A new unified method to characterize beer foams in terms of foamability, foam stability, drainage and cell structure

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Foamability and foam stability are important factors influencing the consumer’s impression of a beer and are therefore regarded as indication of product quality. Another important aspect is the structure of beer foam, which does not only influence the visual impression and the haptic of the foam, but is also closely linked to foam stability.

The foam characteristics of a beer are influenced by various ingredients, which are intensely discussed in literature [1, 2]. Proteins of high molecular weight (> 5 kDa) as well as hop bitter compounds for example have a positive influence on foamability and foam stability, whereas alcohol rather works against foam production and stabilization [2]. To achieve a convincing beer foam result, the positive ingredients should be included in an ideal concentration while the negative ingredients should only be present at low concentrations.

The presented study does not only analyze the foamability, foam stability and the rate of drained liquid of different beer samples but does also provide an analysis of the foam cell size distribution, i.e. the foam structure (Figure 1). It also compares the data with methods recommended by MEBAK [3]. By foam generation and decay analysis and parallel determination of the mean bubble area and the bubble size distribution, a correlation between foam stability, drainage and foam structure is experimentally demonstrated. The foam structure can hence be used as indicator to predict foam stability. Furthermore, samples of different ingredient compositions are analyzed, which enables analysis of the influence of different ingredients not only on foamability and foam stability but also on the foam structure.

Figure 1 Data of 2 beer samples: (a) Foam and liquid height (b) Foam structure at different time points.