NC Craft Beverage Regional Exchange Group

North Carolina Biotechnology Center

Foothills Brewing

Fermentation Sciences

Appalachian State University
Thanks to the continued support from the NCBC for the Regional Exchange Group

We are more than willing to dive into any topics / issues / activities you feel are important.

Feel free to contact us regarding meeting topics or needs for training. We are willing to undertake more in-depth sensory training seminars this summer; these are best done in smaller groupings (20 max). More on that later...

How can we involve and cater to more people, businesses, and industries?
NC Craft Beverage Regional Exchange Group


The consumer – They support your habits and they are becoming more educated, more demanding, and there are plenty of other great beers next to yours!

The Producer – You need to A) keep the business you have and B) take business away from breweries outside of NC and C) identify new consumers

Everyone who works at your business – They represent you are your product; if they cannot explain your product than who can? They are critical input in helping assure your products are falling within the boundaries you set.
... helping assure your products are falling within the boundaries you set.

The cornerstone of **Quality Control and Quality Consistency**
You MUST have a QC program, and at the very least and idea of what this means for your business.

QCPs can be expensive and time consuming, and we cannot always afford to follow through (worst case = dump a beer).

You reputation and that of your cohort depend on **consistency** if nothing else. As NC continues to experience very positive growth there will be a concomitant demand for the bar to rise.

**More competition = tighten your belt!**
**More great breweries = more medals at GABF and more people choosing NC as a beer destination!**
Why Sensory?

I'M NOT ALWAYS A BEER CONNOISSEUR

BUT WHEN I AM IT'S TO IMPRESS FOREIGNERS

Live the Dream!
$450k + $50/sample

ppm levels of detections in general

401k + $7.25/hour

8-12 samples/day

ppb to ppm levels common

Does not get a cold, and is only as confused as the operator.

Really only works with proper training and much more difficult to assess attributes within a matrix.
Connecting our Senses

Ortho-Nasal Olfaction: Aroma detection through the front of our nasal passage: first impression – sets our expectations.

Retro-Nasal Olfaction: Aroma (Flavor) detected as we breath in through mouth and our nasal passage; drawing volatiles up through the back portion of our nasal cavity / olfactory system.

The perception between the two can be very similar, it can also be very different. *Can accentuate or be antagonistic to aromas perceived via Ortho-nasal.*
# Aroma Thresholds

<table>
<thead>
<tr>
<th>Aroma</th>
<th>Substance</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotten cabbage, natural gas</td>
<td>methanethiol</td>
<td>~.002 ppm</td>
</tr>
<tr>
<td>Onion, propane / butane</td>
<td>Ethanol</td>
<td>~.002 ppm</td>
</tr>
<tr>
<td>Clove, spicy</td>
<td>Eugenol</td>
<td>.1-.006 ppm</td>
</tr>
<tr>
<td>Vanilla, sweet</td>
<td>Vanillin</td>
<td>~.004 ppm</td>
</tr>
<tr>
<td>Violet, fruity, woody</td>
<td>β-ionone</td>
<td>$10^{-6}$ - 0.2 ppm</td>
</tr>
</tbody>
</table>

Thresholds are the levels at which point we can correctly identify a compound; these differ based on the matrix we find them in (OAV or Odor Activity Value).
Aroma Thresholds

Important to **start with a blank slate** and learn to correctly identify aromas on their own, then begin to identify them in variable backgrounds or matrices.

Very important to *develop a lexicon for all sensory attributes* associated with your products for your co-workers to use.

If you are **always** wrong, but you are very consistent, its just as good as being **correct**. Important to be consistent in your evaluations and NOTE TAKING!

**DO NOT take turns keeping notes**, because they will be transcribed differently each time. One person can effectively reduce the variability you see based on panel feedback.

Two people can effectively make this much worse / less valuable.
Aroma Thresholds

Ideally, we *start with single attributes* and train on proper identification, *building confidence* in our feedback and discounting correct “guesses”.

Work as a *group to identify attributes*, help each other put words to them, *develop the lexicon* we agree to adhere to as best we can (we may each develop our own lexicon, which is OK).

This is more *descriptive analysis*.

*Work with individuals* to ‘test’ them on correct identification.

This is more *threshold testing*.

*We want to know how ‘sensitive’ each person is to an attribute, and this may differ based on the background (i.e. beer). This may also illustrate that the time of day has a big influence among other things.*
Why do we want to do this?

If you have an agreed-upon profile for a product, you can use your team to make certain your product falls within that expectation each time.

