



SUBSTITUTION OF THE PARAMETERS OF A GEARED ROLLER FOR MIXING BIOSOLVENT PREPARATION INTO THE SOIL DURING PLOWING.

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Annotatsiya. Meliorativ holati yomon, o'rta va kuchsiz sho'rlangan erlarda shudgorlash bilan bir vaqtda, shudgor yuzasi bo'ylab biosolvent birikmasini 1 ga er maydoni uchun 200 liter suvga 5-10 liter biosolvent aralashtirib sepadigan va orqa tomondan tuproqqa aralashtirish vazifani bajaruvchi maxsus qurilmalar bilan jihozlangan texnika va uning texnologik ish jarayoni ishlab chiqilgan. Biosolvent tuproqni g'ovakligini oshirib, suv o'tkazuvchanligini yaxshilash orqali, tuproq tarkibidagi suvda oson eruvchi zararli tuzlarni chiqarib yuborish uchun sharoit yaratadi hamda sho'r yuvishdagi suv miqdori sarfini kamayishiga erishiladi. Buning natijasida suv iqtisod qilinib, erlarning hosildorligini 7-10 sentnerga oshishiga imkoniyat ayratiladi.

Kalit so'zlar: Biosolvent, g'ovaklik, shudgor, suv o'tkazuvchanlik, tuproq, tuz miqdori, o'rta sho'rlangan er, kuchsiz sho'rlangan er, texnika, texnologiya.

Аннотация. На землях с неудовлетворительным мелиоративным состоянием, средне- и слабозасоленных почвах разработаны способ и технологический процесс его обработки, оснащенные специальными устройствами, которые одновременно распыляют по поверхности плуга смесь биорастворителя из расчета 5-10 л биорастворителя с 200 л воды на 1 га площади и перемешивают ее с почвой с обратной стороны. Увеличивая пористость почвы и улучшая ее водопроницаемость, биорастворитель создает условия для выведения из почвы вредных солей, легкорастворимых в воде, и достигается снижение расхода воды при



промывке солей. В результате экономится вода и повышается продуктивность земель на 7-10 центнеров.

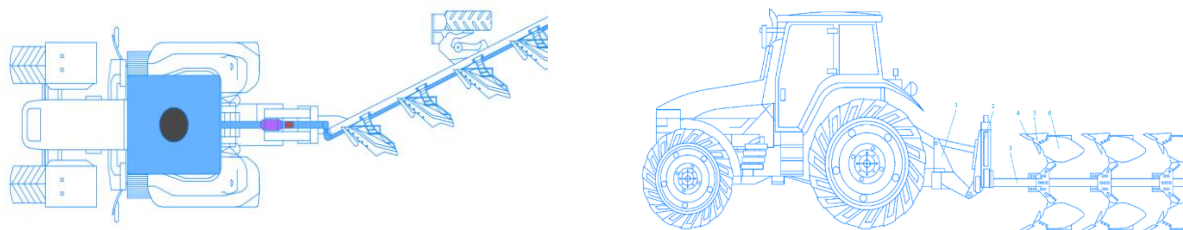
Ключевые слова: Биорастворитель, пористость, плуг, водопроницаемость, почва, содержание солей, средnezасоленная почва, слабозасоленная почва, техника, технология.

Annotation. In lands with poor melioration conditions, medium and weak saline soils, a technique and its technological process have been developed, equipped with special devices that simultaneously spray a biosolvent mixture of 5-10 liters of biosolvent mixed with 200 liters of water per 1 ha of land area along the plow surface and mix it into the soil from the back. By increasing the porosity of the soil and improving water permeability, the biosolvent creates conditions for the removal of harmful salts that are easily soluble in water from the soil, and a reduction in water consumption during salt leaching is achieved. As a result, water is saved and land productivity is increased by 7-10 centners.

Keywords: Biosolvent, porosity, plow, water permeability, soil, salt content, moderately saline soil, weakly saline soil, technique, technology.

Introduction. Energy and resource efficiency are the most important issues in the world in the creation of new agricultural techniques and technologies and the improvement of existing machines. Considering that “more than 1.8 billion hectares of land are cultivated annually for the cultivation of various agricultural crops worldwide” [1], the development of machines and devices that work with high quality and productivity and are energy- and resource-efficient is considered one of the important tasks. In this regard, great attention is paid to the development of plows that simultaneously loosen the subsoil during plowing. Certain achievements have been achieved in this direction in developed foreign countries, including the USA, Germany, the Netherlands, England, Italy, the Russian Federation, Belarus, Ukraine and other countries [2,3].

