EFFECTS OF SODIUM ADSORPTION RATIOS ON EFFLUENT DISPOSAL TO SUBSOILS

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Septic tank effluent produced from individual domestic households is commonly disposed of via sub-soil absorption trenches (drainfields). The mechanism for disposal is by diffusion of the water component through the soil matrix while microbial decomposition of the organic solids occurs within the trench and at the soil-trench interface. Inability of the trench to dispose of the water without creating surface ponding or anaerobic soil conditions poses health risks for residents and environmental hazards for the community.

The size of the drainfield is calculated using hydraulic conductivity values derived from percolation tests. These tests, based upon Ryon's original procedures, have been altered beyond the limits imposed by Ryon, yet the critical values have remained unchanged. The shortcomings of the percolation test are exacerbated by the sodium ion content of the domestic wastewater.

Sodium salts derived from washing powders, detergents, soaps, food products and human metabolic wastes affect the hydraulic conductivity of subsoils. While percolation rates are determined using clean water (low conductivity, low total dissolved salt content), no account is made for the effects of sodium ions in the effluent.

Sodium absorption ratios for domestic effluents reach 14 while electrical conductivity values rarely exceed 300 mSm^{-1}. The effects of water of this quality upon seven major soil groups are examined in relation to standard percolation tests to indicate the reduced hydraulic conductivity.

Amelioration of the effluent to correct the sodium abosorption ratio relative to the electrical conductivity is suggested as a mechanism for increasing hydraulic conductivities.