

QUANTIFICATION OF GLUCOSAMINE AND HYALURONIC ACID IN FOOD SUPPLEMENTS BY POTENTIOMETRIC MULTISENSOR SYSTEM

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The widespread use of glucosamine and hyaluronic acid in dietary supplements for the prevention and reduction of knee osteoarthritis-related pain is common nowadays. It has been shown that glucosamine in any form contributes to the treatment of mild to moderate osteoarthritis after six months' use. Hyaluronic acid is also used as a food supplement and in cosmetic products as a moisturising and softening agent, including for joints.

Biologically active supplements are not medicinal products, but they contain active substances such as vitamins, amino acids, minerals, etc. Therefore, an accurate analytical method is needed to control the content of active components in food supplements. Traditionally, the HPLC-UV method has been used for the determination of glucosamine in food supplements [1], but due to low sensitivity and weak UV absorption, the method is often combined with pre- or post-column derivatization [2]. A method using NMR spectroscopy has also been developed [3]. These methods require expensive equipment and are quite resource and time-consuming.

This study focuses on exploring the possibility of using a potentiometric multisensor system as an express and cost-effective method for the quantitative determination of glucosamine and hyaluronic acid in food supplements. Calibration was performed for glucosamine and hyaluronic acid concentrations ranging from 10^{-3} to 10^{-1} M for glucosamine and from 10^{-4} to 10^{-2} M for hyaluronic acid, resulting in a linear relationship between potential and the decimal logarithm of concentration. The responses of the potentiometric sensor system represent a complex chemical fingerprint of the food supplement samples, which can be linked to their composition using multivariate regression modeling methods. The proposed approach was applied to analyze 37 types of food supplements, showing the potential use of multisensor systems for quantitative analysis of glucosamine and hyaluronic acid content with good accuracy, as well as the classification of samples based on active substances.

References

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