Synthesis of Diglyceride Health Functional Materials for Cosmetics and Pyrrole Platform Chemicals for Pharmaceuticals

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Diglycerides of biologically active organic acids and/or phenols are useful nutraceutical reagents with wide application in the cosmetic and food industries. 1,2- and 1,3-Diglycerides have been practically synthesized by a regio selective epoxide ring-opening reaction. The glycerol linkage in the diglycerides provides flexibility to the constituent esters (or ethers), resulting in synergistic and moisturizing effects, in addition to the bioactive effects of each acid. The diglycerides have been proven to be excellent cosmetic ingredients with various effects, including whitening, anti-wrinkle, moisturizing and antioxidant activities.[1]

Pyrrole compounds serve as key substrates in the development of antibacterial, antiviral, anticancer, and anti-inflammatory agents. Additionally, due to their excellent electronic properties and stability, they are widely applied in organic electronics and polymer materials for OLEDs, solar cells, and semiconductor devices. We developed a one-pot synthesis method using amino acids and reducing sugars to produce pyrrole-based platform compounds.[2] This approach not only simplifies the synthetic pathway for pyrrole derivatives but also offers an eco-friendly and efficient route for generating high-value compounds with potential applications in pharmaceuticals, biotechnology, and electronic materials. Using this methodology, pyrrolo[1,4]oxazin-3-one compounds synthesized from reactions between amino acids and glucose or ribose exhibited pain-relieving potential and demonstrated strong antioxidant activity. Furthermore, we extended this one-pot synthetic strategy to create polycyclic aromatic compounds, including pyrrolo-piperazin-2-ones as analgesic drug candidates,[3] and pyrrolo-1,3,4-oxadiazoles as antibacterial agents.[4]

References

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