



AVAZYME

Agriculture and Food Testing Solutions

Ruckus vs. Saucer

By

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prepared for Fortnight Brewing, September 2016

AVAZYME



Agriculture and Food Testing Solutions

Crafting the Perfect Brew Paired with Bold Innovations



- Saucer: “ Normal” Fermentation
- Ruckus: Continuously sound infused with Wu Tang Clan sound at high dB levels throughout fermentation

Bring on da Ruckus vs. Saucer

✓ Color:

determined by UV/VIS spectrophotometer via Standard Reference Method (SRM), ASBC method Beer 10

- Saucer: 8 SRM
- Ruckus: 8 SRM

✓ International Bittering Units (IBUs):

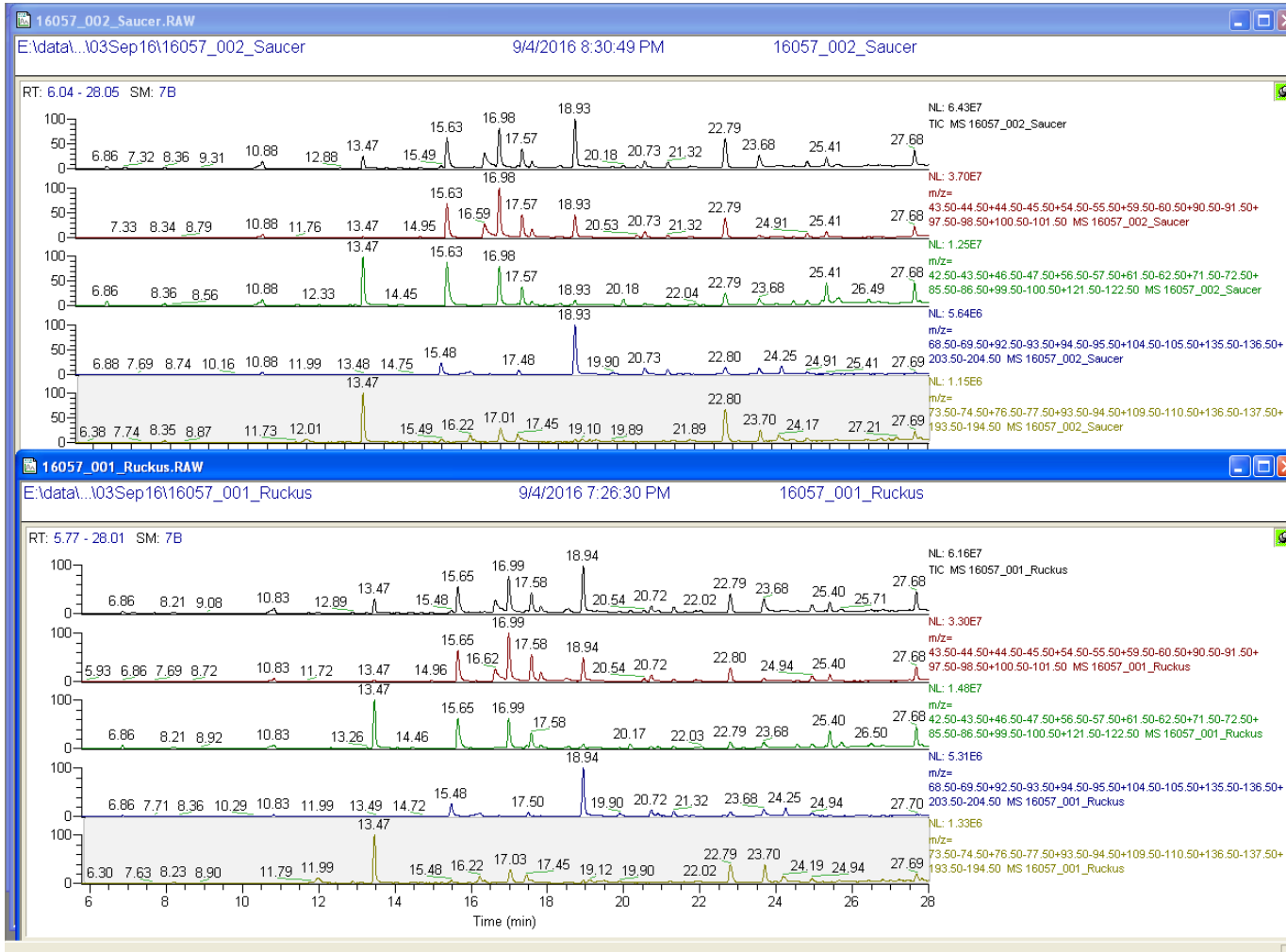
determined by UV/VIS spectrophotometer via ASBC method Beer 23 A.

- Saucer: 69 IBUs
- Ruckus: 72 IBUs, making the sound infused version slightly more bitter.

These results are confirmed by sensory analysis, i.e., color of both beers is essentially the same, but the Ruckus has distinctly sharper hops bitterness.



