COPIGMENTATION REACTIONS OF BOYSENBERRY JUICE

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ABSTRACT

Colour is one of the main sensory characteristics of berry juice and fruit products and this parameter also powerfully impacts on consumer behaviour. However, the colour of berry juices is unstable and degradation occurs during storage. The main objectives of the project were: to determine the mechanism by which boysenberry juice enhances the colour of other berry juices and to determine if its addition to berry juices will also stabilise the anthocyanin pigments and enhance copigmentation. In this study, total anthocyanin, total phenolic acids, hyperchromic and bathochromic shift and the rate of colour degradation was measured by spectrophotometric techniques. Individual anthocyanin and phenolic acid content were measured in each juice by high performance liquid chromatography (HPLC) were evaluated during storage at 5, 20 and 35°C.

Boysenberry juice improved the colour of blackcurrant, cranberry and pomegranate juices immediately after addition; however, only blackcurrant juice colour was stable during storage at 5°C. There was no influence on the stability of total anthocyanins in pomegranate or cranberry juices when boysenberry juice was added. Of the three juices, pomegranate had the highest rate of degradation. The total anthocyanin of blackcurrant enhanced with boysenberry juice was more stable than for cranberry and pomegranate juices. The impact of phenolic acids found in boysenberry juice (kaemferol, quercetin and ellagic acid) on blackcurrant juice colour stability was also investigated.

The colour stability of blackcurrant juice was improved by the addition of ellagic acid at 5°C; however, the colour intensity of blackcurrant enhanced with kaemferol and quercetin decreased with storage. The copigmentations between anthocyanins themselves were not found to be a significant effect on colour stability of blackcurrant juice. Ellagic acid had the strongest colour improvement in blackcurrant juice compared to boysenberry juice. In conclusion, ellagic acid as found in boysenberry juice formed intermolecular copigmentation with blackcurrant juice anthocyanins, so this resulted in stabilised juice colour during storage; however, the effect was found when the juice was stored at 5°C only.

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