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Investigation and utilization of unique natural products from endemic tree species in Taiwan

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Taiwan, formerly known as Formosa, located on tropical and subtropical climate zones with abundant biological resources. According to the latest version of the Flora of Taiwan, there are 4339 species of vascular plants including 1054 endemic species. First, Taiwania (*Taiwania cryptomerioides*), named after its native island of Taiwan, have been isolated more than 500 secondary metabolites, including lignans, terpenoids, steroids, and flavonoids. Several of the metabolites are reported to have antibacterial, antifungal, antimite, antitermite and antitumor activities. In order to investigate plant secondary metabolic diversity toward industrial applications, we established deep transcriptome resources for non-model plants and fungi to produce terpenoid metabolites of economic importance. Second, many plants of Lauraceae have been utilized in folk medicine for their exciting bioactivities. The twigs and leaves from 27 tree species of Lauraceae grown in Taiwan were performed to evaluate potential bioactivity. The leaves of *Cinnamomum osmophloeum* are traditionally used in folk medicines, and many biological activities have been identified, such as antibacterial, antifungal, antitermite, antidiabetic, antihyperuricemia, antiinflammatory, and antioxidant activities. However, *C. osmophloeum* has nine chemotypes with various secondary metabolite profiles. In order to efficiently produce active compounds, we established the genetic markers to identify the chemotype plants. Finally, *Cinnamomum kanehirae* is the host of the medicinal mushroom *Antrodia cinnamomea*. Several in vivo and in vitro studies indicated that *A. cinnamomea* possesses a diverse range of biological activities. Because of the potential pharmacological application, we established the transformation system to enhance the triterpenoid contents production.