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УДК 633.31

INFLUENCE OF NODULE BACTERIA ON THE FORMATION OF THE SYMBIOTIC APPARATUS OF ALFALFA

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Abstract: *Based on the analysis of the results of previous studies, a review of theoretical and practical data is devoted to the study of salt tolerance and genetic determination of this trait in nodule bacteria Sinorhizobium meliloti - alfalfa symbionts. A collection of natural isolates of the nodule bacterium Sinorhizobium meliloti from nodules of wild species of alfalfa (Medicago polymorpha) and alfalfa plant of the Taisiya varieties were used. The degree of resistance of these strains to salinity and which of them fix nitrogen more efficiently under salinization conditions was discussed, and the effect of different levels of salinity on the growth*

of seeds of alfalfa cultivar (Taisiya) was studied.

Key words: *legume-rhizobial symbiosis, nodule bacteria, nitrogen fixation, symbiotic efficiency, Salinity.*

Introduction. Legumes fix atmospheric nitrogen in symbiosis with nodule bacteria and accumulate it in plant biomass. They serve as unique precursors for growing cereals, since they contribute to the restoration of soil fertility by introducing nitrogen in a biologically available form. Leguminous grazing favors the restoration of rotated soils (eg desertified or saline) [3].

Interestingly, some plants have the unique ability to form a symbiotic relationship with nitrogen-fixing bacteria of the Rhizobiaceae family. Rhizobia-based inoculants significantly improve the yield of many legumes and forage crops and can minimize the use of synthetic fertilizers, which are expensive and degrade soil properties [1, 2].

In legume nodules, nitrogen from the atmosphere is converted into ammonia, which is then assimilated into amino acids (the building blocks of proteins), nucleotides (the building blocks of DNA and RNA, as well as important energy molecules ATP), and other cellular components such as vitamins, flavonoids, and hormones. The ability to fix gaseous molecular nitrogen makes legumes an ideal organism from an agricultural point of view, as their need for nitrogen fertilization is reduced. It should be borne in mind that a high nitrogen content in the soil blocks the development of nodules, since there is no benefit for the plant in the formation of symbiosis.

Purpose of the work. Study of tolerance to strains of nodule bacteria-symbionts of alfalfa, and determination of the most effective strains in saline conditions.

Materials and research methods. The material for the article is information from scientific articles analyzed by us on the basis of previous publications and data of Russian researchers.

Results. The results showed that the growth of bacteria in all studied strains decreased with an increase in the concentration of sodium chloride in the medium compared with the absence of salt, as in the control.

Pic. 1. Alfalfa roots contain nodule bacteria

The results showed that root nodulation of the host plant is an important indicator of symbiosis. There are conflicting data on changes in the number and weight of nodules during the formation of symbiosis under salinity. Studies of the symbiosis of nodule bacteria and chickpeas in the presence of salt showed that the effectiveness of symbiosis was positively correlated with the number of nodules, but not with their mass. Other authors, who analyzed the same symbiotic system in the presence of salt, demonstrated that effective isolates reliably form larger nodules than ineffective ones. We showed that, under salinization conditions, effective symbiosis on alfalfa roots was associated with the formation of a significantly larger number of nodules than those registered for ineffective symbioses.

Conclusion. In conclusion, the author notes that strains of nodule bacteria that form effective symbiosis under salinization conditions can be detected.

Therefore, it can be said that this article provides information on nodule bacteria that significantly contribute to the resistance of the symbiotic system to abiotic stresses and increase the yield of alfalfa. The obtained collection of natural isolates of S. meliloti is of high scientific value for understanding the mechanisms of stress resistance of bacteria and their symbiosis with leguminous host plants.

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УДК 54.062

DIE VORTEILE DER VERWENDUNG VON HANFMEHL BEIM BACKEN

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***Inhaltsangabe**: Der Artikel präsentiert die Ergebnisse der chemischen Analyse von Hanfmehl im Vergleich zu Weizen mit den Methoden der NIR-Analyse und Massenspektrometrie mit Zerstäubung in induktiv gekoppeltem Plasma.*