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Energetic and qualitative model for potato combine harvester work

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Abstract: *Energetic and qualitative model for potato combine harvester work.* A mathematical model for the work of potato combine and tractor-combine outfit was developed basing on own mathematical formulas determining: cross-section of ridge, share resistance, length of sifting web, power requirement and quality indices of the combine. This model was used in simulation investigations on the work of potato harvesting outfit and to determine conditions of harvesting process at various technical and exploitation factors and also in determination of quality and energetic indices of the tractor-combine outfit.

Key words: potato combine harvester, mathematical model, quality, energy

Traction characteristics of tractor cooperating with the potato combine harvester

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Abstract: *Traction characteristics of tractor cooperating with the potato combine harvester.* There was developed a mathematical model describing the energetic effects of a tractor-combine outfit depending on the changes in potato mass in the tank and distance from combine wheel axle to the drawbar eye axis. This distance should be as big as possible to assure proper tractor traction parameters over the whole range of combine's work, from the beginning of the tank filling to its full capacity. A decrease in this distance results only from constructional limitations of the combine and admissible load of the tractor.

Key words: mathematical model, tractor traction characteristics, potato combine harvester

Energy consumed in cutting of green forage, collected with the rolling baler with cutting unit, depending on chaff length

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Abstract: *Energy consumed in cutting of green forage, collected with the rolling baler with cutting unit, depending on chaff length.* Green forage of various moisture content (22, 36 and 60%) was collected with the use of a constant-chamber rolling baler in the form of uncut forage and cut into chaff of theoretical length 7.5 and 15 cm. Then, samples were taken in order to determine degree of cutting. During energetic measurements there were determined: feed flow, mean power requirement and specific energy of harvest (in kJ/kg and kJ/kg d.m.), affected by moisture content and mean length of the chaff.

Key words: rolling baler, green forage cutting, energy of cutting

Changes in amaranth seed permittivity under the influence of water content and electromagnetic field frequency

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Abstract: *Changes in amaranth seed permittivity under the influence of water content and electromagnetic field frequency.* Knowledge of electrical properties and their dependence on seed physical properties is a basis for application of electro-technology in construction of meters and equipment for electro-processing of seeds. The property used most often is permittivity. The carried out investigations and analyses showed, that amaranth seed permittivity is decisively affected by water content. Apart from that, it is also significantly influenced by the supply current frequency. An increase in permittivity occurs when the water content is increased. However, an increase in supply current frequency causes a decrease in permittivity.

Key words: amaranth, water content, permittivity

A method for determination of compaction distribution in soil packed by the wheels of tractor outfits

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Abstract: *A method for determination of compaction distribution in soil packed by the wheels of tractor outfits.* The paper presents a method for determination of parameters of soil compaction by the wheels of tractor outfits. In the method there are considered the technical-exploitation parameters of the outfits as well as dependencies between the specific wheel load on soil, its compaction characteristics and ploughing resistance.

Key words: agricultural outfits, field compaction, calculation method

Empirical dependences between the wheel specific pressure on soil, its compaction parameters and ploughing resistance

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Abstract: *Empirical dependences between the wheel specific pressure on soil, its compaction parameters and ploughing resistance.* The paper presents dependences, obtained on a basis of field investigations, between the specific pressure of tractor outfit wheels and soil density, soil compaction and specific ploughing resistance. The worked out dependences can be used in calculation method for determination of soil compaction distribution in the field, caused by the outfit wheels in machine field operations.

Key words: agricultural outfits, soil density, soil compaction, rut depth, ploughing resistance

Effect of control and design parameters of the threshing unit on contamination of amaranth grain

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Abstract: *Effect of control and design parameters of the threshing unit on contamination of amaranth grain.* Results of investigations on amaranth threshing with the use of research

stand were subjected to statistical analysis. A significant effect of investigated threshing parameters on amaranth grain contamination was found, with the exception of feeding rate. Advisability of application of exponential dependence between grain contamination and threshing parameters was confirmed.

Key words: amaranth, grain contamination, statistical analysis

Working resistance and soil failure by narrow tillage tools

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Abstract: *Working resistance and soil failure by narrow tillage tools.* Comparative evaluation of working resistance of narrow tillage tools of different shape calls not only for determination of their total resistance value but also of the volume of soil being disturbed. For this purpose, there was used a method of filming the failures visible on a side glass of the soil bin, during gradual moving away of the tool edge from this glass. There was proved a differentiation in the shape of three-directional failure zone section and the dependence between the specific resistance of investigated tools and their shape different from that for the total resistance.

Key words: narrow tillage tools, working resistance, soil failure

Torque requirement for the rotary subsoiler of various working element shape

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Abstract: *Torque requirement for the rotary subsoiler of various working element shape.* Torque needed for the work of rotary subsoiler for deep soil cultivation can be evaluated theoretically only if it is equipped with rectilinear working elements. Results of empirical investigations on the subsoiler with working elements of various shape are presented in the paper. A significant influence of working element shape on the driving torque value and the course of anti-torque during work of particular tines was proved.

Key words: rotary tillage machines, rotary subsoiler, narrow tillage implements

Energetic investigations on the rolling baler

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Abstract: *Energetic investigations on the rolling baler.* There are presented results of investigations on power requirement for driving the working elements of rolling baler with a constant baling chamber and fuel consumption of cooperating tractor. The mean specific work consumed in material compaction amounted in the case of green forage to 1.8 J/kg d.m. and in the case of straw to 3.4 J/kg d.m., while fuel consumption amounted to 0.91 kg/t d.m. and 1.17 kg/t d.m., respectively. Along with an increase in the mass of compacted plant material, an increase in specific work input occurred. A significant effect of outfit forward speed on performance indices of machine work was found.

Key words: rolling baler, power, fuel consumption

Effect of selected parameters of the auger-finger conveyor in grain combine harvester header on uniformity of crop mass distribution

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Abstract: *Effect of selected parameters of the auger-finger conveyor in grain combine harvester header on uniformity of crop mass distribution.* Constructional-exploitation parameters of the auger-finger conveyor (number and configuration of fingers) affect uniformity of crop mass feeding to the threshing unit. An increase in rotational speed of the auger-finger conveyor in the investigated range unfavourably affects transport uniformity and feeding of crop mass to the threshing unit, causing also an increase in the average power requirement.

Key words: grain combine harvester, auger-finger conveyor, threshing unit, crop mass transport, quality of work