Sensory Training Kits

NEW!
BARREL AGED
SENSORY KITS
AVAILABLE

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STEVENS INSTITUTE OF TECHNOLOGY
1870

1 SENSORY KIT INTRODUCTION

The Siebel Institute Sensory Training Kits are shipped in ready-to-use liquid form, making them as easy to use as possible.
Each kit is designed to help tasters build their skills towards understanding beer flavor at a truly professional level.
While breweries with established tasting panel structures will find these kits valuable, it can also be used for 'taster calibration' by others with an interest in beer including:

- Breweries training new and existing staff to spot beer defects more effectively
- Brewers guilds looking to add value to their regularly-scheduled meetings
- Homebrew groups and beer judges looking to sharpen judging and flavor recognition skills
- Distributors, wholesalers and agents who need to be able to 'talk the talk' about beer attributes with beer specialty retailers

2 FLAVOR DESCRIPTIONS

1	**Acetaldehyde** Green apple, cut grass	Common sources: Fermentation product, staling or contamination	Concentration: 45 mg/L	Threshold in beer: 10-20 mg/L
2	**Acetic acid** Vinegar-like	Common sources: Contamination (mash, bacteria or wild yeast)	Concentration: 360 mg/L	Threshold in beer: 60-120 mg/L
3	**Almond** (Benzaldehyde) Marzipan, Almonds	Common sources: Specific styles (Including Barrel Aging) yeast growth or raw materials	Concentration: 3.0 mg/L	Threshold in beer: 1.0 mg/L
4	**Bitter** (Isolone) Hoppy, bitter	Common sources: Hopping, hop addition	Concentration: 24 mg/L	Threshold in beer: 7-15 mg/L
5	**Butyric acid** Putrid, baby vomit	Common sources: Bacterial contamination	Concentration: 7.5 mg/L	Threshold in beer: 3.0 mg/L
6	**Caprylic acid** Soapy, fatty, candle wax	Common sources: Microbial contamination or yeast breakdown at maturation	Concentration: 31.5 mg/L	Threshold in beer: 5-10 mg/L
7	**Contamination** Sour & buttery	Common sources: Contamination (Lactobacillus)	Concentration: 0.6 mg/L 360 mg/L	Composition: Diacetyl Acetic Acid
8	**D.M.S.** (Dimethyl sulfide) Cooked com or vegetables	Common sources: Wort boil, wort cooling or contamination	Concentration: 200 µg/L	Threshold in beer: 25-50 µg/L

9	**Diacetyl** (2,3-Butanedione) Butter, butterscotch	Common sources: Microbial contamination or improper maturation	Concentration: 0.6 mg/L	Threshold in beer: 0.1-0.2 mg/L
10	**Earthy** (2-Ethyl fenchol) Geosmin, soil-like	Common sources: Packaging or water-derived contamination	Concentration: 15 µg/L	Threshold in beer: 5.0 µg/L
11	**Ethyl acetate** Solvent-like, nail polish remover	Common sources: Wort composition and yeast growth	Concentration: 60 mg/L	Threshold in beer: 20-40 mg/L
12	**Ethyl hexanoate** Aniseed, apple or licorice	Common sources: Fermentation product, wort composition or yeast health	Concentration: 0.6 mg/L	Threshold in beer: 0.2 mg/L
13	**Geraniol** Floral, geranium flowers	Common sources: Hop addition and variety	Concentration: 450 µg/L	Threshold in beer: 100-200 µg/L
14	**Grainy** (Isobutyraldehyde) Husk-like, nut-like	Common sources: Excessive run-off or insufficient wort boil	Concentration: 3.75 mg/L	Threshold in beer: 1.0-2.5 mg/L
15	**Hefeweizen** Spicy & banana	Common sources: Specific beer styles	Concentration: 120 µg/L 4.5 mg/L	Composition: Eugenol Isoamyl acetate
16	**Indole** Farm, barnyard	Common sources: Bacterial infection during fermentation	Concentration: 0.55 mg/L	Threshold in beer: 10-20 µg/L

