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Plant response and adaptation to abiotic stress

Sukiasyan Astghik¹, Kirakosyan A A¹, Safaryan A M², Sargsyan T M² and Safaryan A A³

¹State Engineering University of Armenia (Polytechnic), Armenia

²Yerevan State University of Architecture and Construction, Armenia

³Lernametalurgical Institute CJSC, Armenia

Bulking obsidian has a high porosity, water absorption, and high enough water retention. This prevents soil compaction, increases the filtration and ventilation of deep root systems of plants, and promotes root development, the growth of plants in the root zone to keep enough water. We as aerator soil to stamp out the toxic effect of heavy metals to be used obsidian expanded. Obsidian is an undesirable material for the production of crushed stone, sand lithoidal pumice and perlite. In this obsidian becomes waste. The volcanic glass is obsidian, the amount of water that does not exceed 1%. Bulking obsidian fractions 5-20 mm occurs at 1050-11500C for 3 -10 min. In this case, a lightweight porous material with an average density is 180-350 kg/m³. Study of physico-mechanical properties of the bulked obsidian showed that the compressive strength of 4.5-9.9 MPa, the porosity is in the range 80-89%, water absorption is 10.8-15.5% (wt.). The pores in the bulked obsidian generally with each other and one-way open, interconnected pores consist of 10-25%, and the number of double-sided open pores (capillaries) 8-20% of the total number of pores. It was bulked experimentally that the addition of bulked obsidian in the amount of 0.5-2.0 g per 1.0 kg of clay and gray-meadow soils have a positive effect on the growth of barley: the stalk of the plant is increased from 170 to 200%, root length by 180 to 210%, and the dry weight from 215 to 300%. Water retention after 20 days of 25-32%, 40 days of 5-22% and after 60 days 5-13%. Thus, bulked obsidian has high porosity sufficiently high water retention and water absorption. In this aerator prevents soil compaction high number of heavy metals. When impregnated that bulked obsidian special solutions of which will be located in the pores and hold out in ground water, gradually, as necessary give them to the plants. Thus bulked obsidian reduce rates of fertilizer will reduce the amount of heavy metals in products, groundwater pollution, the need for frequent watering and save water consumption.

Keywords: bulking obsidian, soil aerator, water retention, plant.

Biography

Astghik Sukiasyan is Doctor of Biology (Candidate of science) from Yerevan State University. During her stay, she has learning different biophysical and biochemical properties related to metabolism and growth of plant. She is Assistant Professor in State Engineering University of Armenia, Yerevan, Armenia. Her areas of interesting is antioxidant properties, accumulation of heavy metals and other adaptation to abiotic stress of plant. She has published more 50 papers in National and International Journal.

sukiasyan.astghik@gmail.com