Title of the contribution: Identification of beer bitter acids regulating mechanisms of gastric acid secretion

Abstract:

Beer, one of the most consumed beverages worldwide, has been shown to stimulate gastric acid secretion. Although organic acids, formed by fermentation of glucose, are known to be stimulants of gastric acid secretion, very little is known about the effects of different types of beer or the active constituents thereof. In the present study, we compared the effects of different beers on mechanisms of gastric acid secretion. To investigate compound-specific effects on mechanisms of gastric acid secretion, organic acids and bitter compounds were quantified by HPLC-DAD and UPLC-MS/MS and tested in human gastric cancer cells (HGT-1) by means of a pH-sensitive fluorescent dye which determines the intracellular pH as an indicator of proton secretion. The expression of relevant genes, coding the H(+)/K(+)ATPase, ATP4A, the histamine receptor, HRH2, the acetylcholine receptor, CHRM3, and the somatostatin receptor, SSTR2, was determined by qPCR. Ethanol and the organic acids succinic acid, malic acid, and citric acid were demonstrated to contribute to some extent to the effect of beer. The bitter acids comprising alpha-, beta-, and iso-alpha-acids were identified as potential key components promoting gastric acid secretion and up-regulation of CHRM3 gene expression by a maximum factor of 2.01 compared to...
that of untreated control cells with a correlation to their respective bitterness.