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**Abstract**

The stereocontrolled synthesis of new sugar derivatives carrying the α,β-unsaturated δ-lactone (butenolide) moiety is described. Sugar-fused or sugar-linked butenolides can be constructed by an efficient reaction sequence involving Wittig olefination of 3- or 5-keto sugars and intramolecular cyclization of the intermediate γ-hydroxy α,β-unsaturated esters. The antimicrobial activities of the products and that of a known sugar-derived pyranoid α,β-unsaturated δ-lactone were investigated against six pathogenic bacteria and six fungi. The pyranoid α,β-unsaturated δ-lactone 29 proved to be the most active compound in this series towards the plant pathogenic fungi *Colletotrichum coffeanum* (coffee berry disease) and *Pyricularia oryzae* (rice blast disease).

**Keywords:** furanosidic systems; scaffolds; Wittig reaction; Lactones; Carbohydrates