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Comparison of sugar and sodium nitrate flotation methods for detection of parasites in dog feces

J H Greve*

At Iowa State University, the standard flotation method used to detect parasite eggs and cysts in dog feces has long been centrifugation using sugar (Sheather's) solution. In recent years, several kits using sodium nitrate have been available commercially. The purpose of this study was to compare the sugar centrifugation and sodium nitrate flotation methods in their ability to detect parasite eggs and cysts in dog feces.

The sugar centrifugation method was conducted as described in Sloss and Kemp, and the sodium nitrate flotation method was conducted according to manufacturer's directions (Ovassay, Pitman-Moore, Inc.). The specific gravity of both media was 1.23. Fecal specimens from 292 dogs admitted to the Veterinary Teaching Hospital at Iowa State University were examined using both diagnostic methods.

Both flotation methods agreed in 266 of the 292 (91%) tests. Sugar floated more eggs and debris than sodium nitrate. This resulted in more positives being found by sugar centrifugation (Table 1). Sometimes the amount of debris that floated was excessive using sugar, causing eggs to be obscured and false negatives to be recorded. All 5 instances wherein sodium nitrate detected parasites that sugar did not (Table 1) were caused by flotation of excessive debris in the sugar method. Because sodium nitrate floated less debris, it produced an uncluttered microscopic field, making microscopic examination easier and faster than in the sugar method.

Neither method is recommended for detecting Giardia or tapeworm infections, so disagreements involving these 2 parasites (Table 1) can be set aside as relatively unimportant. The method of choice to detect Giardia is centrifugation using 33.3% zinc sulfate. No flotation method is reliable to detect tapeworms, because tapeworm segments often do not release their eggs into the feces. Eggs of Physaloptera, the stomach worm, were found in 2 fecals by the sugar method, but both cases went undetected by the sodium nitrate method. It is unclear why the sugar centrifugation method was generally superior. One study indicated that centrifugation itself produces better results, all other things being equal.

The sugar centrifugation method was somewhat faster to complete than the sodium nitrate method, but this difference was not great. The sodium nitrate medium began to crystallize when examination was not prompt, but the crystals did not interfere with evaluations in this study. On the other hand, sugar preparations can sit for several hours without suffering. Materials for the sodium nitrate method cost about 70 cents per test, assuming only 1 use of each unit in the kit. However, the units can be cleaned and reused several times. Assuming 10 uses per unit, the cost falls to 30 cents per test. However, the cost of cleaning the units after each use probably negates this saving. Materials for the sugar centrifugation method cost about 5 cents per test.

Table 1. Summary of disagreements between methods

<table>
<thead>
<tr>
<th>Sugar positive/nitrate negative</th>
<th>Sugar negative/nitrate positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Toxocara</td>
<td>3 Ancylostoma</td>
</tr>
<tr>
<td>2 Ancylostoma</td>
<td>1 Ancylostoma</td>
</tr>
<tr>
<td>2 Physaloptera</td>
<td>1 tapeworm</td>
</tr>
<tr>
<td>4 coccidia</td>
<td>1 fluke (Alaria)</td>
</tr>
<tr>
<td>6 tapeworm</td>
<td>4 spurious/pseudoparasites</td>
</tr>
</tbody>
</table>

*Dr. Greve is a professor in the Department of Pathology in the College of Veterinary Medicine at Iowa State University.