CDS solutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Four-Step Analysis of Smokeless Tobacco

Tobacco has been studied extensively using analytical pyrolysis, frequently from the standpoint of identifying specific compounds in the smoke. Whether or not the tobacco product is intended to be smoked, however, significant information may be obtained using a series of thermal sampling steps. The tobacco shown here is a flavored, smokeless product, flavored with wintergreen.

At 100°C, two of the principal components may already be seen, as shown in Figure 1. Nicotine, naturally present, and methyl salicylate, wintergreen flavoring, an additive, are readily apparant. In addition, vitamin E, a natural product of tobacco, is also seen.

At 200°C, acetic acid and propylene glycol are detected. At this temperature, the tobacco begins to degrade, and pyrolysis products may be seen. At 300°, degradationproducts of cellulose become significant, including furans and levoglucosan.

There are several advantages in performing multiple thermal steps in this analysis. Some of the minor constituents (like the vitamin E) would be difficult to identify if a single pyrolysis run, producing all the products at once, were done instead. This approach also makes it clear that the nicotine is actually quite volatile and, even when tobacco is smoke, is not a pyrolysis product, but simply volatilized. Additives, such as menthol, methyl salicylate, propylene glycol and glycerine, may also be determined easily, apart from the products generated when Tobacco is pyrolyzed.

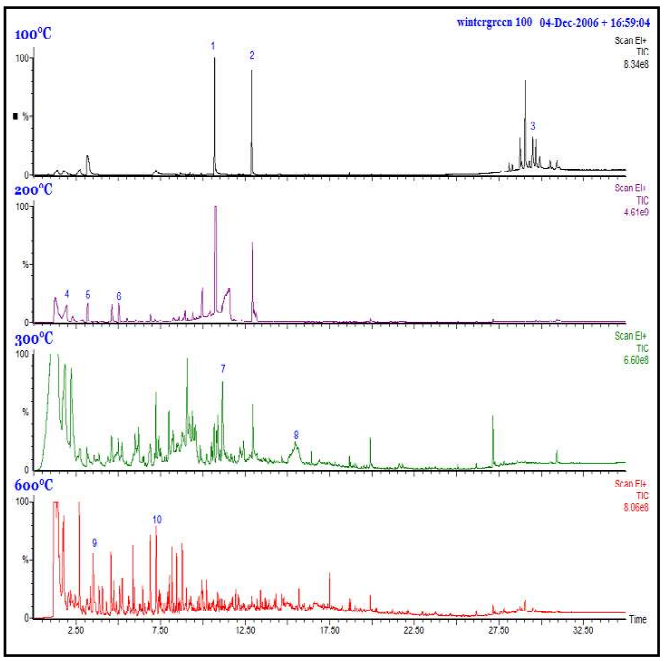

Figure 1. Analysis of wintergreen flavored smokeless tobacco at 100, 200, 300 and 600°C.

Table I Peak Identification

1. Methyl salicylate
2. Nicotine
3. Vitamin E
4. Acetic acid
5. Propylene glycol
6. 2-Furanmethanol
7. Hydroxymethyl furancarboxaldehyde
8. Levoglucosan
9. Toluene
10. Phenol

Equipment

The tobacco sample was analyzed directly from the container, using a CDS Model 5200 Pyroprobe, interfaced to a Clarus 500 gas chromatograph/mass spectrometer.

Model 5200 Conditions

Valve Oven:	300°C
Transfer Line:	325°C
Temperature:	As indicated
Time:	15 seconds

The 5200 was used in the direct pyrolysis mode, without trapping.

GC Conditions

Carrier:	Helium
Column:	Rxi-5ms (30m X 0.25mm)
Detector:	Clarus 500 MS

GC Program:

Initial:	40°C for 2 minutes
Ramp:	10°C/min.
Final:	300°C

FOR MORE INFORMATION CONCERNING THIS APPLICATION, WE RECOMMEND THE FOLLOWING READING:

E. B. Sanders, et al., A model that distinguishes the pyrolysis of D-glucose, D-fructose, and sucrose from that of cellulose. Application to the understanding of cigarette smoke formation, J. Anal. Appl. Pyrolysis, 66 (2002) 29-50.

Additional literature on this and related applications may be obtained by contacting your local CDS Analytical representative, or directly from CDS at the address below.

CDS Analytical, Inc. 465 Limestone Road, P.O. Box 277, Oxford, PA USA 19363-0277 PH: 610 932 3636 FX: 610 932 4158