
IS THERE PENTOBARBITAL IN TOBACCO?

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Background – 1

- In July 2006, *Science Direct* published a note stating that an article entitled, “Pentobarbital in tobacco,” had been accepted for publication in *Food and Chemical Toxicology**
- Since this was an unexpected finding, we contacted the lead author, Dr. Jakub J. Jabłoński, Department of Toxicology, Medical University of Białystok, Białystok, Poland, and requested a copy of abstract or full article

* Jabłoński J, Jabłońska E, Moniuszko-Jakoniuk J., *Food Chem. Toxicol.* 2006 Nov;44(11):1948-51
Epub 2006 Jul 18

Background – 2

- Dr. Jabłoński provided us with a copy of the manuscript, and the abstract stated:
 - Pentobarbital concentrations in tobacco amounted to 3 – 6 μg /cigarette, and in tobacco smoke they were approximately 45% lower
 - In case of tobacco extracts it can with high probability be excluded that pentobarbital is synthesized during chromatographical analysis
 - The presence of pentobarbital in tobacco is thus beyond question
- If Jabłoński were correct, why had others not found pentobarbital in tobacco and smoke?

Background – 3

- We conducted a thorough review of the literature with special attention to reports that described in depth analyses of tobacco and tobacco smoke
- We spoke with some trusted colleagues
- We contacted Dr. Jabłoński and expressed our concerns
- We waited to see what would happen after the article appeared in November 2006 issue of *Food and Chemical Toxicology*

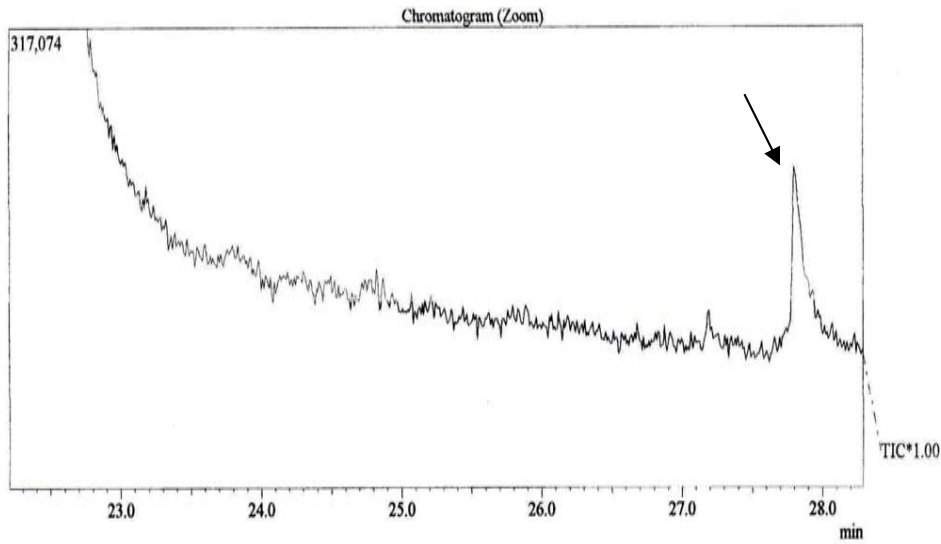
Nothing happened for weeks and months

- So we decided to take action
 - We do not have laboratory facilities so we found an enthusiastic partner with a laboratory and a GC/MS instrument, accessories, etc.
 - Dr. Brian E. Rood, Associate Professor, Environmental and Analytical Chemistry, Department of Chemistry, Mercer University, Macon, GA
 - Shimadzu GCMS-QP5000 with DB-5, 30 m x 0.25 mm ID x 0.25 μ m film thickness capillary column
 - And got some standard and samples
 - Restek #34036 1,000 μ g/mL pentobarbital in methanol
 - Tobaccos from US menthol and nonmenthol cigarettes
 - 1S2 Reference dry snuff

