



# Addressing the TBA odor issue

Roger J. Bleiler, Ph. D.  
Senior Scientist  
Microanalytics



## What are TBP and TBA?

- 2,4,6-tribromophenol (TBP), a halophenol
- 2,4,6-tribromoanisole (TBA), a haloanisole
- 2,4,6-TBP used as fungicide, flame retardant, wood preservative and antiseptic
- Is it banned?

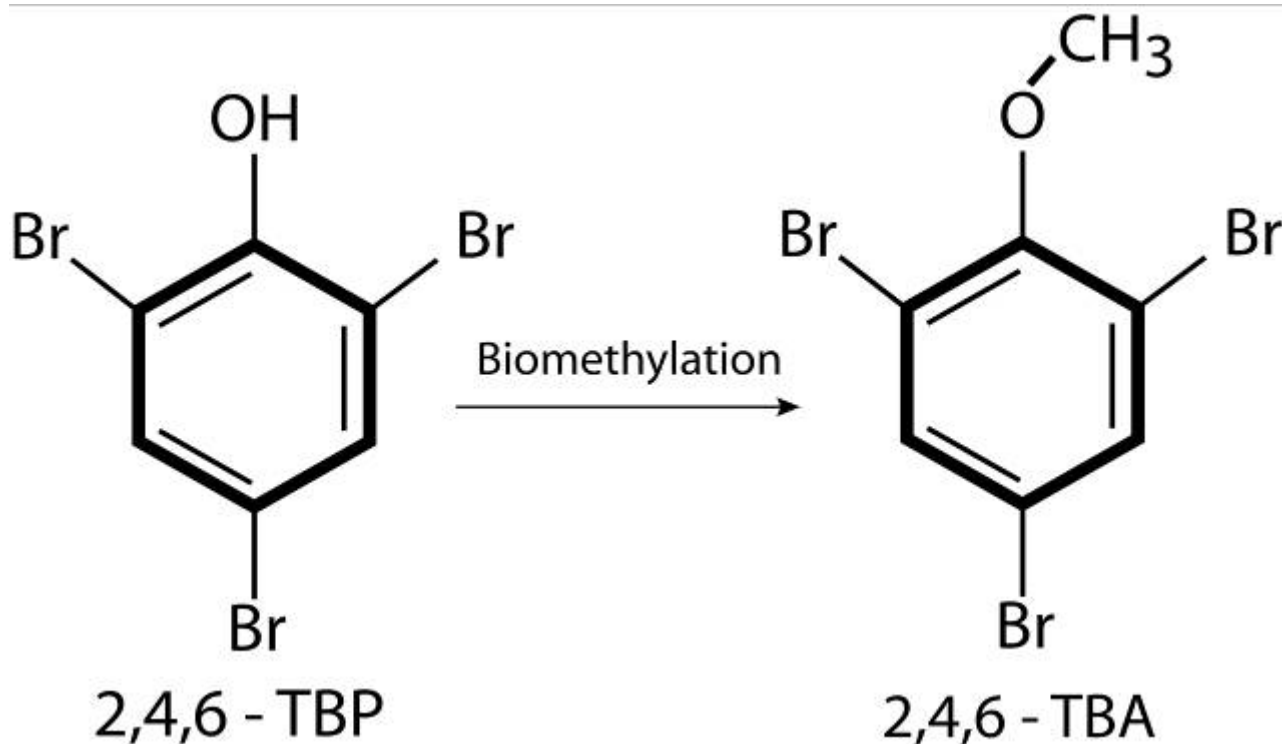


# The Chemistry

- TBA, TBP belong to halocompounds class
- Halophenols precursors for Haloanisoles
- By-products of microbial metabolism
- Halophenolic compounds found in many areas of manufacturing and shipping



# Structure and Reaction





# Contamination

- Can be instantaneous
- From source or from the air
- One source is all it takes
- Warehousing, shipping, retail, all at risk





# Financial Impact

- Major pharmaceutical product recall
- Manufacturer of surgical gowns
- Bottled water absorbed the musty odor, rendering it unusable
- Growing interest in understanding the issue



# Migration

- Corrugated shipping cases
- Primary plastic bottles, jars, packaging
- Products
- Entire physical structures
- Truck trailers, shipping containers

