Predicting water taste liking from mineral composition

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Abstract

Several studies have showed the importance of the total dissolved solids on flavour of waters, but no definitive knowledge is available on the role of specific cations and anions; the interaction between these species introduces great complexity to the subject. The aim of this study was to investigate the most influential physicochemical parameters from selected mineral and tap waters on liking of consumers in order to make it possible and the development of a predictive model.

The overall liking for taste of water by 69 untrained tasters was correlated with the mineral composition of 25 selected bottled and tap waters. Water samples were physico-chemically characterized; residual chlorine levels were also analysed in the tap water samples.

Principal Component Analysis (PCA) and Multiple Factor Analysis (MFA) revealed that overall, untrained volunteers rated high TDS waters with low scores. Waters rich in calcium bicarbonate and sulphate were appreciated, rather than in sodium chloride. With respect to their origin, most subjects preferred bottled waters. However, small quantities of residual chlorine did not appear to have a strong effect on the volunteers' preferences, that is, the mineral content had a stronger influence on taste than residual disinfectant.

Partial Least Square (PLS) regression models enabled the prediction of each water's liking from its thirteen physicochemical parameters. Moreover, it was possible to recalculate the model with a reduced number of physicochemical parameters (nine) without losing predictive power. The VIP (variable importance in projection) selection method showed to be very useful for this purpose.