2 FLAVOR DESCRIPTIONS

17	**Isoamyl acetate** Banana, peardrop	Common sources: Fermentation product, wort composition or yeast health	Concentration: 4.5 mg/L	Threshold in beer: 1.0-1.5 mg/L
18	**Isovaleric acid** Cheesy, old hops, sweaty socks	Common sources: Use of old, degraded hops	Concentration: 3.0 mg/L	Threshold in beer: 1.0mg/L
19	**Lactic acid** Sour, sour milk	Common sources: Beer spoilage bacteria	Concentration: 500 mg/L	Threshold in beer: 140 mg/L
20	**Light-struck** (3-Methyl-2-butene-1-thiol) Skunky, toffee or coffee like	Common sources: Clear or green bottles	Concentration: 90 ng/L	Threshold in beer: 5-30 ng/L
21	**Mercaptan** (Ethanethiol) Sewer-like, drains	Common sources: Poor yeast health, autolysis	Concentration: 3.75 µg/L	Threshold in beer: 1.0 µg/L
22	**Metallic** (Ferrous sulfate) Metal, tin-like, blood	Common sources: Water sources, non-passivated vessels	Concentration: 3.75mg/L	Threshold in beer: 1.0mg/L
23	**Papery** (Trans-2-nonenal) Cardboard, oxidized	Common sources: Product of oxidation, staling	Concentration: 2 µg/L	Threshold in beer: 0.5 µg/L
24	**Spicy** (Eugenol) Cloves, all spice	Common sources: Microbial contamination, wild yeast or aging	Concentration: 120 µg/L	Threshold in beer: 40 µg/L

25	**Vanilla** (Vanillin) Custard powder, vanilla essence	Common sources: Specific styles (barrel aged, common wood flavor)	Concentration: 150 µg/L	Threshold in beer: 40 µg/L
SOLD OUT 26	**Citrus** (Ethyl Isobutyrate) Citrus, Apple, Sweet, Fruity, Pineapple	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 2.45 mg/L	Hop varieties: AU Galaxy, Equinox, Amarillo, Golding
27	**Exotic** (g-Nonalactone) Coconut, Vanilla, Fruity, Glue-like	Common sources: Higher concentration in aged beers (Including Barrel Aged); Thermal load indicator of brewing process	Concentration: 0.06 mg/L	Hop varieties: Equinox, Amarillo, AU Topaz, Cascade
SOLD OUT 28	**Linalool** Fruity, Floral, Blueberry, Lavender, Rose-wood	Common sources: Associated with time of addition and length of boil; Higher concentrations in specific hop varieties; Geraniol decomposition	Concentration: 0.032 mg/L	Hop varieties: Equinox, Amarillo, AU Topaz, Cascade
SOLD OUT 29	**Herbal** Myrcene Herbaceous, Resinous, Green, Balsamic, Piney, Light Terpene/Hydrocarbon	Common sources: Higher concentrations in specific hop varieties	Concentration: 0.06 mg/L	Hop varieties: Perte, Mount Hood, Hersbrucker, Northern Brewer, Hallertau Mittelfruh
SOLD OUT 30	**Berry** (ß-Ionone) Raspberry, Berry, Citrus, Woodlands, Floral, Violet	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 0.002 mg/L	Hop varieties: Centenial, Mosaic, AU Galaxy, Brewers Gold
SOLD OUT 31	**Perfume** (Citronellol) Perfume-like, Floral, Rose-like, Waxy	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 0.15 mg/L	Hop varieties: Chinook, Columbus

