Optimising combinations of selected sugar substitutes

AIM

Aim of this study is to establish sugar replacement in food by conventional and non-caloric sweeteners e.g. sucralose and natural sweeteners as maltitol, erythritol and stevia, without noticeable sensory differences. Based on this purpose the study analyses predominantly two natural sweeteners, the bulk sweetener erythritol and the intensive sweetener stevia rebaudiana.

SAMPLES

Erythritol and stevia rebaudiana are all-natural, non-caloric and non-carogenic sweeteners with a high digestive tolerance.

The bulk sweetener erythritol features a clean and pleasant taste profile similar to sucrose, it is also reported to have a light cooling effect. Furthermore it provides qualitative and additive synergy in blends with intensive sweeteners by boosting the sweetness and masking undesired specific characteristics. These synergism can be realised when erythritol is the major contributor [1].

Stevioside or rather stevia rebaudiana is an intensive sweetener which offers predominantly a sweet taste but also a slight bitter note and unpleasant aftertaste.

Rebaudioside A, one of the main sweeteners extracted from the plant stevia rebaudiana, offers a less bitter aftertaste at high concentrations and even a slightly higher sweetness. Hence the reason rebaudioside A is used in this study. Due to the bitter note stevioside are generally combined with other sweetening agents for the application in food [2].

METHODS

After previous tests to determine the sweetness of each applied sweetener, the Quantitative Descriptive Analyses (QDA, acc. to DIN 10967-1) [3] was conducted by an experienced sensory panel consisting of 11 panelists.

STEP 1

Through the Quantitative Descriptive Analyses the descriptive panel produces taste and texture profiles of sucrose, erythritol, maltitol, stevia rebaudiana or rather rebaudioside A and sucralose in aqueous solutions, first by same intensities of sweetness (1,0) and second by similar amount of bulk sweeteners (30 g / l water).

RESULTS

The results from the descriptive sensory tests are used to describe the perceivable sensory attributes of the tested products. Moreover to identify significant differences among the sweeteners, especially between the sweeteners and sucrose. Significant differences between the samples are marked by * in the spiderweb.

CONCLUSION

The alternative sweeteners erythritol, maltitol, sucralose and stevia do not show sucrose-like taste and texture profiles but specific sensory characteristics. It has been demonstrated that a complete sugar replacement by using these sweeteners separately and keeping sucrose-like properties is not feasible.

The tested combinations of these conventional and natural sweeteners show sucrose-like taste and texture profiles by an adjusted sweetness of 1,0. Consequently, a possible sugar substitution in food is here readily identifiable.

Changing these optimal combinations with the aim of adjusting the maximum of sweetness the negative and characteristic taste of the sweetener can be pointed out again.

Therefore the sweeteners or rather the combinations are application-specific and need to be adapted to different food matrices in future.


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