

DERIVATIZATION OF AMINO ACIDS – THE TOOL FOR THE MEDICINAL DIAGNOSTICS OF HUMAN DISORDERS

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Monitoring of various biogenic substances in the organism is an important part of medicinal diagnostics, which serves for the description of the pathological state of the organism. Amino acids are very important biomarkers of many diseases. The concentration levels in the body fluids (e.g., blood plasma or urea) are changing depending on the (pathological) state of the organism. The quantification of the low concentration levels of amino acids using HPLC/MS (or other analytical methods), which occur in the human body, is difficult. Since the derivatization with a suitable reagent can significantly increase the analyte response and also can improve the chromatographic separation, it is very often performed especially in the case of analytes that are difficult to determine.

In our work, we optimized the reaction conditions (the type of the base, reaction temperature, the type of the solvent, reaction time, amount of derivatization agent) of model amino acids with Marfey reagent as a derivatization agent (Fig. 1). Using Marfey reagent under optimal reaction conditions (triethylamine as a base, acetonitrile as a solvent, molar ratio amino acid:derivatization agent 1:10, 60 °C, 24 h), the reactions proceeded with high conversions (about 70%) of model amino acids (serine, methionine, γ -aminobutyric acid).

Performing the artificially created study, the functionality of the proposed method was evaluated for the quantification of model amino acids in artificial blood plasma. The obtained results can serve as a basis for the clinical study of real blood plasma of patients suffering from various diseases in comparison to the control group of healthy subjects.

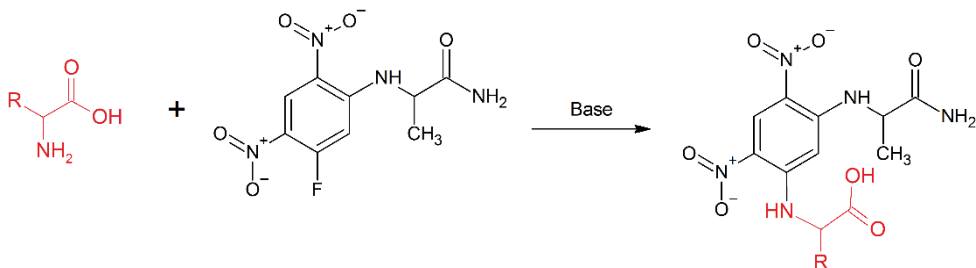


Fig. 1 Reaction scheme of derivatization of amino acid by Marfey reagent