Project 0107

Smoke Chemistry Control

Accomplishments for 1964

Most of the effort was directed towards finding means of decreasing the amount of benzo(a)pyrene (BaP) in cigarette smoke. Two approaches were taken: the measurement of BaP in the smoke from experimental cigarettes, and studies on the chemistry involved in the formation of BaP. Other areas receiving effort were; the synthesis of C^{14} labeled compounds to be used in analytical studies on smoke, and a search for nitrosamines in smoke.

A satisfactory analytical procedure for measuring BaP in cigarette smoke was devised, and over a hundred different cigarettes have been analyzed by this procedure.

Significant findings on mechanical modifications of cigarettes are: cellulose acetate and charcoal filters do not give any selective filtration of BaP; all-bright cigarettes give slightly more BaP and all burley cigarettes considerably less* than do production cigarettes; production BL or TFP gives the same, but TFP's having a high stem and low solubles content can give up to 50% less BaP. Of other variables higher cuts per inch and lower sheet thickness give slightly lower* BaP deliveries.

Over 30 chemical additives have been added to tobacco to determine their effect on BaP delivery. Most of these were in the class of free radical inhibitors, oxidizing agents, metallic catalysts. All had some rationale for possible effectiveness. Of these, only one type, nitrate salts, gave considerable reductions* in BaP delivery, a number of others giving slight decreases.* By adding enough nitrate, a 75% decrease of BaP in smoke can be obtained.

*Slightly less means BaP content of TPM in p.p.m. is 60-80% of that from all bright cigarettes; considerably less means less than 60% of that from all-bright.