2 FLAVOR DESCRIPTIONS

SOLD OUT 32	**Piney** (a-Terpineol) Piney, Lilac, Conifer-like, Resinous, Woody, Lime	Common sources: Green hop character, Higher concentrations in dry hopped beers; Higher concentra-lions in specific hop varieties	Concentration: 8.0 mg/L	Hop varieties: Simcoe, AU Galaxy, UK Phoenix, Chinook
33	**Woody** (Caryophyllene and Humulene Fraction) Woody, Resinous	Common sources: Characteristic of the hop heavier volatiles and Present in some barrel aged beers	Concentration: 12.0 mg/L	Hop varieties: AU Topaz, GRTettnang Fuggle
SOLD OUT 34	**Grapefruit** (Grapefruit Mercaptan) Fruity, Grapefrutt, Citrus (Green Notes)	Common sources: Associated in higher concentra-lions in specific varieties of American hops	Concentration: 154 mg/L	Hop varieties: Cascade, Simcoe, Citra,Comet, GR Mandarina, Bavaria
SOLD OUT 35	**Apricot** (Isoamyl Isobutyrate) Apricot, Fruity, Pineapple, Banana, Sweet, Honey	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 20 mg/L	Hop varieties: Galena, GR Hallertau, Mittelfruh, Palisade, Comet, NZ Rakau
SOLD OUT 36	**Floral** (Geranyl acetate) Floral, Rosy, Waxy/Soapy	Common sources: A characteristic constituent/ building block for a number of hop derived flavors	Concentration: 1.0mg/L	Hop varieties: Nugget, Spalter, Select, Comet, Amarillo, Cluster
SOLD OUT 37	**Catty** (p-Mentha-8-thiol-3-one) Black Currant, Catty, Cassis, Astringent, Tart/Fruity, Herbal	Common sources: A flavor characteristic found at higher and identifiable levels in specific hop varieties	Concentration: 0.10 mg/L	Hop varieties: Galena, Brewers Gold, Bullion

38	**Tobacco** (11-Damascenone) Natural, Woody, Sweet, Fruity, Plum, Spicy Tobacco, Nuances, Menthol-like	Common sources: A specific note found in higher concentrations in certain hop varieties and Present in some barrel aged beers	Concentration: 0.5 mg/L	Hop varieties: Hallertau Tradition & Blanc, Polaris, Aurora, Columbus, Czech Saaz
SOLD OUT 39	**Furaneol** Cotton Candy, Strawberry, Sweet, Caramel	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 0.3 mg/L	Hop varieties: Mosaic, AU Galaxy, UK Northdown, GR Magnum
SOLD OUT 40	**Potato Skins** (2-Isopropyl-3-MethoxyPyrazine) Potato Skins, Bell Pepper, Earthy, Musty (wine-like)	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 0.035 mg/L	Hop varieties: Saaz, Summit, Equinox, Perle
SOLD OUT 41	**Cinnamon** (trans-Cinnamaldehyde) Cinnamon, Pungent, Spicy, Clove, Vanilla	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 15 mg/L	Hop varieties: UK Target, Mt. Hood, Chinook
SOLD OUT 42	**Nonanal** (ß-Ionone) Raspberry, Berry, Citrus, Woodlands, Floral, Violet	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 0.002 mg/L	Hop varieties: Centenial, Mosaic, AU Galaxy, Brewers Gold
SOLD OUT 43	**Anise** (Anethole) Cardboard, oxidized	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 7.5 mg/L	Hop varieties: AU Ella, Mt. Rainier, Columbus
SOLD OUT 44	**Musty** (trans-4,5-Epoxy-(E)2-decenal) Metallic, Pungent, Musty, Green	Common sources: General hop addition and higher concentrations in specific hop varieties	Concentration: 0.01 mg/L	

