EV89 - SEDIMENTATION AND SURVIVAL EVALUATION OF PATHOGENS IN SWINE EFLLUENT AND SLUDGE FOR SAFE REUSE PURPOSES

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The swine effluent is composed by urine, feces, digested food and water, characterizing high contents of solids, organic matters, phosphorus and nitrogen. Solid-liquid separation and aerobic treatment are routinely used to reduce the suspended solid concentration in the liquid fraction. In this study, treated swine effluent after aerobic reactor (AR) before settling tank, were used to evaluate the survival rates of the following pathogens artificially seeded: somatic coliphage phiX-174 (phi-X), Human Adenovirus (HAdV-2) and Salmonella Typhimurium. Imhoff cones (v. 1L) were filled with the effluents and the settling experiments were performed until 120 h, in triplicate. The pathogens survival in liquid and solid fraction were determined after 0, 0.08, 0.16, 0.33, 0.75, 2.5, 5, 10, 24, 48, 72 and 120 h. In the sludge (solid-fraction) this parameter was measured after 24, 48, 72 and 120 h of settling time. The enumeration of the HAdV, phi-X and S. Thyfimurium were respectively performed by integrated cell culture assay–preceded by reverse transcription (ICC-RT-qPCR), double layer agar method and by ISO 6579 (2002). In effluent, the survival rate was: 12.2% for S. Thyfimurium, 64% for HAdV-2 and 76% for phi-X-174 after 120h; In sludge (solid-fraction) the survival rate after 120h was 1.6% for S. Thyfimurium, 64% for HAdV-2 and 75% for phi-X-174. The settling rate of the three pathogens was also evaluated by measuring their reduction in the liquid-fraction. S. Thyfimurium was significantly reduced from effluent at 45 min and 5h post sedimentation remaining constant in the other periods evaluated; HAdV-2 at 20 min, 2.5 and 24h, and phi-X at 10, 20 min, 2.5, 5 and 10h. The sedimentation of the HAdV and phi-X was positivity correlated with the sedimentation of solid particles. HAdV-2 and S. Typhimurum increased significantly after 72h of settling in the secondary sludge. This means that the pathogens are present mainly in the solid particles. Solid-liquid separation and survival studies of these prevalent pathogens in effluents and sludge are viable methods that allow studying the disinfection of these matrices. This can predict the safe reuse of these secondary-products as biofertilizers in agriculture or back to the swine facilities. FINANCIAL SUPPORT: CNPQ 472804/2013-8.

EV108 - ADENOVIRUS AND ENTEROVIRUS IN SURFACE WATERS IN THE WATERSHED SINOS RIVER, RS, BRAZIL

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Adenovirus (AdV) and enterovirus (EV), among other viral agents are responsible for different pathologies, mainly associated with gastroenteritis. These non-enveloped viruses are eliminated through the feces of symptomatic or asymptomatic individuals released in high concentrations in water bodies and remain for long periods due to its high resistance to environmental conditions. The Sinos River watershed serves 1.5 million people (94% urban) living with serious problem caused by intense contamination of its waters. The watershed is geographically divided into three stretches: upper (source, low population density and small farms), medium (increased urban density) and lower (mouth, strong population density and industrial concentration). The present study evaluated the occurrence of AdV and EV in water samples by qPCR in catchment points for public supply in Sinos River, main watercourse of watershed. Five-hundred mL of raw water were collected monthly in sterile bottles in eight catchments of water treatment plants (WTP) along the river for 24 months. Initially the samples were submitted to virus concentration by adsorption-elution method and sequence nucleic acids were extracted with a commercial kit (RTP DNA/RNA Virus Mini Kit). For EV detection an additional step (cDNA) was performed using the kit High Capacity cDNA Reverse Transcription. For both viruses, primers targeting conserved regions of the genome were used for qPCR reaction. All 178 samples were negative for EV. In the upper part of the river high rates of AdV