We started with Jabłoński's procedure

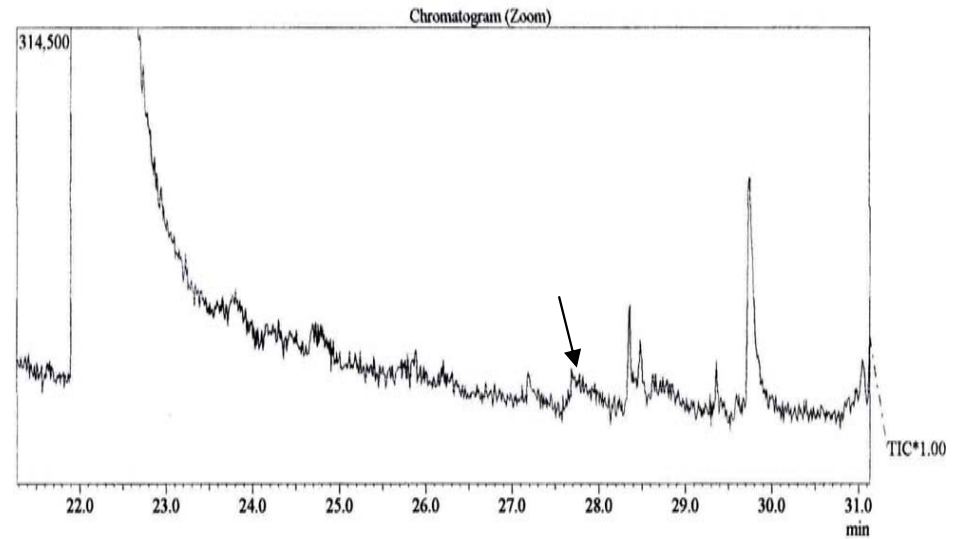
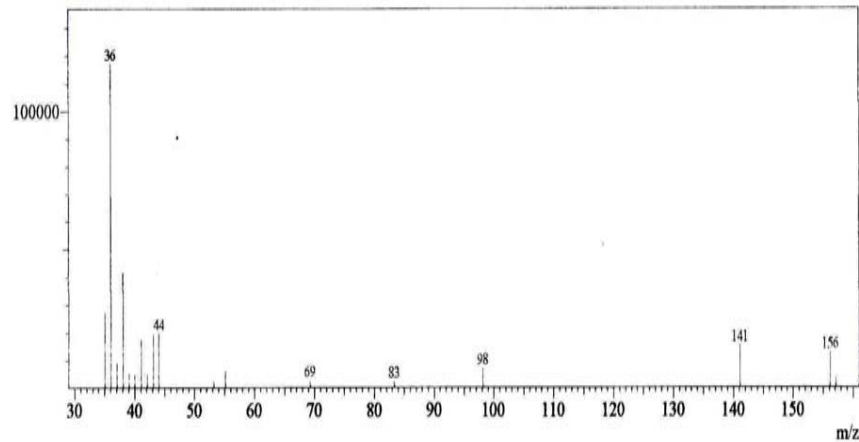
- Tobacco samples (0.5 g) were extracted with solvent (10 mL) for 40 minutes
 - Jabłoński used chloroform (CHCl_3)
 - We used several solvents in addition to CHCl_3
 - Methanol
 - Dichloromethane
 - Acetonitrile
 - We also used solvents spiked with 5, 10 and 20 ppm pentobarbital
- Jabłoński used SPE to filter extracts
 - Bakerbond cartridges
 - Concentrated extracts to 1 mL for analysis
 - We did not use SPE and concentration

