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### Naturally occurring Chiral 2-Hydroxycitric acids in the construction of molecules of drug-likeness

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#### Abstract

Chiral molecules, either obtained directly from nature or through chemical modification of the naturally occurring molecules, play a vital role in the pursuit of pharmaceutical and synthetic organic chemistry. Those molecules isolated from various sources often exhibit diverse biological activities, and exemplified by their pivotal role in the scope of chemical biology, drug discovery, and drug development. Among various strategies toward the synthesis of enantiopure compounds, the chiral pool approach is extremely attractive due to assured optical purity of the target molecule, and economic viability. Several tropical plants are rich sources of structurally simple chiral 2-hydroxycitric acids. Out of the four possible optical isomers, the (2S,3S)-diastereomer garcinia acid and the (2S,3R)-diastereomer hibiscus acid have been isolated as their γ-butyrolactones in optically pure form in kilogram quantities (Figure 1). The two stereogenic centers in these γ-butyrolactones have structural and stereochemical features that relate to several small bioactive molecules of synthetic or natural origin.

However, using the molecules having a three- or four-carbon framework, synthesis of target molecules with a basic skeleton having more than four carbons inevitably involves lengthy synthetic sequences. Therefore, the chiral lactones of garcinia and hibiscus acids bearing chemically amenable functional groups, could be an ideal choice for the diversity-oriented construction of several bioactive molecules such as (-)- and (+)-crispine A, (+)- and (-)-harmicine, bicyclic furo[2,3-b] pyrrolo skeleton, bisfuran, pyrrolidine-2,5-diones (Figure 2). Accordingly, the uniqueness of relatively cheap, naturally occurring chiral 2-hydroxycitric acid lactones as Chiron has been demonstrated by the construction of some important molecular skeletons that are otherwise difficult to synthesize.

#### **Biography**

Chitra Mohan was born in Kerala, India, in 1984. She obtained her Ph.D. in synthetic organic chemistry at IIRBS, Mahatma Gandhi University, Kerala (India), under the supervision of Prof. Dr. Ibrahim Ibnusaud. She too pursued her MPhil degree from Mahatma Gandhi University. She is as an Assistant Professor at the School of Chemical Sciences, Mahatma Gandhi University, Kerala. In 2021, she joined as a member in Organic Chemistry Division, and Professional Relations Division (Women Chemists) of American Chemical Society (ACS). Her research interests encompass synthesis of enantiomerically pure compounds from Natural Product starting materials, the synthesis of complex organic molecules, and medicinally pertinent molecules via photoredox catalysis.