Gas Chromatography Mass Spectrometry Analysis, Part 1



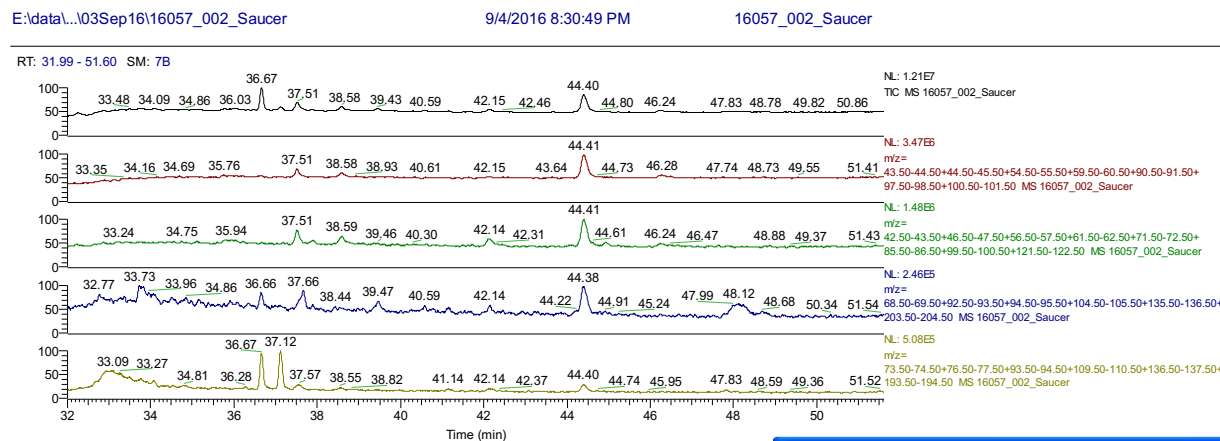
- 🍺 Top: Saucer
- 🍺 Bottom: Ruckus
- 🍺 Both beers show almost identical flavor profiles
- 🍺 Proof of the high degree of consistency of Fortnight's brewing process
- 🍺 No off-flavors are detectable

Gas Chromatography Mass Spectrometry Analysis, Part 2

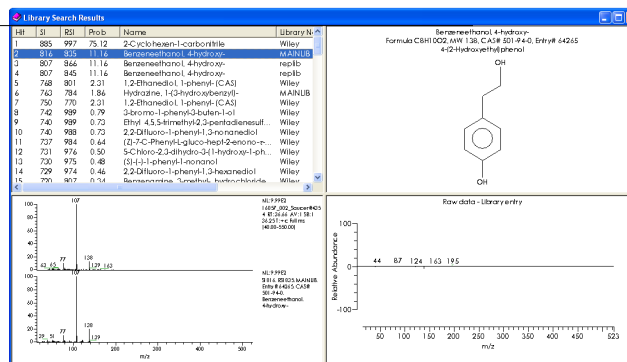
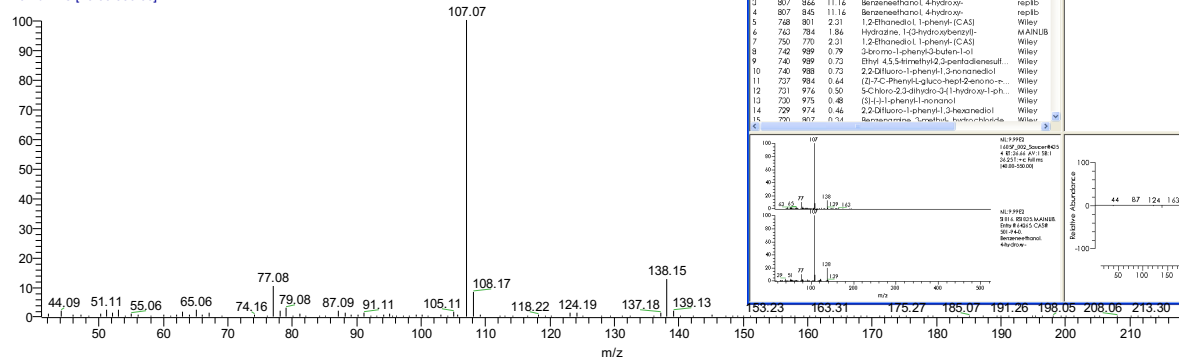


- 🍺 Top: Saucer
- 🍺 Bottom: Ruckus
- 🍺 Saucer has one flavor much more pronounced than Ruckus
- 🍺 See mass spectrometry structure identification

Mass Spectrometry Analysis, Flavor Identification



16057_002_Saucer #4354 RT: 36.66 AV: 1 SB: 1 36.25 NL: 3.66E6
T: + c Full ms [40.00-550.00]



🍺 4-hydroxy-benzene ethanol, an aromatic alcohol

🍺 A common flavor compound produced by yeast in typical English Ales

🍺 Flavor of Old English Roses, with a hint of Ancient Cherry Tree Bark (English Garden)

🍺 The sound infused yeast clearly was not in the mood to produce this flavor!

Conclusions



- 🍺 Scientific proof that Fortnight beers maintain high level of consistency
- 🍺 Sound infusion has a distinct and measurable impact on the fermentation and metabolism behavior of ale yeast
- 🍺 All analytical results have been confirmed via scientific sensory analysis by a German beer scientist
- 🍺 Continuous sound infusion removed a distinct flavor associated with traditional, well balanced English Ales and brought out a bolder, the more hip-hops forward flavors of “Bring on da Ruckus”!
- 🍺 Future experiments may investigate the effect of different types of sound...

Supporting Craft Breweries, Craft Maltsters, and Hops Growers

- ✓ Avazyme: your Laboratory and Quality Management resource, so that you can focus on what you do best:
 - Brew highest quality beers consistently
 - Grow hops with unique flavor profiles in good yields
 - Produce highest quality base malts, specialty malts, and roasted malts
- ✓ Member of the American Society of Brewing Chemists (ASBC), BA, and MBAA



- ✓ Member of the North Carolina Brewers Guild

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