

# CANADIAN CRAFT BEER CHARACTERIZATION USING TD-GC×GC-TOFMS

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For beer lovers, the worldwide tendency is to foster microbrewery style beer. The market is shifting from high volume pilsner beer to more unique varieties with higher alcohol content and a more complex character. Among small scale brewing, Belgian-style beer is encountering great success. In order to target similar specificity, international brewers can have access to yeast and hops commonly used by brewers in Belgium. However, even if the importance of these two factors is already established, they are unlikely to be the sole elements responsible for the popularity of the “Belgian touch”.

In this study, thermal desorption coupled to comprehensive two-dimensional gas chromatography hyphenated with time-of-flight mass spectrometry (TD-GC×GC-TOFMS) was used to investigate the traditional Belgian beer style aroma profile and to compare it with a micro-scale Belgian-style beer production from Canada. Prior to the analysis, the chromatographic separation and the sampling parameters were statistically optimized using experimental design.

In order to obtain the most information from the complex GC×GC data matrix, advanced statistical tools were applied for comparing the different beer profiles. The major statistical approach was based on a Euclidian distance calculation to perform hierarchical cluster analysis (HCA). This allows multivariate investigation of the data with less stringent requirements in terms of the numbers of replicates, compared to other statistical methods.

This TD-GC×GC-TOFMS approach, combined with advanced statistical tools permitted the grouping of the different beers based on type and brewing method.