Occurrence, Transport Risk and Assessment of Cryptosporidium

*Ping Lu¹, tao yuan²,³, yadong kong¹, jinhui niu¹, qiyan feng¹

1. Department of environmental science and spatial informatics, China University of Mining and Technology, 2. Department of Architecture Equipment and Civil Engineering, Jiangsu Vocational Institute of Architectural Technology, 3. Jiangsu Collaborative Innovation Centre for Building Energy Saving and Construct Technology

Cryptosporidium can infect people when swimming or diving in the recreational water bodies. Here, our work shows findings regarding the transport of Cryptosporidium sized-microspheres from soil to the water bodies, which was a potential source of Cryptosporidium of water bodies, as well as a one-year investigation of the occurrence and distribution of protozoan parasites Cryptosporidium in Yunlong Lake, Xuzhou, China. The objective of this work was to investigate the soil chemical characteristic impact on transport of Cryptosporidium from the bank soil to surface water bodies, and to evaluate the full-body contact risk of infection of Cryptosporidium in the lake. Results show (1) The number of Cryptosporidium-sized microspheres transport declined from 25 #/mL to 2 #/mL while the Total Organic Carbon (TOC) in soil increased from 0mg/L to 40mg/L. The number of microspheres washed out reduced sharply with the increased of the content of sodium ion in soil, while the content of sodium ion in soil increased from 0.007mol/L to 0.200mol/L the substitutes washed out reduced from 115 #/mL to 33 #/mL. The transport of microspheres remains stable for the weakly alkaline soil and reduced sharply for the weakly acidic soil, when soil pH rose from 5 to 7, microspheres washed out stabilized at 24 #/mL, but when soil pH rose to 8, microspheres washed out sharply reduced to 10 #/mL. (2) The number of Cryptosporidium oocysts were 0-8/10L in water samples and 0-260/g in sediment samples. According to risk assessment, in July, it is the highest risk for swimming or diving (probability of each time infection was 3.66 ×10⁻³).

Therefore, soil chemical characteristics have an important impact on Cryptosporidium transport with runoff. Monitor of Cryptosporidium in water bodies is highly recommended after a rain.

Keywords: risk assessment, transport, runoff, Cryptosporidium