

Synthetic study of nemorosonol and hyperuralone A having a tricyclo[4.3.1.0]decane skeleton

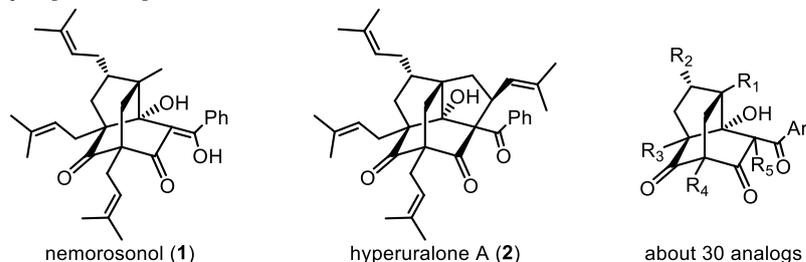
(Degree Programs in Pure and Applied Sciences, University of Tsukuba) ○Keisuke Mitsugi, Toru Takabayashi, Takayuki Ohyoshi, Hideo Kigoshi

Keywords: polycyclic polyprenylated acylphloroglucinol, tricyclo[4.3.1.0]decane skeleton, nemorosonol, hyperuralone A, unified total syntheses

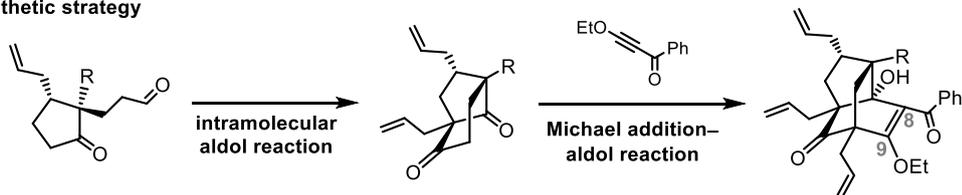
About 30 PPAPs having the tricyclo[4.3.1.0^{3,7}]decane skeleton are known, and these PPAPs show various biological activities. Examples include nemorosonol (**1**), which has the most basic structure, and hyperuralone A (**2**), which has one of the most complex structures. (+)-**1**¹⁾ has no reported biological activity, while its enantiomer²⁾ shows antimicrobial activities against various fungi. In addition, **2** has a tetracyclo[5.3.1.1^{4,9}.0^{4,11}]dodecane skeleton and exhibits cytotoxicity against human lung cancer cells A549³⁾. Despite these attractive structures and biological activities, there are few synthetic reports of these PPAPs. Therefore, we aimed to establish a unified synthetic strategy for these PPAPs.

First, we established a synthetic strategy through intramolecular aldol reaction, which give a bicyclic skeleton, and tandem Michael addition–intramolecular aldol reaction using 3-ethoxy-1-phenyl-2-propyn-1-one. Tandem Michael addition–intramolecular aldol reaction enabled introduction of a benzoyl group at the C8 position and control of the degree of oxidation at the C9 position at the same time. Based on this synthetic strategy, we achieved concise total synthesis of nemorosonol (**1**) and investigated the synthesis of hyperuralone A (**2**).

PPAPs having tricyclo[4.3.1.0^{3,7}]decane skeleton



unified synthetic strategy



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