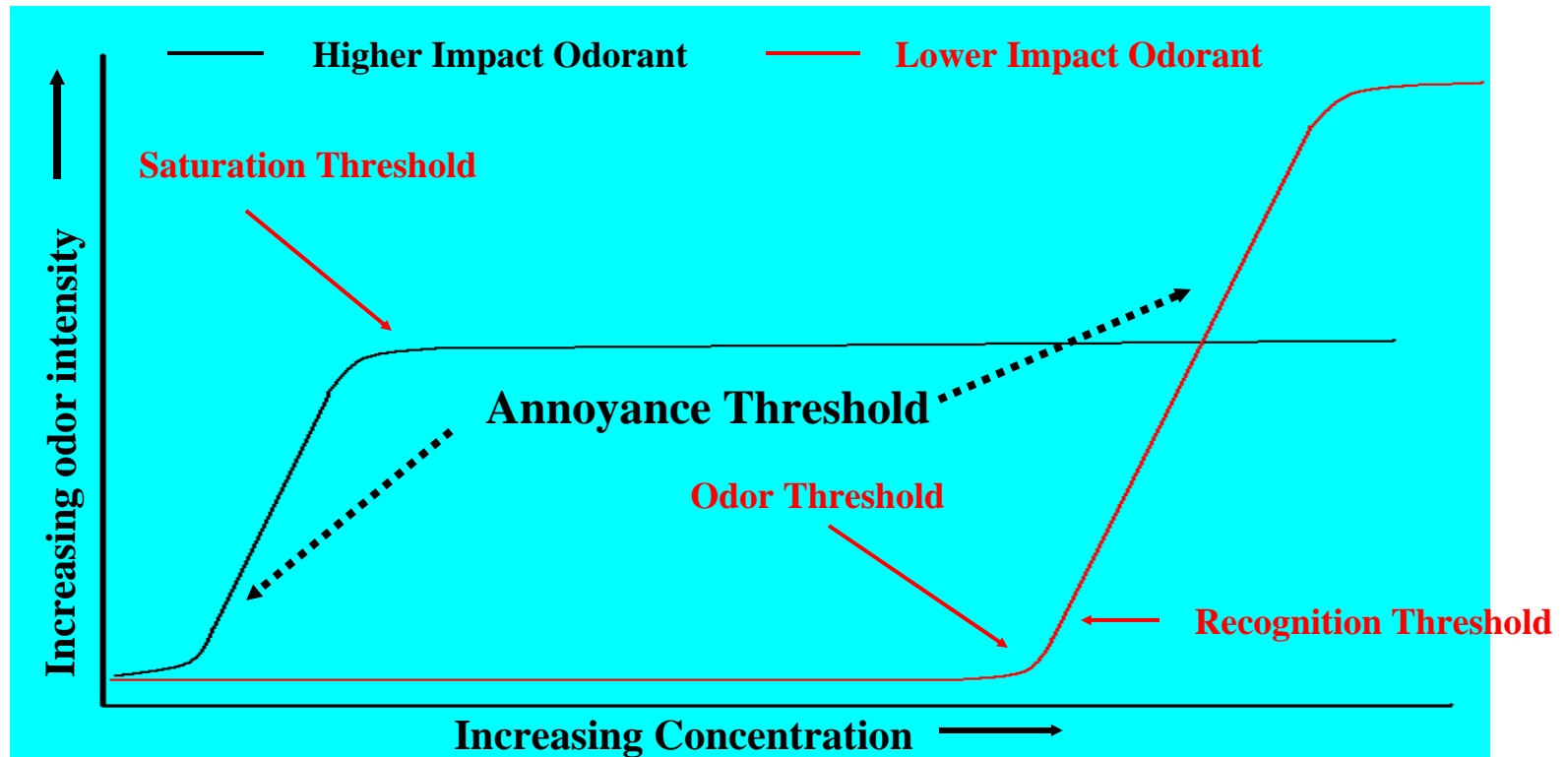




# Detection

May not be detected immediately in warehouse

## Representative Odor Threshold Curves





# Odor Threshold Values

- Low Impact Odorant – Isopropyl Alcohol  
30 parts per million
- High Impact Odorant – TriBromoAnisole  
~ 30 parts per quadrillion
- Ratio =  $10^9$



