

AROMATIC AMINES IN MAILLARD REACTION

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It is shown that aromatic amines actively participate in the Maillard reaction with formation of appropriate melanoidins, and an initial stage of this process, as well as in case of aliphatic amines, is formation of N-glycosides. From the viewpoint of dependence from pH of the reaction medium, aromatic amines (aniline, toluidines and amino phenols) are similar to aliphatic amino acids – their reactivity is increased with increase of pH. In these conditions, the isomeric amines are subject to certain regularity. In acid, neutral and alkaline medium, the amount of formed melanoidin is increased with increase of the pH of the reaction medium, and thus the m-isomer is always least active. In this respect, in a case of amino benzoic acids opposite regularity is observed – their activity in Maillard reaction decreases with increase of pH, and reactivity of p-isomer is rather low.

Interacting of amino benzoic acids with D-glucose is subject to the certain pattern – by an increase of temperature the quantity of the reacted amino benzoic acid increases. Thus, in acid, neutral and alkaline mediums, the m-isomer reacts much more actively, then the p-isomer, and in this respect o-isomer occupies an intermediate position. Presumptively, such regularity is conditioned by various values of pKa of isomeric amino benzoic acids.

The fact that a reactivity of amino benzoic acids in Maillard reaction is reduced by decrease of pH of reaction medium is common regularity and is confirmed in case of all aldoses investigated by us. In comparison with aldohexoses, aldopentoses participate in process of formation of melanoidins more actively. For example, aryl amines including amino phenols, so actively react with aldopentoses (xylose, an arabinose) that in the reaction conditions indicated above the great bulk of an end product is precipitated as insoluble melanoidin.

We investigated distribution of a melanoidin pigment between the fractions of the reaction mixture received as a result of m-amino benzoic acid and D-glucose. In result it was shown that in melanoidin, formed from m-amino benzoic acid and D-glucose, the contents of high molecular weight (>3500 dalton) was higher (22-30%), then in melanoidins from the glucose/glycine and glucose/ α -alanine systems.