4.5 m/s; 3 – flow velocity 5.0 m/s; 4 – flow velocity 5.5 m/s.



Conclusions

Results, implementation

- According to the results of experimental evaluation, the air flow rate at which the best separation of sunflower seeds will take place is 75-90% of the critical air flow velocity and is 4.5-5.0 m/s.
- The results of experimental studies of the developed vibroaspiration separator of sunflower seeds allowed to substantiate the following rational parameters of this process: the diameter of the hopper of the distributor should be within 50-60 mm; the value of the diameter of the seed supply pipe inside the vertical aspiration channel is 30-40 mm with a useful channel length of 0.8 m.

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