

# Composition Studies on Tobacco. XXX. Basic Pigment of Cigarette Smoke Condensate

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In a continuation of our work on the pigments of cigarette smoke condensate (1-4), we have superficially investigated a basic pigment found therein. Fractionation of smoke condensate from commercial cigarettes as previously described (5) yields an aqueous HCl solution of bases, which, on alkalization, gives a black, tarry precipitate. After purification of this material by repetitive precipitation from dilute solution in 2N HCl and prolonged ether extraction of the purified solid, an ether-insoluble, black, amorphous substance (A) is obtained which is similar in appearance to the acidic pigments of condensate (2-4).

Pertinent analytical data on A and on the nondialyzable, weakly and strongly acidic pigments reported previously are shown in Table 1. Although the numbers of acid hydrolyzable amino acids are approximately similar in all pigments, significant differences in the levels and proportions of these compounds are apparent between A and the acidic pigments. The amount of alkaloids and bases in the alkaline fusion products from A is lower and N-methylpyrrolidine comprises 90 percent of these components. Quinic acid is absent in acidic hydrolysates of A.

On alkaline fusion of A, much lower yields of phenols are obtained using the colorimetric method employed previously (3). The aliphatic acids in the fusion products of A are pre-

dominately (98 percent) formic and acetic acids and higher homologues and isomers are either absent or present in trace amounts, as shown by gas chromatographic determina-

**Table 1. Comparative data on three pigments from smoke condensate**

Products	Pigments		
	Acidic		Basic
	Weak	Strong	
<b>Amino acids</b>			
Yield (%)	0.92	3.5	5.8
Number	18	19	20
Major	Glycine, leucine, alanine, valine	Glycine, 1-methylhistidine, glutamic acid, valine	1-Methylhistidine, 3-methylhistidine, leucine, $\gamma$ -aminobutyric acid
<b>Bases</b>			
Yield (%)	0.3	0.5	0.1
Number	23	10	9
Major	Pyrrole, $\beta$ -picoline, methyl-3-pyridyl ketone	$\alpha$ -Picoline, $\beta$ -Picoline,	N-Methylpyrrolidine, pyrrolidine, nicotine
Quinic acid (%)	<0.04	0.12	0
Total phenols (%)	3.3	6.6	0.004
Total acids (%)	12.4	21.5	35.0

tion (3). In contrast, the weakly acidic pigment contains C<sub>1</sub>-C<sub>8</sub> aliphatic acids and formic and acetic comprise about two-thirds of the total. The possible source of these acids has been discussed earlier (3).

The basicity of this pigment may be attributable to greater numbers of free amino or other nitrogen-containing groups in the structure of A compared to the acidic pigments, which would indicate a fundamental difference in the linkages of the moieties in the two types of pigments.

#### Literature Cited

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