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THE DISTRIBUTION OF SUBSTANCES BETWEEN THE VAPOUR  
AND PARTICULATE PHASES OF CIGARETTE SMOKE  
PART 1: CYCLIC KETONES

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THE DISTRIBUTION OF SUBSTANCES BETWEEN THE VAPOUR AND PARTICULATE  
PHASES OF CIGARETTE SMOKE. PART I: CYCLIC KETONES

(Report No. RD.361-R)

SUMMARY

Making the assumptions that equilibrium exists between the particulate and vapour phases and obeys Raoult's law, it is predicted that the distribution of a compound between the two phases in smoke is related to its vapour pressure and independent of the total amount present.

To test this theory, the concentrations of volatile cyclic ketones in the two phases of smoke (defined by separation using a Cambridge filter) were measured using cigarettes made from tobacco to which had been added:

- (a) involatile solid precursors of the ketones
- (b) the ketones themselves.

When involatile solid precursors were used, the "average" distribution over a whole cigarette was in reasonable quantitative agreement with the theoretical prediction; whereas with the added ketones this was not so. The divergence from theory found with the free ketones can be explained in terms of uneven release of the ketone resulting from its volatility and the procedure whereby the "average" results were obtained.

Consequently, the results from both experiments are consistent with the hypothesis that the equilibrium between the vapour and particulate phases is established in the time it takes for the smoke to emerge from the end of the cigarette.

This study is being continued using a range of chemical compounds which are known to be present in smoke.

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