# Time frame for detection

- Preliminary olfactory detection
- Verification





# Verification

- Collection of samples





# Verification

- Collection of samples
- Sample preparation





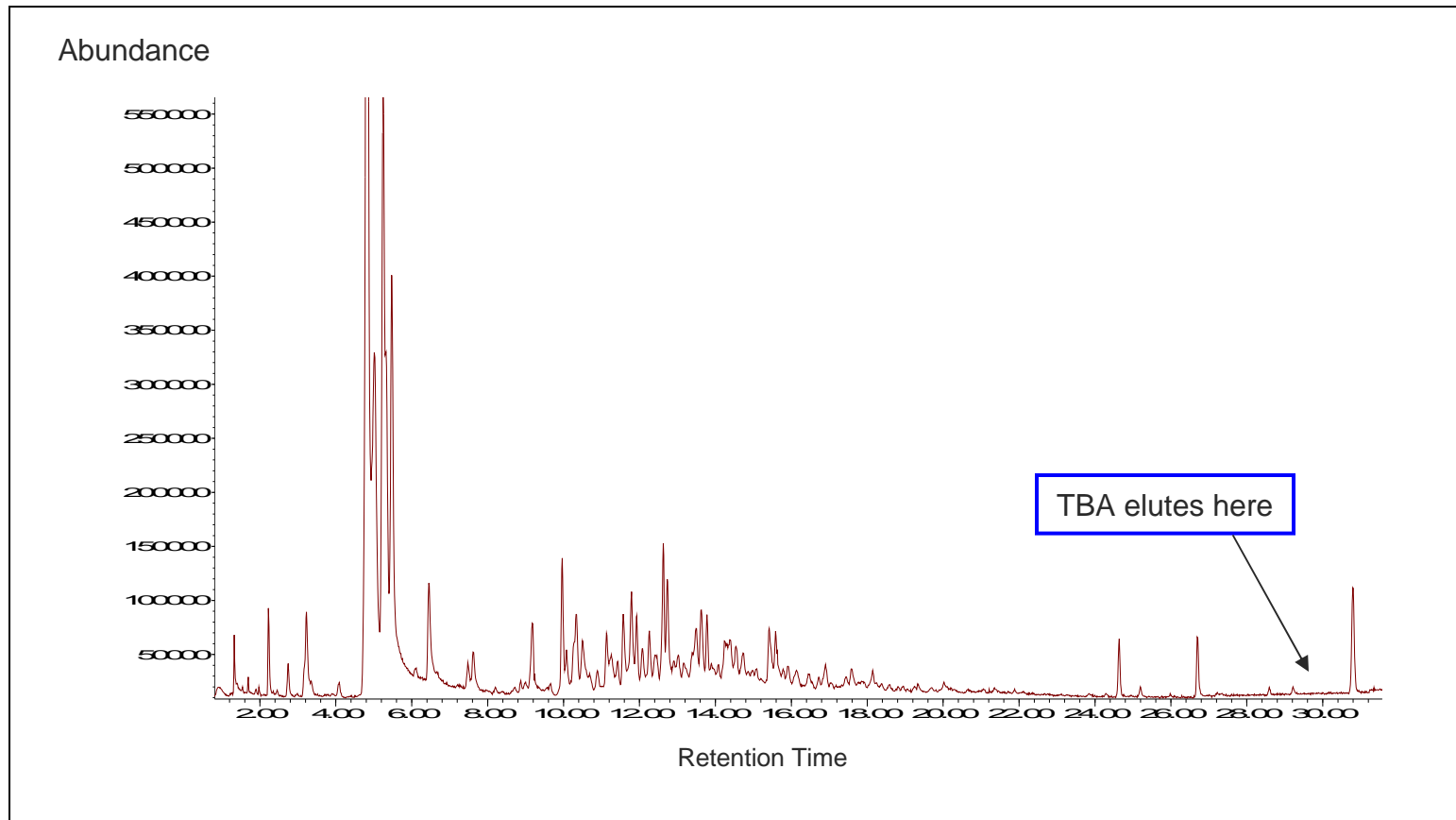
# Verification

- The advantage of AromaTrax Instrument



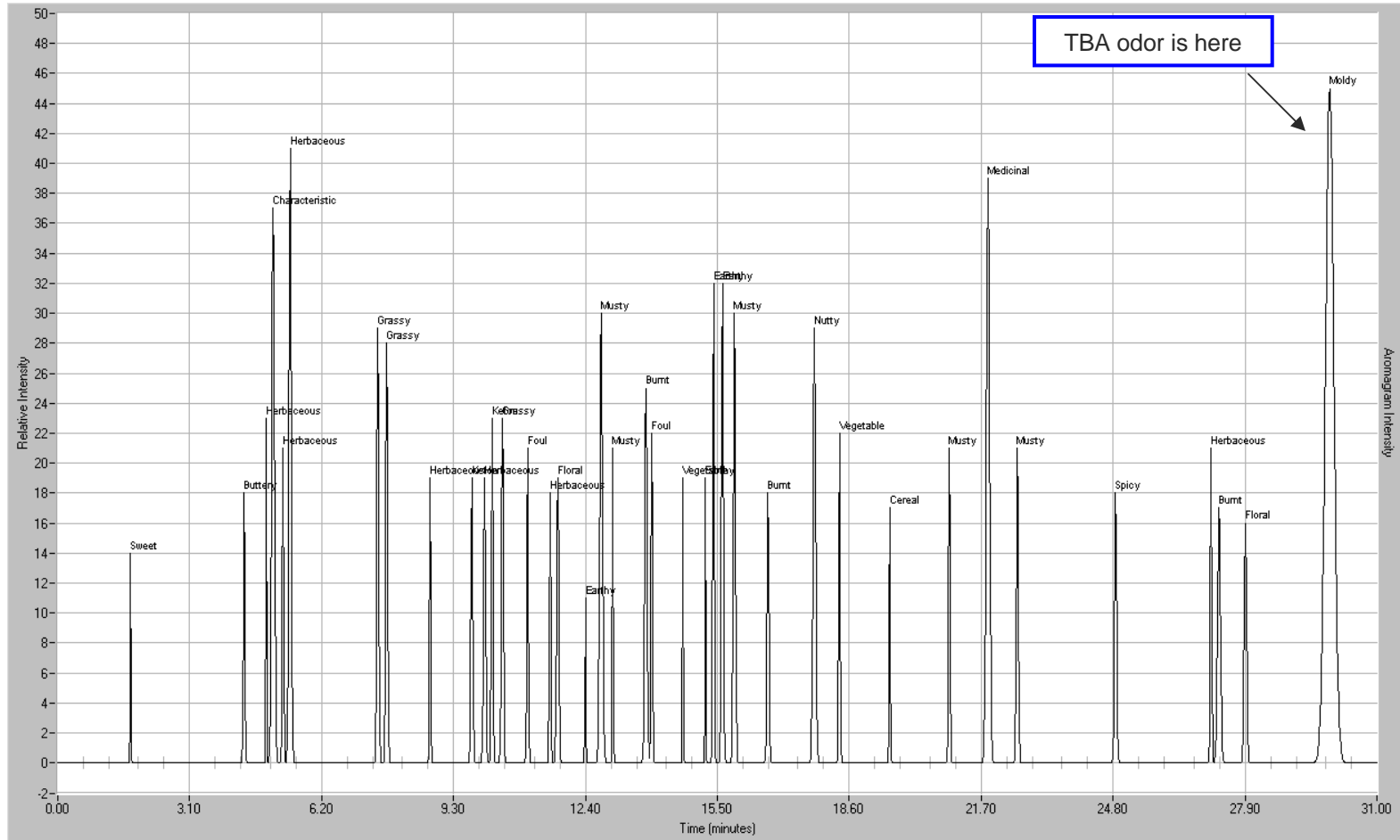


