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CONTROL OF MAILLARD REACTIONS IN LACTOSE HYDROLYSED UHT-PROCESSED MILK BY GREEN TEA EXTRACT

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Introduction: Existing literature show that Maillard reactions (MR) are more pronounced in lactose-hydrolysed (LH) milk and the heat load during UHT-processing may boost the reaction^{1,2,3}. In the present work, we have investigated the effect of epigallocatechin gallate (EGCG)-enriched green tea extract (GTE) in controlling MR in long-term stored LH UHT-processed milk.

Methods: GTE was added to LH skim milk, UHT treated, stored at room temperature for 1 year and then analysed for free polyphenols, α -dicarbonyls, polyphenol- α -dicarbonyl adducts and advanced glycation end-products (AGEs).

Results: The UHT-processing resulted in epimerization of EGCG into gallic catechin gallate (GCG). The concentration of free EGCG/GCG decreased dramatically during storage, indicating that polyphenols are bound to reactants, intermediates and/or products of MR. Mass spectrometric analysis confirmed that polyphenols could trap α -dicarbonyls, including glyoxal and 3-deoxyglucosone, which was further correlated with the decreased levels of free α -dicarbonyls in GTE-dosed milk. Moreover, the addition of GTE lead to the reduced formation of AGEs.

Conclusions: Polyphenols can form covalent adducts with MR intermediates, thereby, inhibit MR cascades in milk. The addition of GTE could be a viable strategy to improve quality and stability of LH UHT milk, but the effects of GTE on protein binding should be investigated further.

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