A NOTE ON THE ASSAY OF ASCARIDOLE IN CASTOR OIL SOLUTION

By D. C. Garratt and R. F. Phipers

From Boots Pure Drug Co. Ltd. Standards Department, Nottingham and The Cooper Technical Bureau, Berkhamsted, Herts.

Received September 9, 1953

Oil of chenopodium diluted with 19 parts of castor oil, with the official title of solution of chenopodium[1] is used as a veterinary anthelmintic and owes its therapeutic activity to the ascaridole present. Apart from the desirability of estimating the active ingredient rather than an added constituent of a galenical, the importance of the determination of ascaridole in solution of chenopodium lies in the need to standardise the ascaridole content within narrow limits. This close assessment is necessary because it has been asserted that the therapeutic dose is close to the toxic dose for certain animals.

Since the B.P. assay of ascaridole in chenopodium oil is an empirical method requiring strict adherence to detail the determination is inapplicable with the considerable modification of conditions necessitated by the presence of the castor oil and the low concentration of ascaridole.

Preliminary experiments with more obvious methods of approach to the problem were all abortive, the recovery of ascaridole being very low. These determinations included (*a*) distillation of the oil of chenopodium from water in the B.P. apparatus for the determination of volatile oils in drugs, followed by a determination of ascaridole on the recovered oil by the B.P. method, (*b*) direct extraction of the oil of chenopodium from the mixture with 70 per cent. acetic acid and determination by the B.P. method and (*c*) direct titration of the mixture, in ethanol (96 per cent.) by titanous chloride solution (Paget[2]).

The possibility of co-distillation with a water-miscible solvent possessing a boiling point slightly higher than that of ascaridole was commendable, a glycol being an obvious choice. Early trials were encouraging since good recoveries of ascaridole were achieved but a large number of analyses showed that small but significant under-recoveries of ascaridole (of the order of 10 per cent.) were obtained. These low results were traced to losses occurring during evaporation of the solvent used to extract the ascaridole from the distillate after dilution with water. Further experiments showed that these losses could be avoided if the solvent were evaporated in the presence of 90 per cent. acetic acid, the acid solution being suitable for direct application of the B.P. method; the method described below gave satisfactory results.

To 50 g., accurately weighed, of a 5 per cent. solution of oil of chenopodium in castor oil placed in a 500-ml. Claisen flask, add 50 ml. of ethylene glycol. Distil at a pressure of about 0·5 mm. Hg. (using glass wool and porous pot to prevent bumping) until the contents of the distillation flask are clear. Transfer the distillate to a separating funnel and dilute

with 100 ml. of water. Wash the condenser and receiver with 25 ml. of anæsthetic ether and use it to extract the distillate. Extract the aqueous solution further with 3 successive quantities, each of 25 ml., of ether and shake the mixed ethereal extracts with 40 ml. of 90 per cent. acetic acid. Remove the ether by heating in a water bath maintained at 60° to 70° C. or by passing a current of air over the solution. Adjust the remaining solution to 50 ml. with 90 per cent. acetic acid and place this solution in a 10 ml. burette which possesses an outlet capable of delivering 5 ml. in not more than 5 seconds. Thereafter the method follows that described in the B.P.

When the method described above was applied to solution of chenopodium, the following results were obtained:—ascaridole in oil of chenopodium, 72·0, 72·3, 72·2, 72·2 per cent.; theoretical figure for 5 per cent. w/w in castor oil, 3·61 per cent., Found, 3·48, 3·49, 3·58, 3·53, 3·57, 3·50; 3·54, 3·51, 3·60, 3·53, 3·47, 3·56 per cent.

The advantage of the proposed method rests particularly in the fact that the ascaridole is being determined by the same method as directed for oil of chenopodium. Since this B.P. determination is empirical the desirability of checking the compounding of the galenical by the same method is obvious.

References

1. *British Veterinary Codex 1953*, Pharmaceutical Press, London, p. 585.
2. Paget, *Analyst*, 1926, **51**, 170.