

# PROCESS CONTROL FOR ESTERS IN BEER: GAUGE

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**Meilgaard:** recommends for **Flavor Wheel** that ester standards used to train panelists include: **ethyl acetate, ethyl caproate and isoamyl acetate.**

Electronic nose and tongue.....GC-MS "Sensory" ... no chromatographic separation ....pattern recognition and multivariate stats to characterize differences in complex sample profiles. .....non-volatile macrosolvents - selectively binds within each category eg ketones of different types, or aldehydes, etc.....

**"Estery" characters originate from @ 90 different ester congeners.**

SPME is revolutionizing volatile analyses.... assay partitions compounds from the headspace of beer, process, wort, materials headspace on to the surface of a fibre coated with a liquid phase tailored to different types of compounds. Closest thing to mimicking the human process i.e. absorption at nasal olfactory sites! In the case of esters, SPME fibers coated with polyacrylate do the trick when linked to High Resolution Gas Chromatography using flame ionization detection with a temperature gradient.

Matrix has a large impact on sensory evaluation for "fruity"..... high [ethanol] suppresses fruity notes.....PPs can interact with flavor volatiles, keeping them in solution rather than free to volatilize. 2004 Nobel Prize awarded for work in olfactory receptors...transduced over neural network to the brain.....determined receptors not specific to one compound, but rather multiple compounds.

**Effect on Ester Levels in Beer**

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Sensory: high levels not desired in lagers... if too high can take on a solvent-like character.

**ASBC No.XIIIIf  
(Casey;  
April/06)**