Here is what we found – 1S2 dry snuff



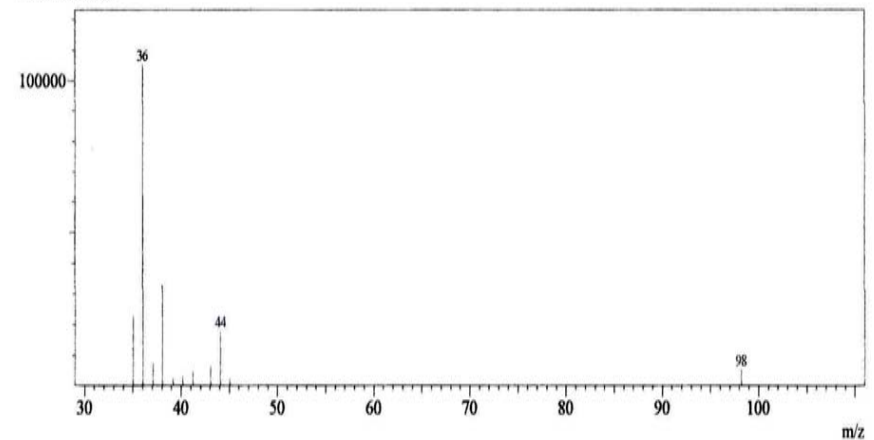
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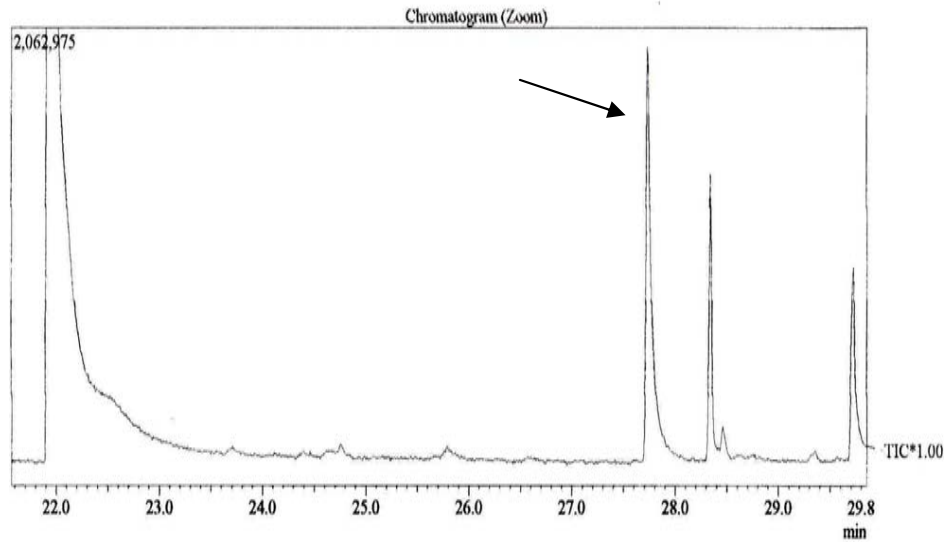


