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Utilizing Portable Olfactive Devices with ASTM standards to evaluate product performance on Odor Elimination

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Background

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- Consumers confront stinky situations throughout their daily lives and will often make purchase choices about personal and home care hygiene products based on their ability to reduce or eliminate odors
- Testing the malodor counteractive performance of consumer products against difficult malodors often creates a lot of stink in a facility and can potentially contaminate a facilities' HVAC system
- For some product categories, there isn't a method to evaluate performance with consistency and without cross-contamination



Research Objectives:

1. Obtain product performance of a disinfectant and fabric refresher spray for the ability to reduce or eliminate the perception of cigarette smoke contaminated fabric from a Portable Olfactive Device (POD)
2. Provide product development guidance

Research Methodology

Sample Description:

- N=50 per test
- Female head of household
- 18-55, Primary shopper
- Currently use air fresheners to eliminate odors
- Pass industry screen
- Free of olfactory impairments and allergies to fragrances
- Exclude respondents who have anosmia, are pregnant or nursing or smoke

Methodology:

Comparison to Reference design

- A direct assessment of the malodor intensity of a reference POD is compared to that of the test PODs
- 4 PODs are used (Reference & 3 Test PODs)
  - Reference (Malodor)
  - Malodor only
  - Malodor & Test Product
  - Test Product only



Olfactive Evaluation:

- Consumers were allowed to sniff for as long as they needed to form an opinion
- They were allowed to sniff again as needed to complete the survey
- Samples were randomized within cell to address carry-over and position effects

Survey Instrument:

- Portable Olfactive Devices (PODs)
- 15 pt. bipolar scale with descriptors at the mid-point and at each end . The scale did not have number values visible to the respondents

POD Criteria:

- Central location 1 Room with 4 PODs
- Testing 2 aerosol disinfectants against cigarette smoke malodor (on cloth)
- ASTM malodor reduction & elimination protocol
- Inoculate cloth in a smoke chamber
- Malodor is applied to a 13" x 13" towel though a 15 second exposure to smoke in a confined chamber
- Inoculated cloth is transferred to the PODs at designated air exchange and calibrated for 10 minutes
- Consumers sniffed from the POD
- The POD was refreshed every 90 minutes to ensure a consistent aroma experience

Study Design

Treatment of Samples:

- 2 PODs treated with 4g aerosol disinfectant Product A; 1 is also treated with malodour
- 2 PODs treated with malodor only (1 to be used as a reference for malodor strength)

Scale:

The scale consisted of a bipolar scale with descriptors at the mid-point and at each end. The scale did not have number values visible to the respondents. The respondents checked the box that best reflected their opinion as to the strength of the malodor in the test POD as compared to that of the reference POD

Much Weaker						Same as Reference						Much Stronger	
-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7

Note: The scale does not have number values visible to the panelists

Smelling of Samples:

- Respondents smell the Reference POD to acclimate to the strength of malodor for comparison
- They then evaluate one of the 3 test PODs and rate the level of malodor in the test POD compared to the level of malodor in the Reference POD
- Respondents then re-smell the Reference POD to re-acclimate to the strength of malodor for comparison before evaluating the next test POD
- This procedure will be repeated until all 3 test POD are evaluated
- The PODs are balanced for order of evaluation and this process is repeated for Product B

ASTM Protocol



Malodor Reference smelled prior to each POD evaluation

Malodor only

Malodor & Test Product

Test Product only

Action Standard

- Significantly lower score for Product & Malodor POD vs. Malodor Only POD shows ***odor reduction***
- Odor reduction **and** no significant difference between Product & Malodor POD and Product Only POD shows ***odor elimination***

Key Research Findings



Malodor & Test Product < **Malodor only**

Malodor & Test Product = **Test Product only**

Reduction **Elimination**

MEAN SCORES	Malodor Only -A-	Product Only -B-	Product & Malodor -C-
Product A	2.72 BC	-2.80	0.76 B
Product B	2.05 BC	-1.73	-1.08

	Malodor vs. Product & Malodor	Product vs. Product & Malodor	
Product A	Significantly Different	Significantly Different	Reduction
Product B	Significantly Different	No Significantly Different	Elimination

Product A displayed odor reduction for smoke malodor by:

- Showing a significant difference between Product & Malodor and Malodor only
- Odor elimination was not shown as there was a significant difference between Product & Malodor and Product only

Product B displayed odor elimination for smoke malodor by:

- Showing a significant difference between Product & Malodor and Malodor only
- Showing no significant difference between Product & Malodor and Product only

Statistical Analysis Performed:

- An Analysis of Variance (ANOVA) statistical analysis of the intensity scores from the: 1/ Malodor only POD and Product & Malodor POD 2/ Product & Malodor POD and Product only POD
- A Least Significant Difference (LSD) calculated at 95% confidence

Implications



Goal 1: *Obtain product performance of a disinfectant and fabric refresher spray for its ability to reduce **or** eliminate the perception of cigarette smoke contaminated fabric from a POD*

Implications: ASTM survey questions elicit meaningful evaluation results when malodor is contained by the POD

PODs are a viable alternative for malodor testing, providing consistency and no cross-contamination of evaluation space

The PODs reduced extraneous variables that can occur in-home

Goal 2: *Provide product development guidance*

Implications: Performance was differentiated, providing functional product developmental guidance