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Some energetic and qualitative problems in convectional drying of agricultural products

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Abstract:. *Some energetic and qualitative problems in convectional drying of agricultural products.* Some problems connected with thermal energy consumption during agricultural product drying and the quality of obtained product are discussed in the paper on the basis of own author's investigations. It is evident from carried out analysis on the obtained results, that pursuit of minimization of thermal energy consumption in warming up of a drying air affects not always positively the quality of dried material, since both problems inversely depend in some cases on the same parameters of process course. Therefore, the task of mathematical optimization of drying process should be a task for multi-criteria optimization, which is difficult and labour-absorbing. Therefore, it was found that diagrams would be the best aid in determination of drying parameters; their examples are presented in the paper.

Key words: drying, agricultural products, energy consumption, quality

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Mathematical model for determination of thermal conductivity in plant materials

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Abstract: *Mathematical model for determination of thermal conductivity in plant materials.* A mathematical model for determination of thermal conductivity in plant materials was developed, combining the features of both the additive and geometrical models. The model enables also to obtain data on plant material structure.

Key words: heat conductivity, plant material, mathematical model

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Power requirement for the work of potato combine harvester units

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Abstract*: Power requirement for the work of potato combine harvester units.* A mathematical model enabling to determine power requirement for the work of potato combine harvester units is presented. The effect of outfit utilization conditions on the combine units loading was analyzed.

Key words: power, utilization, potato combine harvester

Forces acting on the plate share lifting the ridge

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Abstract*: Forces acting on the plate share lifting the ridge.* A mathematical model for determination of forces acting on a plate share is presented. It was found that an increase in working depth of the share in the range of 14-20 cm caused on average a 10% increase in horizontal component of the force acting on the share per every depth increment unit, while an increase in the ridge height resulted in 3-4% decrease in the value of this component per every centimeter of the increment. No significant change in vertical component of the force acting on the plate share was found. Changes in working speed and the height of articulated joint connecting the digging-separating unit affected to a slight degree the values of forces acting on the share.

Key words: plate share, working resistance, potatoes

Investigations on model plough body for ploughing without lands

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Abstract*: Investigations on model plough body for ploughing without lands.* A model plough body was investigated in the soil bin. The results are presented in the form of Tables and Figures. Using a multiple regression method there was obtained an equation connecting specific ploughing resistance with angle of body setting to direction of motion, angle of cutting, forward speed and soil compaction.

Key words: specific ploughing resistance, soil bin

Changes in tangent of dielectric loss angle of amaranth seeds under the influence of water content and electromagnetic field frequency

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Abstract*: Changes in tangent of dielectric loss angle of amaranth seeds under the influence of water content and electromagnetic field frequency.* Knowledge on the tangent of dielectric loss angle is essential in determination of power absorbed during dielectric heating, thus, it allows for evaluation of possibility for application of dielectric drying equipment for a given type of material. Designing more and more accurate devices for electric processing of grain is possible on the basis of the knowledge on electric properties of seeds. The carried out investigations and analyses proved that tangent of dielectric loss angle of amaranth seeds is highly influenced by water content. Besides, it is significantly affected by supplying current frequency. As water content increases, the tangent of loss angle increases too. An increase in supplying current frequency causes a decrease in the value of loss angle tangent.

Key words: amaranth, water content, tangent of dielectric loss angle

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Evaluation of intensity of compacting action of agricultural tractor and machinery wheels on soil

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Abstract*: Evaluation of intensity of compacting action of agricultural tractor and machinery wheels on soil.* Results of analysis on intensity of soil compacting by the wheels of agricultural outfits in various potato cultivation technologies are presented. The intensity of field surface compaction in a given technology was determined by the index describing relation between the field surface area compacted repeatedly and the area free from compaction at a given stage of technology realization. The analysis was carried out for potato cultivation technology.

Key words: tractors, agricultural machines, technologies, field compaction, index

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Effect of method of agricultural outfit running on the field on soil properties and sugar beet yielding

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Abstract*: Effect of method of agricultural outfit running on the field on soil properties and sugar beet yielding.* Results of field investigations on soil properties and sugar beet yielding at three cultivation systems are presented. The investigations were carried out for a crop in block and a plot with controlled traffic system.

Key words: beet roots, compaction, controlled traffic system, yield

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Analysis of work quality of spreading units of fertilizer disc distributor

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Abstract*: Analysis of work quality of spreading units of fertilizer disc distributor.* Results of investigations on work quality of spreading units of fertilizer disc distributor are presented. Quality of the units' work was determined basing on a transverse non-uniformity of fertilizer distribution.

Key words: disc distributor, quality of work

Improved method for determination of soil parameters by a vertical plate pressure

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Abstract*: Improved method for determination of soil parameters by a vertical plate pressure.* Many models describing cooperation between the working elements and the soil assume as its basic parameters the angle of internal friction and the cohesion. Determining these parameters with classical methods (direct shearing or triaxial compression) is not convenient, especially under soil bin conditions. A method introduced recently for determination of these parameters by a vertical plate pressure often shows discrepancy between the results obtained by other methods. To correct this situation, the dependences considering external friction between soil and vertical plate were introduced in this paper. There are presented comparative results obtained in the soil bin in a sandy soil, with consideration to external friction and also without it.

Key words: soil parameters, soil deformation, stress in soil

A research on dynamic strength of single and double spring cultivator shanks

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Abstract*: A research on dynamic strength of single and double spring cultivator shanks.* Various types of cultivator shanks, made of 60 SiMn5 spring steel, were exposed to dynamic loading trials in order to determine the ideal case. The shanks were rectangular in cross section of 33x13 mm and 45x9 mm. Three out of nine were double (Rau type) and the rest were single. It was found that double shanks were not broken at 200,000 vibrations, which is the limit of world standards, while the single shanks were broken at very low levels. According to the trial results, they should be made of high strength steel of tensile strength higher than 100 kg/mm^2 to prevent breaking when they hit to roots or rocks in the field. They must also be made of spring steel, especially to avoid deformation.

Key words**:** cultivator, dynamic, steel, cultivator shank