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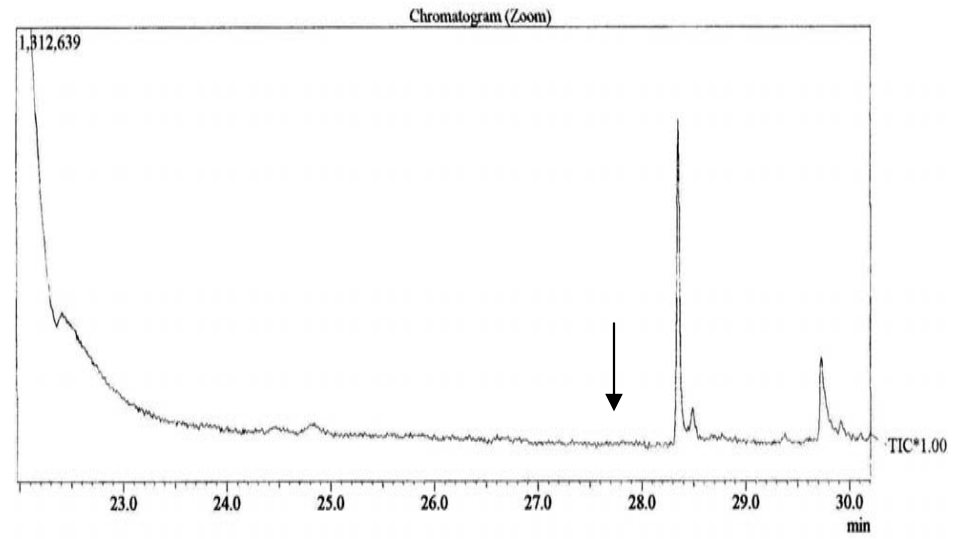
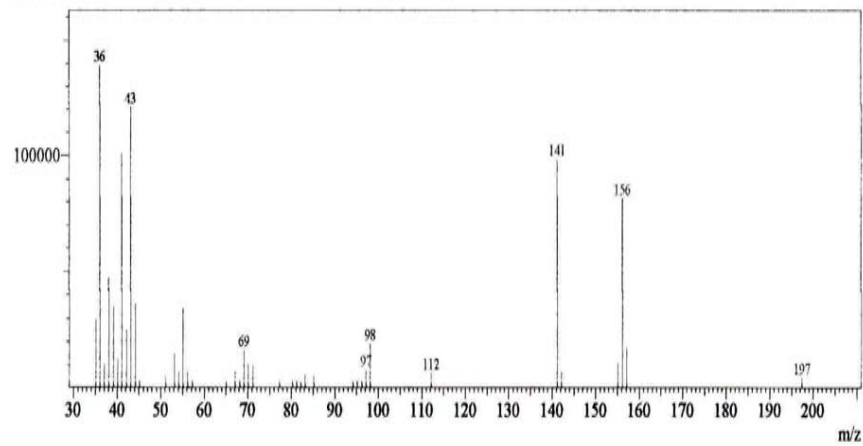


Here is what we found – US tobacco blend



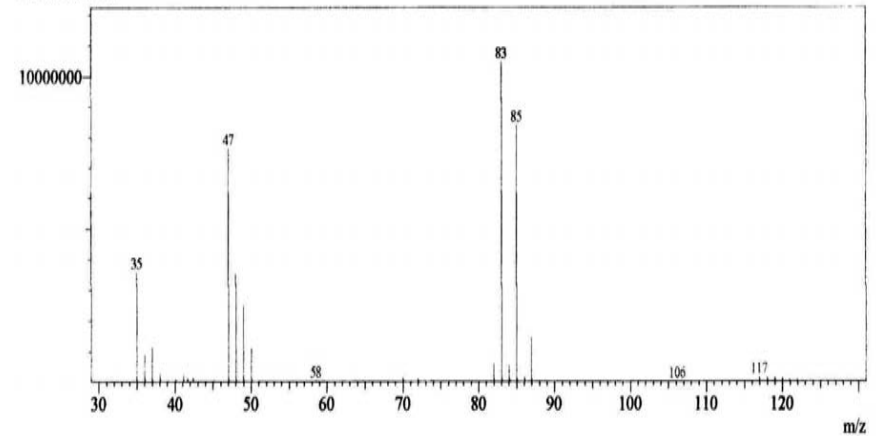
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We also found the same thing with

- The other samples we analyzed
 - 1S2 and extractions with methanol, dichloromethane, and acetonitrile
 - US nonmenthol cigarette tobacco blend and extractions with methanol, dichloromethane, and acetonitrile
 - US menthol cigarette tobacco blend and extraction with chloroform
- Thus, under the conditions of our analyses, we did not find detectable amounts of pentobarbital

Why didn't we find pentobarbital

- We do not believe there is pentobarbital in tobacco
- We suspect that the one or more of the systems used in Jabłoński's laboratory were contaminated with pentobarbital
 - Jabłoński's laboratory likely had been doing toxicological analyses with pentobarbital
 - We know from our own experiences and experiences of others that the GC/MS systems can be contaminated by analytes from other samples

Next steps and conclusion

- We plan on analyzing other samples and submitting a manuscript describing our analytical work and findings to *Food and Chemical Toxicology*
- We believe that we have provided reasonable evidence that Jabłoński's findings were incorrect and that tobacco and tobacco products do not contain pentobarbital