Simple Protocols for Stereocontrolled Synthesis of Acyclic Low-Molecular Bioregulators

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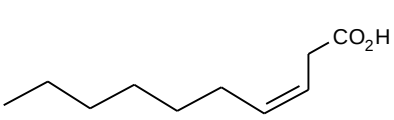
Recently, three operationally simple protocols for stereocontrolled synthesis of various biologically active acetogenins, isoprenoids and sugars were developed in our laboratory:

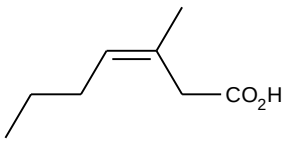
(*1*) A sequence that combines the Horner—Emmons olefination of aldehydes by bifunctional allylic phosphonates with Frankel's 1,4-*cis*-hydrogenation of the resulting alkyl 2,4-alkadienoates to give optionally *Z*- or *E*-configured trisubstituted olefins depending on the structure of the diene. Some new modifications of this protocol were also elaborated, *e.g.*, the synthesis of "skipped" *Z,Z*-diolefins.

(*2*) Stereodivergent synthesis of all possible stereoisomers of chiral biomolecules that employs the PPL-mediated kinetic resolution of racemic precursors as the key step. An original modification of this protocol consists in enhancing the enantioselectivity of resolution of an aromatic substrate by means of temporarily converting the latter into an (η^6-arene)chromium tricarbonyl complex.

(3) The use of the "*meso*-trick" to transform D-xylose or D-galactose into less common sugars such as L-xylose or L-fucose by means of lipase-mediated kinetic resolution.



1



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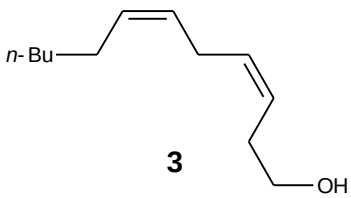

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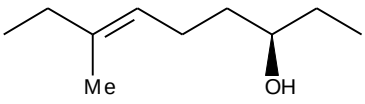
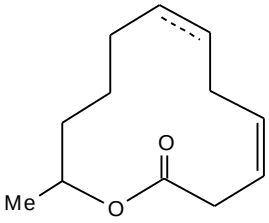
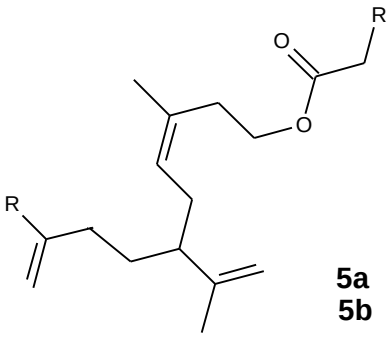


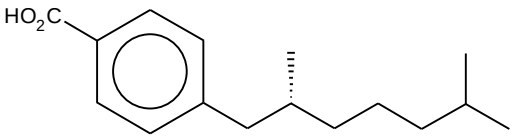
(*R*)-**4**



6a
6b



5a
5b



(*R*)-**7**

Using these protocols, various biologically active substances (*e.g.*, **1—7**) were obtained. Thus, **1-4**, **5a,b** and **6a,b** are insect pheromones, (*R*)--**7** is a hypolipidemic agent, while L-xylose and L-fucose are building blocks or valuable ingredients for making some pharmaceutical drugs or compositions.