FACTORS REGULATING ASTRINGENCY OF WHEY PROTEIN-FORTIFIED BEVERAGES

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ABSTRACT

A rapidly growing area of whey protein use in foods and beverages is the sports drink category. There are two types of whey protein-fortified drinks; those at neutral pH and those at low pH. Astringency is very pronounced at low pH. Astringency is an undesirable characteristic thought to be caused by compounds in foods that bind with, and precipitate salivary proteins. The mechanism of astringency of whey proteins is not understood and has not been investigated. Salivary flow rate, viscosity, and pH have been reported to influence astringency of red wine, tannic acid, alum, and chitosan solutions, and cranberry juice.

Trained sensory panelists evaluated the viscosity and pH effects on astringency of whey protein-fortified model drinks (n=8). Changes in optical density of saliva and drink mixtures before and after centrifugation were investigated in an attempt to correlate aggregation and precipitation with astringency. Increasing viscosity (1.6 mPa s – 7.7 mPa s) did not reduce astringency, however there were significant differences across the pH range investigated (pH 2.6 – 6.8). Acidic drinks were higher in astringency and sourness compared to the drink at neutral pH. Saliva and drink mixtures showed that aggregation and precipitation was taking place, and the degree of precipitation correlated with perceived astringency. Electrostatic interactions between positively charged whey proteins at low pH and saliva proteins with low isoelectric points are thought to be responsible for aggregation and precipitation, resulting in the perception of astringency.