

**INHIBITION OF RADICAL INITIATED VINYL ACETATE POLYMERISATION BY TOBACCO SMOKE
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Both the vapour & particulate phases of tobacco smoke have been shown to retard benzoyl peroxide initiated polymerisation of vinyl acetate by interception of the radicals involved in the polymerisation process.

The extent of inhibition of polymerisation by test compounds is estimated by measuring the time taken for a mixture of monomer & benzoyl peroxide, immersed in a water-bath at 70°C, to reach a spontaneous boil & comparing it with the time required for a similar mixture with added retarder to reach boiling point. Units are expressed as minutes of inhibition per part per million of inhibitor $\times 10^3$.

Inhibition by the vapour phase can be attributed to conjugated unsaturated compounds, chiefly isoprene, which has an inhibition factor of 788 min. ppm⁻¹ $\times 10^3$.

To trace the groups of compounds responsible for the inhibitory activity of the particulate phase, the particulate matter was fractionated by the method of Stedman et al.. The fractions containing the highest activities were ether soluble weak acids, methanol soluble neutrals & nitromethane soluble neutrals with inhibition factors of 83, 122 & 135 min. ppm⁻¹ $\times 10^3$ respectively.

The distribution of activity in the major fractions of the particulate phase of the smoke from a number of different tobacco types & smoking vehicles has been examined.

Since the nitromethane fraction contains most of the aromatic hydrocarbons produced on smoking & some polycyclic aromatics are known to have high inhibition factors, it was subfractionated after the method of Elmenhorst, but no subfraction with activity appreciably higher than the crude nitromethane fraction was obtained.

These results & the mechanism by which smoke inhibits polymerisation will be discussed.

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