

Ionization Characteristics of Maltooligos in MALDI-TOFMS

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Carbohydrates are the most abundant and structurally diverse compounds. The hydrophilic nature of oligosaccharides and the lack of a chromophore have presented problems for their analysis and the absence of a basic site inhibits protonation in MALDI mass spectrometry. Carbohydrates are most often ionized by adduction of metal ions, usually sodium cation. In order to measure accurate molecular weight distributions of an analyte using MALDI mass spectrometry, ionization efficiencies of all molecules in the analyte must be corrected. In the present work, we investigated the variation of ionization efficiency of maltooligose with its size. The sample was ionized in the presence of sodium ion by irradiation with nitrogen laser (337 nm). The peak intensity of $[M + Na]^+$, M is the maltotriose, maltotetraose, maltopentaose, maltohexaose, and maltoheptaose, increased notably until the hexamer by increasing the molecular size and then decreases. The increased ion intensity with increase of the molecular size can be explained with the stable ion-molecule complex between sodium ion and maltose. The $[M + Na - 18]^+$ ions assigned to $[M + Na - H_2O]^+$ were also observed in the maltohexaose and maltoheptaose. Experimental results using MALDI-TOFMS were compared with LC/MS results.