*If not, what is wrong / why not?*
*Is the product old? Is there an issue associated with temperature control at the fermenter? Is there an issue indicative of microbial spoilage? Do we see issues with yeast health or nutrition?*

We use this process, and our team members, to **identify potential issues along the production path to help guide corrective action.**

If you cannot identify the correct aroma/issue, how do you fix the problem?
How do we do this?

It is critical to include as many people as you can from within your facility, do not limit the process to production personnel.

You want to honest and unbiased opinion of many, and the feedback of people representing your products and interacting with the consumer, not just making them.

*Women and generally much better than men!*

Time of day is important; this is not cocktail hour; it should be enjoyable but it’s not a social event... until you’ve done your work.
How do we do this?

A first step – schedule one to two times / week that you can meet with your group for one hour.

Sit down with a product, a stack of pencils and paper.

Guide yourself through the sensory analysis process – focus on consistency.

Be descriptive!

Have someone dedicated to collecting notes and guiding discussion – make sure you understand if/that each person is talking about the same thing.

“burnt sunset at the Jersey Shore in 1991” vs “kinda reddish”
Visual – Look, prod, swirl etc. What do the color, visual characteristics (bubbles, viscosity, turbidity) and other aspects of appearance tell you?

Smell – *Orthonasal olfactory perception*? What does it smell like, from your nose to your brain? Does it set expectations?

Taste- Sweet, sour, bitter, salty, umami, metallic.

Flavor – *Retronasal olfaction / Aroma*. How does the flavor profile match with the aroma and taste?

Mouthfeel/Body - What does if **FEEL** like in your mouth? Crisp, dry, astringent, creamy, oily, fat, watery...

Second “Taste” – **Overall experience** and perception, review all components incorporated together.
How do we do this?

Give people quiet time to do this on their own first- *the power of suggestion is too great an influence*. Everyone wants to be right!

Develop a list of descriptors for each application and see that your group can agree on what is important and/or a defining characteristic.

*You have built a lexicon, now force yourself to stick within that lexicon.*

Correctly identifying positive and negative attributes will help production teams build better products and more reliably so.

You must have confidence in this process and you must *keep your knives sharp* all year. This is probably the most effective tool (especially costs associated) at your disposal.
How do we do this?

A second step – develop or seek specific attribute trainings for sensory attributes.

You can purchase kits and pure compounds, although this can be an investment of time and money. Be careful of cheap products and long shelf-storage; they can be rather misleading.

Form a tasting group with other professionals in your area and share your experiences, compare notes.

The more great beer in NC, the more beer is sold in NC based on consumer confidence. No reason whatsoever that NC beers should not be on the shelves across CA, OR, CO etc...
How do we do this?

**Blind** – At all logical times, present samples blind to your panel. If people know what to look for, they will try to tell you it is there! Present panel members with challenges, not to trick them, but to make them feel confident in giving honest feedback:

- 3 beers, all are the same
- 3 beers, 2 are the same
- 3 beers, one spiked …

*Grab some beers off the shelf, pour them next to your products*

**BLIND** - get descriptive and hedonic feedback.
Anyone who is satisfied with every product they make may as well throw in the towel…

Storage and aging trials – Keep a library and go back 2-3 generations.
How do we do this?

Keep your sensory panel engaged and interested. You have a moving target...

We are happy to provide sit-in’s during our sensory trainings and offer in-depth sensory workshops for smaller groups.

Go in with your cohorts to purchase standards etc. if the costs is prohibitive at first; some of these compounds may last you years but may cost hundreds of dollars up-front to purchase what you want.

Invest in this process – time is money, but so is beer you are not proud of.
Further training and outreach opportunities
NC Craft Beverage Regional Exchange Group

We will be hosting another meeting on May 28th at ABTCC; Enka campus, at the NC Bionetwork Business Center.

This workshop will focus on QA/QC Laboratory Basics: Analyses, equipment, data processing, and ‘how to’ setup a small in-house lab facility.
**Sensory Training Workshops:** We are happy to cater to smaller groups to help train you on building a sensory program / protocol, and begin specific attribute identification and threshold testing.

We have an ongoing sensory panel at ASU and project using advanced instrumentation in conjunction with our trained panel to profile products based on raw ingredients, production methods, packaging, and storage.

**We can work small groups of people into this process and offer specific training; e.g. 5 session series (1 week or weekly).**

For those not familiar, setting up a dependable sensory panel can be a little challenging but it can also move very quickly and be an integral part of your QA/QC process.