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Application News

GC-MS GCMS-QP™2020 NX

Monitoring Indoor Air Refresher by HS-GC/MS

Y. Nakagawa

User Benefits

- Air refresher vs time lapse is easily monitored
- Chemicals other than target compounds are also captured and monitored
- A personal exposure is measured to ensure the safety of the product

■ Introduction

Indoor insect repellents, antifungal agents, air refreshers and moisture adsorbents have become household essentials. Among the most popular products is a hanger type that reportedly remains effective for weeks and months. With the popularity also comes a safety concern as consumers are exposed to chemicals emitted from such a product over an extended period.

In this application, a hanger type air refresher was monitored over three consecutive days. Emitted chemicals were analyzed each day at 0, 1, and 2 meter points from the product. An exposure level was also measured by attaching a passive sampler to a volunteer and letting the subject stay in the room for 8 hours.

Fig. 1 Hanger Type Air Refresher

■ Materials and Methods

A hanger air refresher was purchased from a drug store and placed in a well-ventilated room.

Radiello RAD147 (Restek, P/N: RAD147) was used as a passive sampler in this experiment. This passive sampler was placed at 0, 1 and 2 meters away from the air refresher. Over the three consecutive days, the samplers at each distance were separately measured after a 15 hours collection time to monitor daily chemical fluctuations. The samplers were replaced each day to start collecting chemicals for the following day.

Once the collection period has passed, each sampler was placed in a 20 mL HS vial and the collected chemicals were thermally desorbed and analyzed by HS-20 Trap and GCMS-QP-2020 NX.

Fig. 2 GCMS-QP™2020 NX Connected to HS-20 (Left) and Radiello (Right)

Table 1 Instrument Configurations

GC-MS	: GCMS-QP2020 NX
Headspace	: HS-20 Trap
Analytical Column	: SH-624 (60 m × 0.32 mm I.D., df=1.8 µm) *1

*1 P/N: 221-75864-60

Table 2 Analytical Conditions

HS	
Oven Temp.	: 180 °C
Sample Line Temp.	: 200 °C
Transfer Line Temp.	: 200 °C
Trap Cooling Temp.	: 25 °C
Trap Desorb Temp.	: 260 °C
Pressurizing Gas	: 150 kPa (Helium)
Equilibrating Time	: 30 mins
Multi Injection Count	: 3
GC	
Injection Mode	: Split
Split Ratio	: 10
Carrier Gas	: Helium
Control Mode	: Constant linear velocity (34.3 cm/s)
Column Oven Temp.	: 100 °C (1 min) → (10 °C /min) → 240 °C (10 mins) Total 25.00 mins
MS	
Ion Source Temp.	: 200 °C
Interface Temp.	: 240 °C
Measurement Mode	: Scan
Scan Range (*m/z*)	: 35-800
Event Time	: 0.30 seconds

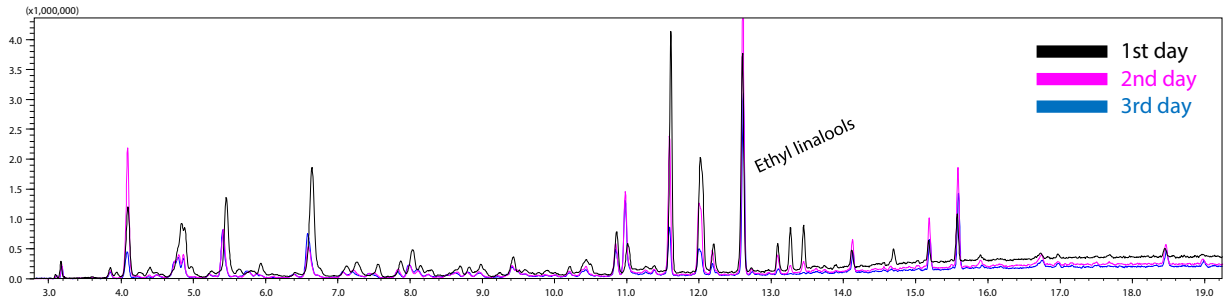

Fig. 3 Chemical Profiling by Day (at 0 m Point)

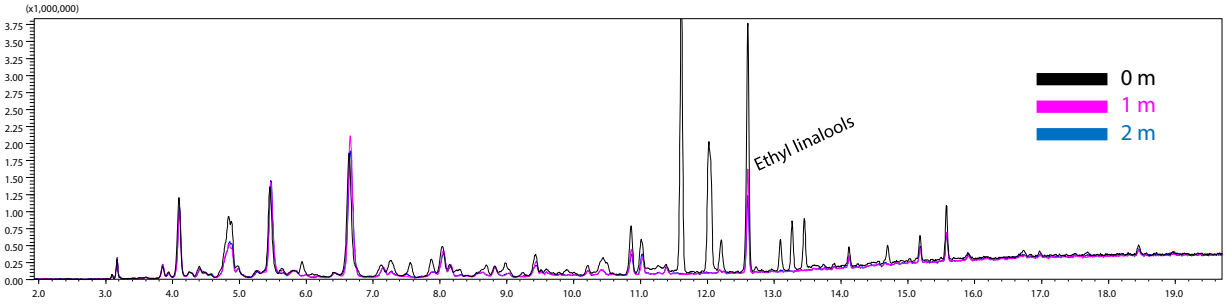

Fig. 4 Chemical Profiling by Distance (on the First Day)

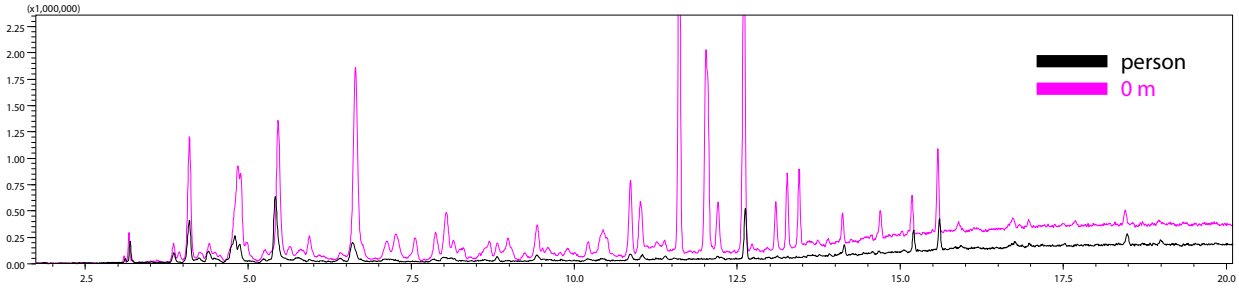

Fig. 5 Exposure to a Volunteer

■ Results

Fig. 3 and 4 are overlaid chromatograms and display chemical profiling changes by day and distance.

Some compounds decreased over the 3 days period while others increased over the same period. Ethyl linalools eluting at around 13-14 mins were sources of floral odor and noticeably decreased in response over the 2 m distance.

■ Exposure Level

Exposure to a person was also measured and a chromatogram was obtained (Fig. 5, 6). It was found that the volunteer subject was far less exposed to chemicals than what the results from the fixed samplers had suggested.

Fig. 6 Radiello on a Personnel

■ Conclusion

A floral fragrance air refresher product was analyzed by HS-20 Trap and GCMS-QP2020 NX. Radiello (Restek, P/N: RAD 147) was used as a passive sampler.

It was found that some compounds are more affected by distance than by day and others vice versa.

HS-20 and GCMS-QP2020 NX are thus considered an excellent tool in ensuring the product efficiency and safety.

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