



HARRPA Common Technical Committee

Odor Assessment
Sensory panel
GC, GC-MS, GC- MS Olfactometry Test methods



HARRPA

Hydrocarbon Resins, Rosin Resins and Pine Chemicals
Producers Association



cefic



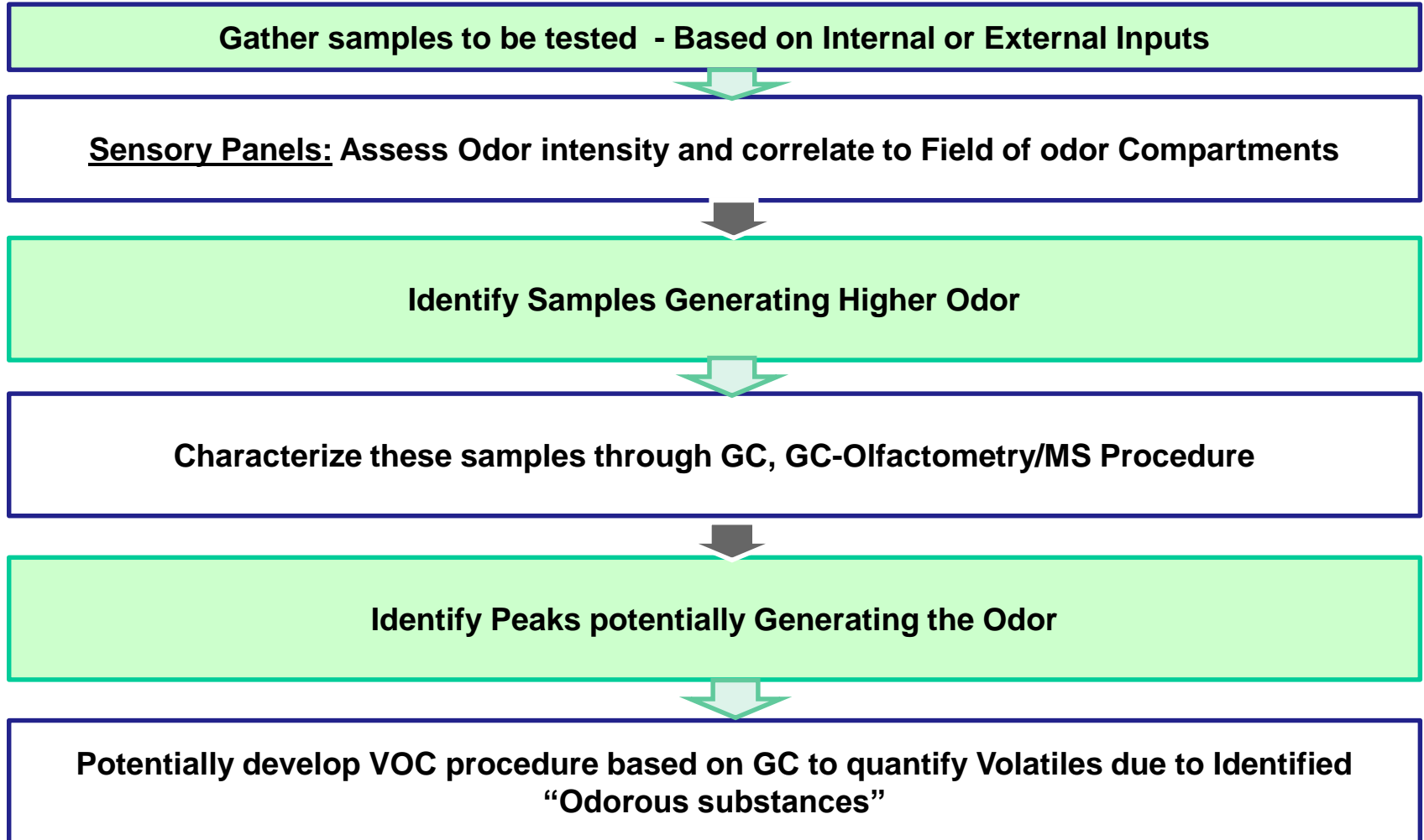


Odor Sensitivity Background

HARRPA members are producers of hydrocarbon, rosin and terpene resins.