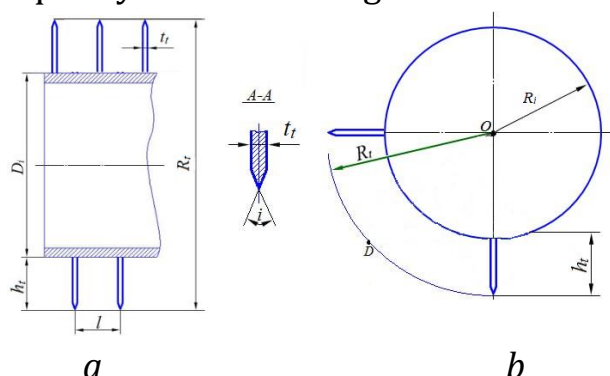
The irrigated area of our republic is 4.3 million hectares, the total water resources are 52 billion m³, of which 41.0 billion m³ are formed in the territories of the joint states, 11.0 billion m³ are formed in the territory of Uzbekistan, of which an average of 90 percent is used in agriculture, 4.5 percent in the municipal sector, 4.3 percent in industry and energy, and 1.2 percent in fisheries. Surface water resources are 49.9 billion m³ (96%). Groundwater is 0.5 billion m³ (1%). Return water is 1.6 billion m³ (3%).



1-frame suspension; 2 - hydraulic cylinder for turning the plow bodies; 3 - frame; 4- lower softener; 5- front softeners; 6 - blades; 7 - roller.

Figure 1. Scheme of a combined plow equipped with a biosolvent spraying device

During the work of the double-row plow, the biosolvent compound is treated with a device (rotor) mounted on the back that spreads the biosolvent compound onto the surface layer of the soil and mixes it with the soil to preserve its chemical composition from sunlight, wind, and various natural influences. During the salt leaching process, the biosolvent compound maintains its chemical effect on the soil, increasing the porosity of the soil, dissolving harmful salts, and improving the quality of salt leaching.



1- teeth; 2 - Biosolvent softener gear roller cylinder

a - cross-section of the view in a plane perpendicular to the direction of movement

b - view in a plane along the direction of movement

Figure 2. Parameters of the biosolvent grinding roller

Determination of the diameter of the biosolvent grinding roller.

It is known that the diameter of the biosolvent grinding roller should be such that its blades, when meeting the workpiece, can easily roll over it without pushing it forward. In this case, the pressure of the blade is concentrated on the cuttings, which will break them up, otherwise the soil will accumulate in front of the biosolvent grinder's toothed roller, which will disrupt its technological process, increase its resistance to abrasion, and deteriorate the quality of work.

For reliable clamping of soil particles between the toothed roller cylinder of the biosolvent aerator and the treated field, the following conditions must be met:

$$\chi > (\varphi_1 - \varphi_2) \quad (1)$$

this χ – angle of contraction of the slices, degrees;

φ_1 and φ_2 – Friction angles of the Biosolvent grinder with a toothed roller and the field surface (soil) in the appropriate direction, degrees.

The opposite is true, that is $\theta > (\varphi_1 - \varphi_2)$ When the cuttings are pushed out between the Biosolvent grinder gear roller and the field surface, they accumulate in front of the Biosolvent grinder gear roller, disrupting the technological process, increasing the wear resistance of the Biosolvent grinder gear roller, and preventing the cuttings from being crushed to the required level.

During operation, the cuttings may interact with the cylinder of the biosolvent grinder or the blades attached to it. Therefore, we determine the conditional average radius of the Biosolvent Grinder.

Conditional average radius of the biosolvent emulsifying roller bearing

See Figure 2

$$R_s = R_i + \frac{h_t}{2}, \quad (2)$$

where R_i – is the radius of the Biosolvent Grinder toothed roller cylinder, cm; h_t – is the height of the teeth, cm. When grinding the pieces with a conventional hollow cylinder of the Biosolvent Grinder toothed roller, two normal forces appear on the surface at the point of their mutual impact K: the normal force on the Biosolvent Grinder toothed roller cutting surface $N_1 = N \tan \psi$ and the normal force on the cutting surface $N_2 = N / \cos \psi$. The equalizer of these forces $N = N_1 + N_2$ O_x The biosolvent softener tries to remove the surface of the gear roller cylinder and the treated field.

Conclusion. Currently, the simultaneous implementation of the technological process of spraying various biopreparations on the land along with plowing during the main tillage of the soil allows reducing the number of movements of the unit in the field and reducing the costs of the process, especially fuel consumption. Our republic requires research to substantiate the technological process of the device for simultaneous plowing and spraying biosolvent preparations during plowing for soil and climatic conditions.

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