ABSTRACT

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Title of Doctoral Thesis	Application of substituted pyranones in dendralene chemistry and total synthesis of natural compounds

This thesis deals with the preparation of substituted pyranones *via* the sequence of two palladium-catalyzed reactions, Migita-Stille coupling and Tsuji-Trost allylic transposition. The products obtained were applied in the synthesis of cross-conjugated heterocyclic [3] and [4]dendralenes, providing structurally complex *mono*- to *tris*-cycloadducts with a suitable dienophile through diene-transmissive Diels-Alder reactions with a high degree of chemo- and stereoselectivity. The insights into the cycloaddition reactions of pyranones were subsequently utilized in a biomimetic total synthesis of a newly described natural isocoumarin prunolactone A, featuring a unique 6/6/6/6/6 spiropentacyclic skeleton. Potencial use of the allylic isomerization lies also in a similarity with a structurally atypical isocoumarin, pestalactone C, with promising biological activity. Thus, the first total synthesis of racemate and both enantiomers was described. The study of the unexpected reactivity of pyranones further enabled the design of a synthetic pathway towards the biologically active isocoumarin sescandelin B, together with structurally similar natural compounds, penicimarin E, 10-*O*-isovalerylsescandelin B, 8-*O*-methylsescandelin B and phomoisocoumarin C. Selected compounds were tested on a wide range of biological activities.