Comparison of the non-volatile ethyl acetate-extractable reaction products formed in a xylose-lysine model system heated with and without pH control

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Abstract

Aqueous solutions of xylose (1 m) and lysine monohydrochloride (1 m), initial pH 5.27, were refluxed for 1 h, either without pH control (final pH 2.83) or by maintaining the pH at 5 throughout heating by the addition of sodium hydroxide solution. The ethyl acetate-extractable components were obtained from each system and analysed by TLC and HPLC (with diode array detection). The study illustrates the effect of pH during heating on the TLC and HPLC separation patterns obtained for the non-volatile reaction products. None of the colourless compounds and only two of the coloured compounds detected were common to both systems. One of these coloured compounds is 2-furfurylidene-4-hydroxy-5-methyl-3(2*H*)-furanone (FHMF). Compounds U1(1) and U2(2) are both coloured and were isolated from the system without pH control. Their similar electronic absorption and PMR spectra indicate certain common structural features, including the presence of two terminal furan rings, each substituted in the 2-position.