- **These resins represent a distinct class of amorphous products being characterized by:**
 - High Tg in relation to their molecular weight.
- **Several end uses of resins are odor sensitive**
 - Resins can be linked with specific odor depending on raw material - processing and finishing parameters used during all production – application cycle.
- **Odor perception is subjective, meaning that:**
 - Odor quantitative and qualitative analysis are both important
- **Several options exist to perform quantitative and qualitative analysis**
- **This overview can help to identify the proper grades depending on the final end uses.**

Typical Procedure to Assess Odor Intensity and Identify Odor Source



Odor assessment process



1st step:

Sensory panel:

- *Nose cannot be replaced by Analysis test method*
- Sensory panel effective to classify multiple samples based on Human sense:
 - Odor intensity:
 - intensity is the major reliable characteristic since “quality” depends from individual to individual
 - Field of odor: (see slide 4)

2nd step:

GC, GC – MS, GC – MS Olfactometry procedures:

- GC, GC-MS: Allows identification of high intensity peaks
- GC-MS Olfactometry: Allows to link GC-MS peaks with odor intensity

VOC procedures:

- **When “Odorous substances” identified, based on specific procedures detailed in previous slides:**
 - Of interest to develop specific VOC test methods to quantify these “Odorous substances”

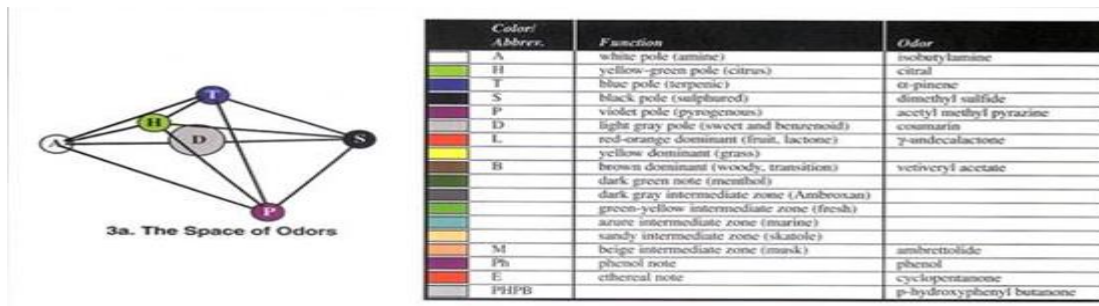


Sensory Panel

Panel to be composed of trained personnel ensuring:

- Assessment repeatability
- Low Standard deviation between assessment of various assessors.
- Avoid bias based on different sensitivity: Results should not necessarily “qualified” as negative, positive or neutral.
- *No standardized test method is available*

Results are linked to global odor intensity and intensity related to different poles of the Space of odors



Different poles of the space of odors are extracted from the following presentation:
The field of odors: Towards a universal language for odor relationship by Jean Noel Aubert, Le Havre University

GC, GC-MS, GC-MS Olfactometry procedure

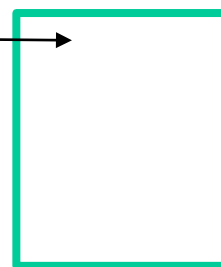
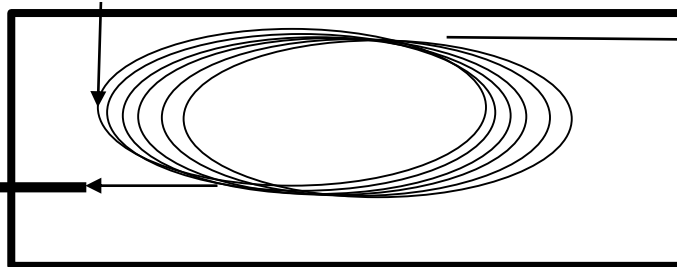


Characterize identified samples through GC, GC-MS, GC-MS Olfactometry Procedure



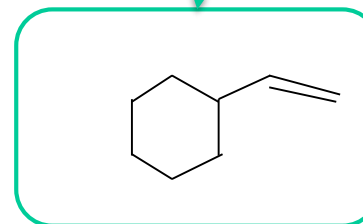
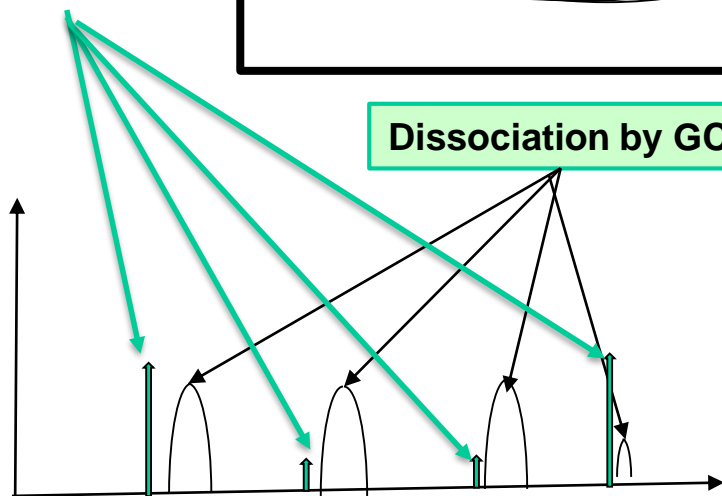
Gas Chromatography-Olfactometry/Mass Spectrometry:

Olfactometry
evaluation



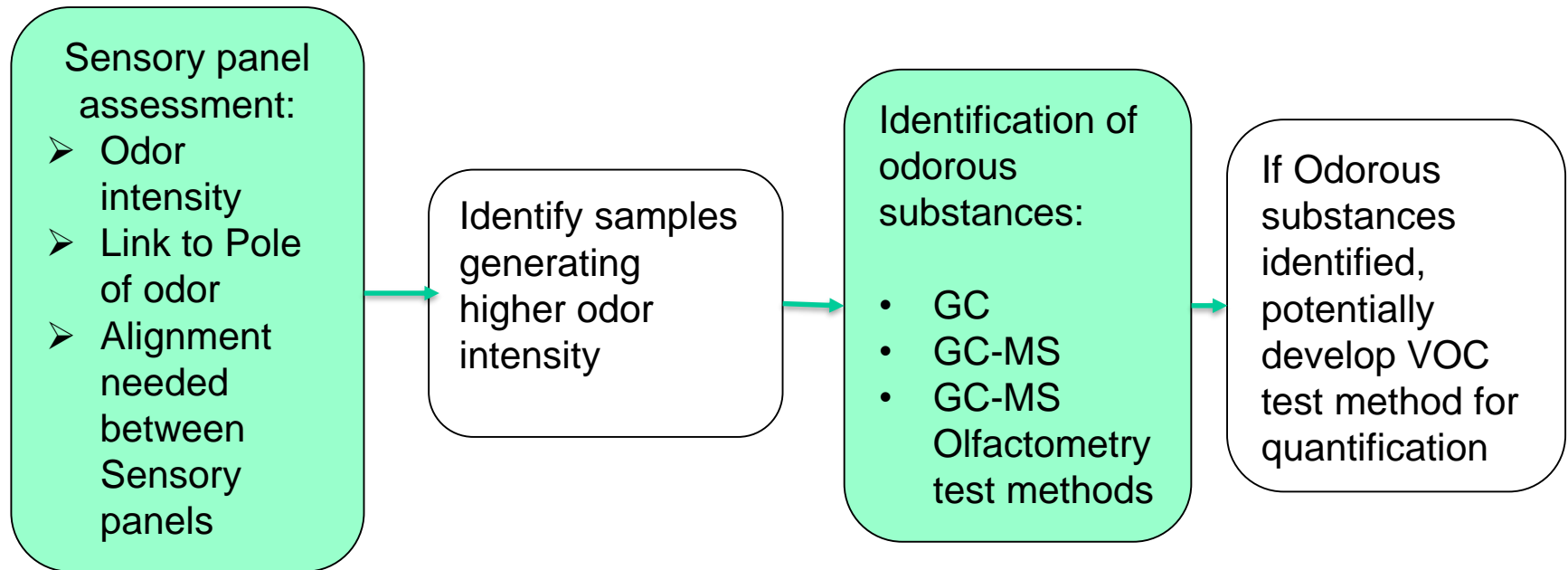
Dissociation by GC

Identification by MS



Identify Peaks potentially / probably generating the odor

Odor assessment Flow Chart



GC-MS Olfactometry Procedure

Safety – Reproducibility Recommendations



SAFETY:

-GC-MS Olfactometry procedure should not be conducted on substances of unknown composition.

-Safety datasheet of Product to be tested must be available and reviewed before launching testing procedure.

-To prevent Nose irritating → gentle moisture – humidified air stream of interest in the proximity of the sniffing port.

-Short sniffing procedure duration recommended (<25 minutes)

-Replaceable cone should be regularly cleaned and assigned to individual operator.

REPRODUCIBILITY:

-Perceived intensity might be affected by long continuous sniffing - Short sniffing procedure duration is recommended (see above)

-GC-MS Olfactometry procedure should be performed in a room with positive air handling system to prevent and eliminate odor (temperature and pressure control)

-Assessors recommended to avoid using hygiene odorous products (perfume, deodorant for ex,..) before GC-MS Olfactometry testing procedure.

Outside Laboratory: Odor assessment



Olfasense:

<https://www.olfasense.com/>

Odournet:

<https://www.odournet.com/>

Fraunhofer

<https://www.ivv.fraunhofer.de/en/product-performance/odor-optimization.html>

<https://www.fraunhofer.de/en/press/research-news/2017/september/the-scent-of-adhesives.html>

CERTECH:

<https://www.certech.be/en/>

AVOMEEN:

<https://www.avomeen.com/scientific-applications/product-testing-laboratory/scientific-applications-materials-testing-off-gas-testing-laboratory/>

ODOTECH:

<http://www.odotech.com/en/about-odotech/>

+ Significant number of other laboratories located worldwide