

Epimerization of oligopeptides induced by radiation rays

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Proteins just after translation are composed of L-form homochiral amino acids. The formation process of homochiral polypeptides, which are fundamental for proteins, has not been elucidated. Although many hypotheses have been proposed, most of those relate to explaining the one-handed structure of amino acids. This research focuses the reactivity of oligopeptides to discuss epimerization of oligopeptides induced by irradiation using gamma rays and discharges, and the difference in epimerization rate between diastereomers.

Linear and cyclic alanine dipeptides were irradiated in solution or as solid state by gamma rays (1-24 kGy). The resulted reaction solutions were analyzed by means of HPLC equipped with achiral or chiral columns. Linear L-Ala-L-Ala epimerized faster (reaction rate constant: 0.017kGy^{-1}) than D-Ala-L-Ala (0.0033kGy^{-1}) in 1mM solutions. This suggests that such reaction conditions are not suited for accumulation of homochiral peptides. However, the results in the reactions using cyclic dipeptides showed heterochiral peptides epimerizes faster than homochiral peptides.

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