2 FLAVOR DESCRIPTIONS

45	**H2S** Rotten eggs	Common sources: Fenmentation, maturation or contamination	Concentration: 72 µg/L	Threshold in beer: 4 µg/L
46	**Smoky** (Syringol) Smoky (smoked wood/ smoked fish), Phenolic	Common sources: Present in Specific Styles and a Common Flavor Component in Barrel Aged Beers	Concentration: 97.1 mg/L	Threshold in beer: 1.8 mg/L
47	**Peat-like** (Guaiacol) Peat-like, Smoky, Woody, Medicinal	Common sources: Present in some barrel aged beers	Concentration: 1.35 mg/L	Threshold in beer: 10 mg/L
48	**Barnyard** (4-Ethylphenol) Barnyard, Horsey, Brett-related flavors, Wine-like, Alcohol	Common sources: Common in Many Beers Inno-culated with Brettanomyces Also Present in some barrel aged beers	Concentration: 10.0 mg/L	Threshold in beer: 0.3 mg/L
49	**Coconut** (2-Heptanol) Dill, Earthy, Coconut	Common sources: Present in some barrel aged beers	Concentration: 22.4 mg/L	Threshold in beer: 0.5 mg/L
50	**Caramel** (5-Methyl Furfural) Caramel, Spicy, Sweet, Almond	Common sources: Present in Specific Styles and a Common Flavor Component in Barrel Aged Beers	Concentration: 147 mg/L	Threshold in beer: 50 mg/L
51	**Whiskey** (Lactone) Woody, Oakey, Coconut, Rum-like, Green	Common sources: Common Flavor Component in Barrel Aged Beers	Concentration: 18.1 mg/L	Threshold in beer: 0.4 mg/L
52	**Pineapple** (Ethyl Butyrate) Pineapple-like, Brett-re-lated flavors, Rum-like, Tropical Fruit	Common sources: Common Flavor Component in Many Beers Innoculated with Brettanomyces, also Present in some barrel aged beers.	Concentration: 1.8 mg/L	Threshold in beer: 0.4 mg/L (ASBC)

3 SAMPLE PREPARATION

1

STEP 1:

To spike your beer sample: Find the appropriate vial. The painted band around the narrow neck of the vial (the white line) means that the vial is ready to open without scoring.

IMPORTANT:
If there is liquid above the white line in the vial, gently tap with your finger to get all the liquid to the bottom part of the vial.

2

STEP 2:

To open the vial, hold it with both hands, with one thumb against the narrow top section.

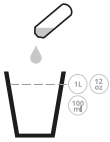
ADVICE:
You may want to protect your hands from broken glass by using a paper towel, light cloth or piece of gauze when opening the vial.

3

STEP 3:

Hold the bottom of the vial firmly while pushing the top section away from you with easy, even pressure. A light pressure should cleanly snap the vial open, while using too much force can cause it to shatter.

4

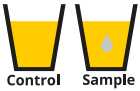


STEP 4:

Pour the entire contents of the vial into an empty, clean glass or container that is capable of holding the appropriate amount of beer as indicated on the kit's outer packaging.
Add the appropriate amount of beer to the glass or container. This will yield approximately three times the flavor threshold of the compound.

4 TASTING PROCEDURE

1



STEP 1:

Prepare a control (unspiked) and a spiked sample of beer. A typical serving is 80ml to 100ml per person.

IMPORTANT:
To remind you of the beer's original aroma and taste impression and to allow to directly compare the differences between both samples, always start the tasting procedure with your control sample followed by the spiked sample.

2

STEP 2: AROMA IMPRESSIONS

Swirl the glass gently. 'Drive» the sample by your nose while sniffing in for initial aroma impression. Use two or three short, sharp sniffs to allow the volatiles to reach the appropriate areas.

3

STEP 3: TASTE IMPRESSIONS

Take one or two small sips and allow the sample to sit on your tongue for taste impressions.

4

STEP 4: SWALLOW

Swallow the sample. This is necessary to allow evaluation of the sample's bitterness component.