# TBA Contaminated Sample MDGC-MS TIC



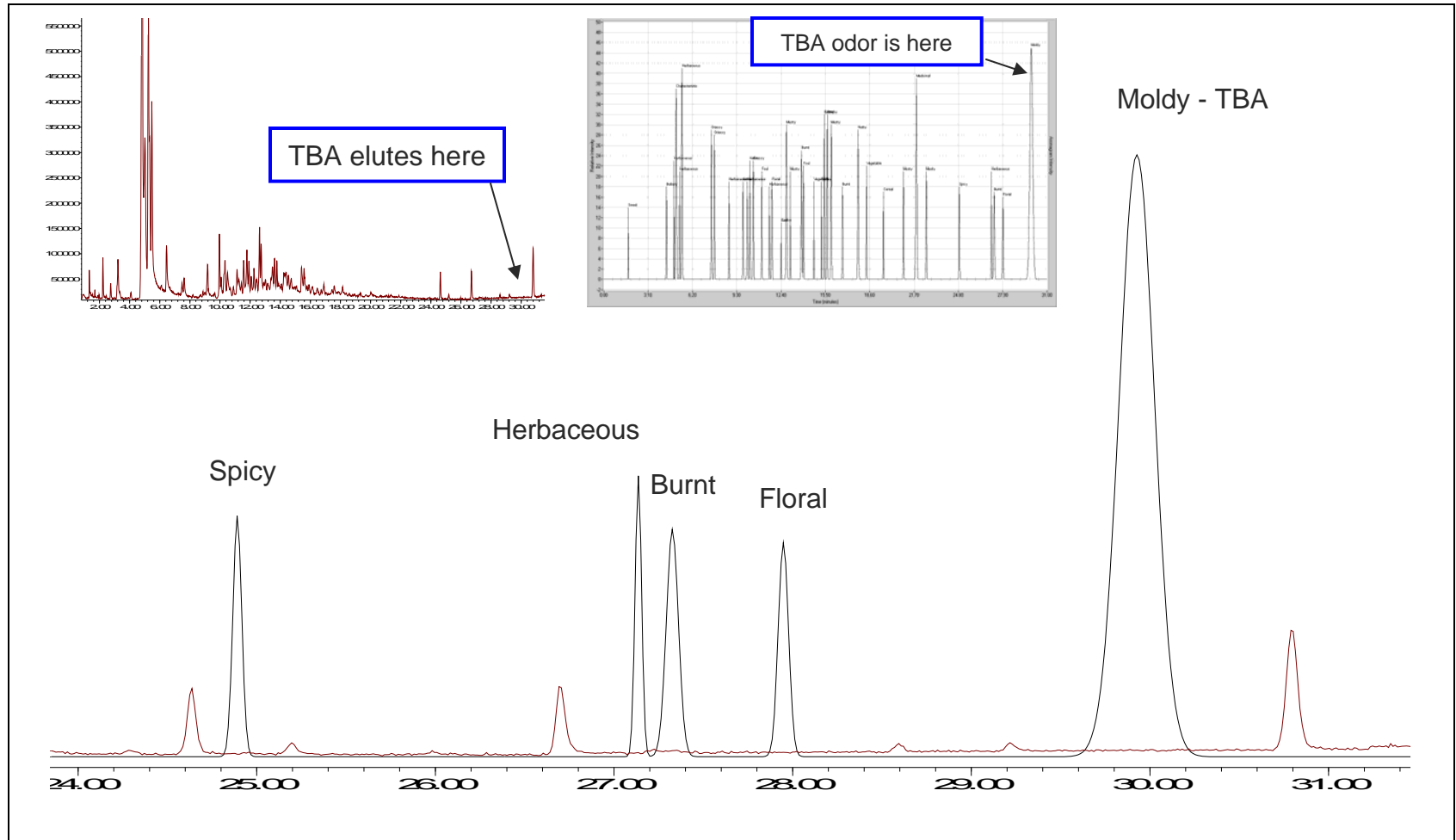


# Multi Sensory Detection - Aromagram





# Finding the match





# Summary

- Standard chromatography is not enough
- Identify the compound
- Identify extent of contamination and the source(s)
- Establish protocols
- Clean up and decontamination
- On going QC procedures and verification



# Questions?

Email [webinars@mocon.com](mailto:webinars@mocon.com)  
for further questions or a copy  
of today's seminar.



# Upcoming Seminars

## Permeation Basics & the India Lab (International Series)

Wednesday, April 21st  
9:00pm CDT

## ASTM F2097 Choosing Test Methods for Medical Packaging

Wednesday, May 12th  
10:00am CDT

Go to [www.mocon.com](http://www.mocon.com) to register