Characterisation of phenolic compounds and polysaccharides in Strawberry: Harvest effects and their correlation with colour stability.

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Consumer's decision regarding fruit products like juices and nectars is highly influenced by the perceived colour, which mostly results from a high phenolic content. The acceptance rate of strawberry nectar has been linked to colorimetric parameters through an Acceptance Factor (AF) [1-2]. However, this correlation has been limited to pH, Brix, titrable acidity and sensory perception of consumer (*fresh, healthy, juicy, aged, etc…)*. Moreover, macromolecules like polysaccharides and/or proanthocyanidins, and their interaction with anthocyanins may influence the colour stability of strawberry products [3]. Hence, a physicochemical study was implemented to evaluate the potential effect of these molecules on colour stability. A correlation between variety, ripening stage, harvest time and chemical composition was established regarding the Acceptance Factor (AF) [2]. These new parameters can give an accurate description of the most adequate raw material for nectars and juices with high colour stability.

The content and composition in phenolic compounds and polysaccharides of 13 strawberry varieties at 2 ripening stages and 2 harvest times were characterised. Colour stability was evaluated by monitoring the colour change of strawberry nectar after production, calculated as the change in the acceptance factor after 12 weeks (AFΔ12), based on the CIELAB parameters [1-2]. Phenolic compounds were identified by HPLC/ESI-MS^2 and quantified via HPLC-DAD with or without depolymerization by menthofuranolysis. In addition, polysaccharides were extracted and characterised regarding their composition (neutral sugars, galacturonic acid) and structure (degrees of methylation, linearity and branching).

Samples were successfully correlated with 12 out of 40 variables analysed (individual anthocyanin concentration, degree of polymerization and composition of proanthocyanidins, degree of methylation and composition of pectin…*).* Overall, significant differences were found for these variables depending on variety, ripening stage and harvest time. Distinctively, overripe samples from the late harvest showed a higher colour stability. Concerning variety, more stable samples often had higher concentrations of the main strawberry anthocyanin pelargonidin-3-glucoside (P3G) (i.e. Variety Faith). By contrast, varieties like Rendezvous and Mailing Centenary displayed high colour stability despite their low content in P3G. This suggests that other variables, such as cyanidin-3-glucoside, proanthocyanidins rich in epiafzelechin, and pectin characteristics (xylose, galactose, degree of methylation of 70-80%), have a positive influence on the colour of strawberry nectars. This mainly shows that the mechanisms of colour stabilization of strawberry products during storage are multifactorial and still incompletely understood.

[1] M. Gössinger *et al.*, « CONSUMER'S COLOR ACCEPTANCE OF STRAWBERRY NECTARS FROM PUREE », *J. Sens. Stud.*, vol. 24, n° 1, p. 78-92, 2009.

[2] H. Murray, C. Dietl-Schuller, M. Lindner, K. Korntheuer, H. Halbwirth, et M. Gössinger, « Prediction of the potential colour stability of strawberry nectar by use of a Stability Prediction Value (SPV) », *LWT*, vol. 173, p. 114233, 2023.

[3] S. Erşan, M. Müller, L. Reuter, R. Carle, et J. Müller-Maatsch, « Co-pigmentation of strawberry anthocyanins with phenolic compounds from rooibos », *Food Chem. Mol. Sci.*, vol. 4, p. 100097, 2022.