

Facile and Rapid Direct Gold Surface Immobilization with Controlled Orientation for Diverse Carbohydrate Types

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Efficient carbohydrate immobilization methods by coupling with some linkage materials are current interest. Here, we proposed novel and simple modification method for direct surface immobilization by introducing thiol-group to reducing sugar of target saccharide through amination reaction. To demonstrate generality of this method, we performed the modifications of various saccharides: glucose (monosaccharide), lactose (disaccharide) and GM1 pentasaccharide, and confirmed their successful modifications through accurate mass identification. Results of direct binding assay on gold surface by surface plasmon resonance (SPR) supported that all modified thiol-group-contained saccharides were successfully immobilized without other treatments. Especially, in the case of GM1 pentasaccharide, we also confirmed direct immobilization using electrochemical method. In comparison with conventional indirect immobilization, directly immobilized GM1 pentasaccharide on gold surface showed higher efficiency. Therefore, this novel, simple, and general modification method using amination reaction can be successfully used for direct surface immobilization of diverse carbohydrates that can be applied for biosensor and carbohydrate chip.