5 MATERIAL SAFETY DATA SHEET

The Siebel Institute flavor standards are safe to consume once used as directed. For further infonnation please consult the **Material Safety Data Sheet (MSDS)** available for download at http://www.siebelinstitute.com/products/sensorykits/

6 AVAILABLE SENSORY KITS

COMPREHENSIVE SENSORY KIT

25x1 selected flavors to spike 1L

The Comprehensive Sensory Training Kit offers 25 vials representing a large variety of the most important flavors and aromatics found in beer. While breweries with established tasting panel structures will find this kit valuable, it can also be used for «taster calibration» by brewers guilds, homebrew groups and beer judges.

This kit contains the following flavors:

1x 1 Acetaldehyde	1x 2 Acetic acid	1x 3 Almond
1x 4 Bitter	1x 5 Butyric acid	1x 6 Caprylic acid
1x 7 Contamination	1x 8 D.M.S.	1x 9 Diacetyl
1x 10 Earthy	1x 11 Ethyl acetate	1x 12 Ethyl hexanoate
1x 13 Geraniol	1x 14 Grainy	1x 15 Hefeweizen
1x 16 Indole	1x 17 Isoamyl acetate	1x 18 Isovaleric acid
1x 19 Lactic acid	1x 20 Light struck	1x 21 Mercaptan
1x 22 Metallic	1x 23 Papery	1x 24 Spicy
1x 25 Vanilla		

6 AVAILABLE SENSORY KITS

BASIC SENSORY KIT

4x6 selected flavors to spike 1L

The Basic Sensory Training Kit offers 4 pre-measured vials of six of the most common & important beer-related flavor compounds. This kit is perfect for companies that do frequent sensory training panels using these core standards. It is also suitable for those looking for basic sensory training.

This kit contains the following flavors:

4x 1 Acetaldehyde	4x 7 Contamination	4x 8 D.M.S.
4x 9 Diacetyl	4x 17 Isoamyl acetate	4x 23 Papery

SPECIALTY SENSORY KIT

24x1 individual flavors to spike 1L

Our Specialty Sensory Training Kit is ideal for companies conducting sensory training on a frequent or large-scale basis.

5 MIX&MATCH SENSORY KIT

5x1 individual flavors to spike 1L

The 5 Mix&Match Sensory Kit can be custom designed. You may choose any 5 flavor compounds that suit your individual needs.

6 AVAILABLE SENSORY KITS

12 MIX&MATCH SENSORY KIT

12x1 individual flavors to spike 1L

The 12 Mix&Match Sensory Kit can be custom designed.
You may choose any 12 flavor compounds that suit your individual needs

BARREL AGED SENSORY KIT

12x1 selected flavors to spike 1L

This kit contains the following flavors:

1x 3 Almond	1x 38 Tobacco	1x 49 Coconut
1x 25 Vanilla	1x 46 Smoky	1x 50 Caramel
1x 27 Exotic	1x 47 Peat-like	1x 51 Whiskey
1x 33 Woody	1x 48 Barnyard	1x 52 Pineapple

6 AVAILABLE SENSORY KITS

REGULAR SENSORY KIT (1 L)

12x1 selected flavors to spike 1L

The Regular Sensory Training Kit (1L) contains 12 of the most common flavors found in beer. It is suitable for intermediate training of taste panels and groups of up to 10 people.

SOLD OUT

REGULAR SENSORY KIT (12 OZ.)

12x1 selected flavors to spike 12 oz. (355ml)

The Regular Sensory Training Kit (12 oz.) contains 12 of the most common flavors found in beer. It is suitable for intermediate training of groups of up to3 people.

This kit contains the following flavors:

1x 1 Acetaldehyde	1x 4 Bitter	1x 7 Contamination
1x 8 D.M.S.	1x 9 Diacetyl	1x 12 Ethyl hexanoate
1x 17 Isoamyl acetate	1x 18 Isovaleric acid	1x 20 Light struck
1x 22 Metallic	1x 23 Papery	1x 24 Spicy

6 AVAILABLE SENSORY KITS

CRAFT SENSORY KIT

12x1 selected flavors to spike 1L

The Craft Sensory Kit contains 12 flavor compounds that may be found in many unique styles of craft beer.

