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DEVELOPMENT OF NaCl CYCLE IN A CLOSED LIFE SUPPORT SYSTEM

Abstract

Utilization problem of organic wastes in a matter cycle of closed biological-technical life support systems (BTLSS) includes a control question of NaCl content in recycling products. Concentration of this salt in nutrient medium obtained for plants cultivation should not exceed a certain value to avoid its toxic influence on a plant unit. Human wastes are the main source of NaCl therefore the development of a separation technology of this salt and its return to a human seems to be an important task. The selective desalinization method of mineralized human wastes' solution obtained in the result of "wet" incineration was developed at the Institute of Biophysics SB RAS (Russia, Krasnoyarsk). The given method presupposes desalinization of the products of mineralized wastes immediately after their physical-chemical oxidation. The basis of the given method is electrodialysis and the consecutive stages of the salts' concentration, carbonization and a temperature separation. Consequently, a mineralized solution of human metabolites with a decreased NaCl concentration is obtained, which comes in irrigation solution. Besides, the solution saturated with potassium hydro carbonate and including several ingredients of other mineral compounds is generated. Chlorine is separated from the mineralized wastes in the form of Cl₂ and is catalytically converted into HCl. The final stage of the desalinization technology implies production of dietary salt both by a chemical method due to mixing NaHCO₃ and HCl solutions and by a biological one. When a biological method is used, the NaCl solution serves as a source for preparation of nutrient medium on which saltwort (*Salicornia europaea*) being a biological source of dietary salt in the conditions of closed LSS can be cultivated.