

EVALUATION OF A MODIFICATION OF THE DADA TECHNIQUE
FOR THE RECOVERY OF HELMINTH EGGS FROM SOIL,
AND DETERMINATION OF THE SPECIFIC GRAVITY
OF CERTAIN HELMINTH EGGS USING SUCROSE
DENSITY GRADIENT CENTRIFUGATION

by

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DEDICATION

To my parents

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INTRODUCTION

A number of medically important helminth parasites are acquired through the ingestion of soil contaminated with their infective stages. In certain cases, these are embryonated eggs. In epidemiological studies of infections with such soil-transmitted parasites, it may be desirable to determine the presence and distribution of their eggs in the soil in the community under study. This calls for a technique to separate the eggs from the soil.

In 1979, Dada and Lindquist devised such a technique and reported its recovery efficiency rate to be 67.5% when used for Toxocara canis eggs. The present study explored the possibility of improving the efficiency of this technique via a modification in its methodology. This modification was evaluated for its efficiency in recovering T. canis, Ascaris suum and Trichuris vulpis eggs from artificially-seeded soil.

This study also investigated several helminth eggs in the hope of explaining the different rates of their recovery from soil by differences in their specific gravity.

REVIEW OF LITERATURE

Caldwell and Caldwell (1928) were the first to report on the extraction of helminth eggs from soil. Their method utilized antiformin to release the eggs from the soil particles, sugar solution of high specific gravity to float them, and a small vial to remove them from the surface. They did not furnish any data on its efficiency.

Spindler in 1929 reported on a modification of the Caldwells' technique devised by Cort, Otto and Spindler. It involved treatment of the soil sample

with 30% antiformin for 1 hr with frequent stirrings and subsequent centrifugation in sodium dichromate solution (sp gr 1.35) at 1,000 rpm for 1-2 min. The floated eggs were then looped from the surface using a small vial or the open end of a glass tube. Other than stating that it is possible to recover the "majority of (Ascaris) eggs" using this technique, Spindler did not dwell on its efficiency.

Maplestone and Mukerji (1936) described a technique for the extraction of Ascaris eggs from soil as follows: the sample was treated with 2.13% sodium hydroxide solution for 1-2 hr with frequent stirring, following which chlorine was bubbled through for 10 min. Thirty minutes later, the mixture was centrifuged, the supernatant pipetted off, and saturated salt solution added. Centrifugation was then carried out repeatedly until no more eggs were recovered from the surface ("direct centrifugal flotation pushed to finality"). Using this technique, Maplestone and Mukerji recovered 16.9-51.1% of seeded eggs from moist soil and 2.4-32.4% from dry soil.

In 1942, Stevenson reported on a centrifugal flotation technique utilizing calcium chloride solution (sp gr 1.35-1.40). He stated that CaCl_2 gave consistently better results with soil artificially infected with Toxocara canis eggs than zinc sulfate of the same specific gravity or sodium chloride (sp gr 1.20).

Berlinguer (1962) described another method in which he washed the soil sample in NaOH and then centrifuged in sodium nitrate solution (sp gr 1.38). It gave "consistently higher recovery rates (about 95%)" than the methods of Spindler (loc. cit.) and Maplestone and Mukerji (loc. cit.).

Ito and Natsume (1964) used saturated magnesium sulfate solution as a flotation medium and recovered 50% of Ascaris eggs from sandy soil and 10% from clay soil. Treatment with antiformin influenced the results to a greater extent in the case of clay soil.