Occurence of Cryptosporidium spp. in low quality water and on vegetables in Kumasi, Ghana

Protozoan parasites belonging to the genus Cryptosporidium are transmitted e.g. by food and water and may cause severe diarrhoea, dehydration, weight loss and malnutrition. Ingestion of 10 oocysts can lead to infection and pathogenic symptoms. Thus, to characterize Cryptosporidium spp. contamination level of river water, irrigation water and lettuce, 10L of water and 16 lettuce samples were collected four times in the period of, September – October 2013, with weekly intervals from six sample sites in and around Kumasi, Ghana. Oocysts were purified from water by sedimentation for 2 x 48 hours or pulsifying of lettuce followed by immunomagnetic separation and quantification by immunofluorescence microscopy, with sensitivities of 2 and 9%, respectively. After approximately six weeks of storage at 4°C, analysis and additional storage on slides, oocysts were washed off the slides and attempts to characterize Cryptosporidium spp. positive samples were done by PCR amplification and sequencing of the SSU rRNA, the HSP70 and the GP60 genes after. Cryptosporidium oocysts were found in 75% of the water samples and on 43% of the lettuce with concentrations of 53 – 3268 per 10 L water and 11 – 118 oocyst per 15 g of lettuce. Positive water samples on one or more occasions were demonstrated in all water and farm sites while all farms had positive lettuce samples on all occasions. Rainfall seemingly lowered the concentration of oocysts in water but not on lettuce. Molecular characterization of Cryptosporidium positive samples was unsuccessful, thus no conclusions can be drawn concerning sources of contamination. Nevertheless, the detection of high prevalence and concentration levels of Cryptosporidium oocysts on vegetables consumed raw and in water with direct contact to humans entails a potential risk of infection in humans. Implementation of preventive measures based on this study should be considered and actions taken accordingly.