Chemical parameters and occurrence of Cryptosporidium spp., in raw and treated water from Nariño, Colombia

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Introduction

Water-borne transmission of Cryptosporidium has been highly reported around the world. Cryptosporidium infective oocysts have demonstrated remarkable resistance. Oocyst can interact with suspended and dissolved particles from water contamination, decreasing disinfection process efficacy (2,3). Detection from water and genotyping methods of Cryptosporidium are not enough, suggesting a research challenge in detection of potential human circulating pathogens strains.

Methods

36 water samples from Pasto, Ipiales and Túquerres, were collected throughout September 2016.

We used an experimental plan covering:

- Effect of water time collection in both mornings and afternoon at either, week and weekend days.
- Type of samples from raw (R), post-treatment (PFQ) and post-disinfection (chlorination) (PCL). Figure 1.

Objective

To analyse the influence of chemical parameters and presence of Cryptosporidium in raw and drinking waters collected from three sampling sites in Nariño province, Colombia.

Results

- By the first time, the presence of Cryptosporidium in raw and treated waters from Nariño, Colombia was confirmed. Detection increased during weekend days.
- Cryptosporidium in water samples of raw, post-treatment and post-disinfection spots were detected through RT-PCR (Figure 2 and Table 1).

Table 1. Representation of the electrophoresis results of the amplification products of the Cryptosporidium white gene (218 bp) in 9 water samples analyzed in test 3.

<table>
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<tr>
<th>SAMPLE</th>
<th>TYPE OF WATER TREATMENT</th>
<th>TD CV</th>
<th>CV</th>
<th>TD CV</th>
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<td>0.02</td>
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<td>0.19</td>
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<td>0.13</td>
<td>0.23</td>
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</table>

Discussion

- By the first time, Cryptosporidium in raw and treated water from Nariño, Colombia was confirmed. Beside differences of MON in sources of water supply and between WTP, before and Pos chlorination the parasite was present.
- High turbidity, TOC and total hardness represent high and variable contamination of water sources and it was associated with high presence of parasite.
- It is necessary to continue with Cryptosporidium’s sequencing to identify circulating strains, and include more samples for improve our conclusions.

Acknowledgment

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Conclusions

- This is the first report of Cryptosporidium from water in Nariño, Colombia.
- The parasite can resist to water treatment. Is need sequencing, and confirm circulating strains and their potential pathogenic power.
- The high water chemical parameters can explain the physical oocyst protection and the observed resistance to disinfection.

References

(4) Norgen Biotek Corporation (2011) - Cryptosporidium RT-PCR Detection Kit Product # 39100. Product Insert, Thorold, ON, Canada L2V