

2D LC/MSⁿ FOR THE IDENTIFICATION OF HAZE FORMING PROTEINS IN BEER

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Beer haze is an appearance defect caused by interaction of salts, proteins and condensed polyphenols. These complex reactions are often accelerated with increased storage time, temperature and vibration becoming essentially irreversible. The effect of this reaction is fine particulate material visible in the finished product. Recently increased export volumes of CUB product into an increasingly competitive overseas market have forced industry to re-evaluate this problem.

Industry knowledge to date is based on observation and trial. Currently treatments used to alleviate haze formations include the adsorption of proteins and polyphenols with silica hydro gel and poly vinyl poly pyrrolidine. Papain, a hydrolysing enzyme isolated from green papaya fruit is also utilised, reducing the size of haze forming molecules.

Previous methods using 2D gels to identify haze forming proteins prove to be time consuming and identify only denatured proteins rather than native compounds. 2D LC/MSⁿ permits a more detailed analysis of a highly complex matrix like beer, allowing analysis of native proteins. The complexity of the beer sample itself has been reduced using a two dimensional approach, allowing the sample to be divided into fractions dependent upon charge and polarity before chromatographic analysis. This results in the resolution of peaks in the region where gels resolve only a single spot. MSⁿ capability permits positive identification of these individually resolved peaks.

Haze management methodologies utilising 2D LC/MSⁿ technology to measure and control haze formation will be presented.