This kit contains the following flavors:

1x 3 Almond	1x 8 D.M.S.	1x 9 Diacetyl
1x 12 Ethyl hexanoate	1x 13 Geraniol	1x 14 Grainy
1x 15 Hefeweizen	1x 17 Isoamyl acetate	1x 18 Isovaleric acid
1x 23 Papery	1x 24 Spicy	1x 25 Vanilla

ESSENTIAL OFF-FLAVOR KIT

6x1 selected flavors to spike 1L

The Essential Off-Flavor Kit contains 6 of the most frequently encountered off-flavors common to beers of all styles.

This kit contains the following flavors:

1x 7 Contamination	1x 8 D.M.S.	1x 9 Diacetyl
1x 18 Isovaleric acid	1x 23 Papery	1x 45 H_2S

6 AVAILABLE SENSORY KITS

INTERMEDIATE OFF-FLAVOR KIT

12x1 selected flavors to spike 1L

The Intermediate Off-Flavor Kit offers a total of 12 compounds that cover a variety of spoilage-related flavors as well as artifacts from other sources.

This kit contains the following flavors:

1x 1 Acetaldehyde	1x 2 Acetic Acid	1x 7 Contamination
1x 8 D.M.S.	1x 9 Diacetyl	1x 14 Grainy
1x 16 Indole	1x 18 Isovaleric acid	1x 20 Light struck
1x 22 Metallic	1x 23 Papery	1x 45 H_2S

ADVANCED OFF-FLAVOR KIT

18x1 selected flavors to spike 1L

The Advanced Off-Flavor Kit offers 18 different compounds that cover the full spectrum of off-flavors that are critical for beer tasters to know towards accurately evaluating beer.

This kit contains the following flavors:

1x 1 Acetaldehyde	1x 2 Acetic acid	1x 5 Butyric acid
1x 6 Caprylic acid	1x 7 Contamination	1x 8 D.M.S.
1x 9 Diacetyl	1x 10 Earthy	1x 14 Grainy
1x 16 Indole	1x 18 Isovaleric acid	1x 19 Lactic acid
1x 20 Light struck	1x 21 Mercaptan	1x 22 Metallic
1x 23 Papery	1x 24 Spicy	1x 45 H_2S

7 FURTHER QUALITY CONTROL TOOLS

HLP MEDIUM

Hsu's *Lactobacillus/Pediococcus* Medium

Enables selective counting of lactic acid bacteria. Many lactic acid bacteria can be detec-ted in as little as 48 hours. Differentiation of Lactobacil/us and Pediococcus can be made after 5 days of incubation. HLP is a simple test for the most common beer spoiling bacteria, requiring minimal lab equipment. Anaerobic incubation equipment and an autoclave are not required.

LCS MEDIUM

Lin's Cupric Sulfate Medium

For detection and quantitative determination of wild yeast populations in brewing culture yeast. Approximately 1 million culture yeast is plated on LCSM. This medium is designed to encourage the growth of non-Saccharomyces yeast. A few Saccharomyces yeast may show some growth on this medium.

LMDA MEDIUM

Lee's Multi Differential Agar

A nutrient medium that will detect most organisms commonly encountered in a brewery. Acid producing bacteria are identified by the development of a clear zone around the colonies. Further identification is facilitated by the characteristic color reactions. Actidione may be added to the medium to suppress the growth of culture yeast.

LWY MEDIUM

Lin's Wild Yeast Medium

For detection and quantitative determination of wild yeast populations in brewing culture yeast. allli Approximately 1 million culture yeast is plated on LWYM. The growth of culture yeast is suppressed. Wild yeast grow as larger distinct colonies. This medium is designed to encourage the growth of Saccharomyces wild yeast. A number of non-Saccharomyces yeast will also grow on this medium.

8 CONTACT INFORMATION

For questions please contact:

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www.siebelinstitute.com/sensorykits