OPEN ACCESS Freely available online

Journal of Plant Biochemistry & Physiology

Short Communication

Diverse Applications of Terpenoids in Plants

Xuanqiang Liang*

Department of Agricultural Sciences, Crops Research Institute, China

DESCRIPTION

Terpenoids are the largest group of plant specialized metabolites. These naturally occurring chemical compounds are highly diverse in chemical structure. Although there have been many excellent studies of terpenoids, most have focused on compounds built solely of isoprene units [1]. The zest of citrus fruits, and the healing powers of many medicinal plants. We delve into the fascinating world of plant terpenoids, unraveling their chemical structure, ecological functions, and their immense significance in various fields [2-4].

Terpenoids, also known as isoprenoids, are a vast and diverse group of natural compounds derived from a common precursor, isopentenyl diphosphate and its isomer dimethylallyl diphosphate. Through various enzymatic reactions, plants intricately modify these precursors, giving rise to a bewildering array of terpenoids. From the volatile monoterpenes and sesquiterpenes to the complex diterpenes and triterpenes, plants have evolved the ability to produce an astonishing range of chemical structures. Nature has bestowed plants with an exquisite array of terpenoids, each with its unique scent, color, and flavor, serving multiple ecological purposes [5-7]. For instance, the alluring aromas emitted by flowers are often a result of volatile terpenoids, acting as olfactory beacons to attract pollinators. The diverse range of terpenoid compounds also serves as chemical defenses, repelling herbivores with their bitter taste or toxic properties. Some plants have even developed intricate chemical communication systems using terpenoids, signaling nearby plants about potential threats. The therapeutic potential of plant terpenoids is an area of burgeoning research and discovery. Terpenoids are a large and diverse group of natural compounds that are synthesized by plants through the mevalonate or the 2-C-methyl-D-erythritol-4-phosphate pathways. These compounds play essential roles in plants, including serving as pigments, hormones, fragrances, and defense chemicals [8-10]. The structure, function, and chemical composition of plant terpenoids can vary widely, but they generally consist of isoprene units that are assembled and modified in various ways. Plant terpenoids have diverse functions and play crucial roles in plant physiology and interactions with the environment. Terpenoids, such as carotenoids, are responsible for the bright colors in fruits, flowers, and leaves. They function as pigments involved in photosynthesis and attract pollinators and seed dispersers. Certain terpenoids act as plant hormones, regulating growth, development, and responses to environmental cues. For example, gibberellins and abscisic acid are important terpenoid hormones [11]. Terpenoids are responsible for the characteristic aromas and scents of plants. They attract pollinators and seed dispersers and can also repel pests. Fragrant compounds like linalool, menthol, and limonene are common terpenoids. The chemical composition of plant terpenoids is determined by the specific arrangement and modifications of isoprene units. Different combinations of isoprene units and modifications can result in a wide variety of terpenoid structures [12]. The specific chemical composition of a terpenoid can influence its properties, such as volatility, polarity, and reactivity.

CONCLUSION

The world of plant terpenoids is an intricate and captivating domain, encompassing an astonishing diversity of compounds with multifaceted roles. From their scents and flavors to their Therapeutic potential, terpenoids have captured the attention of scientists, botanists, and enthusiasts alike. The exploration of their chemical structures, ecological functions, and industrial applications continues to unravel the hidden wonders of the natural world.

REFERENCES

1. Cao JY, Mei LJ, Wu N, Yu RT, Tao YD. Terpenoids from the whole plants of *Saussurea medusa* maxim. And their chemotaxonomic significance. Biochem Syst Ecol. 2022;105:104511.
2. Avalos M, Garbeva P, Vader L, van Wezel GP, Dickschat JS, Ulanova D. Biosynthesis, evolution and ecology of microbial terpenoids. Nat Prod Rep. 2022;39(2):249-272.
3. Jagatap VR, Ahmad I, Patel HM. Recent updates in natural terpenoids as potential anti-mycobacterial agents. Indian J Tuberc. 2022;69(3):282-304.
4. Drummond CP, Renner T. Genomic insights into the evolution of plant chemical defense. Curr Opin Plant Biol. 2022;68:102254.

Correspondence to: Xuanqiang Liang, Department of Agricultural Sciences, Crops Research Institute, China, E-mail: liangx8@gmail.com

Received: 09-Jan-2023, Manuscript No. JPBP-23-24407; **Editor assigned:** 11-Jan-2023, PreQC No. JPBP-23-24407 (PQ); **Reviewed:** 25-Jan-2023, QC No. JPBP-23-24407; **Revised:** 01-Feb-2023, Manuscript No. JPBP-23-24407 (R); **Published:** 08-Feb-2023, DOI: 10.35248/2329-9029.23.11.268

Citation: Liang X (2023) Diverse Applications of Terpenoids in Plants. J Plant Biochem Physiol.11:268.

5. Korkmaz B, Renda G, Erik İ, Kılıç G, Coşkunçelebi K, Yaylı N. Two new dihydroisocoumarins and terpenoids from Scorzonera longiana Sümbül an endemic species to Turkey and their antimicrobial activity. Nat Prod Res. 2023;37(7):1185-98.
6. Kifle ZD, Abdelwuhab M, Melak AD, Meseret T, Adugna M. Pharmacological evaluation of medicinal plants with antidiabetic activities in Ethiopia: A review. Metabol Open. 2022:100174.
7. Kurze E, Wüst M, Liao J, McGraphery K, Hoffmann T, Song C, et al. Structure–function relationship of terpenoid glycosyltransferases from plants. Nat Prod Rep. 2022;39(2):389-409.
8. Klaus O, Hilgers F, Nakielski A, Hasenklever D, Jaeger KE, Axmann IM, et al. Engineering phototrophic bacteria for the production of terpenoids. Curr Opin Biotechnol. 2022 Oct 1;77:102764.
9. Rinaldi MA, Ferraz CA, Scrutton NS. Alternative metabolic pathways and strategies to high-titre terpenoid production in *Escherichia coli*. Nat Prod Rep. 2022;39(1):90-118.
10. Liu C, He M, Xu J. The constitutions of terpenoids and hormones of leaves in red-flesh citrus mutants and their wild types. Hortic Plant J. 2022;8(3):297-310.
11. Zhu DH, Zhang JK, Jia JF, Liu JJ, Wei JJ, Yang M, et al. Lignans and terpenoids from the stem of *Ephedra equisetina* Bunge. Phytochemistry. 2022;200:113230.
12. Luo Q, Cao WW, Cheng YX. Alkaloids, sesquiterpenoids and hybrids of terpenoid with p-hydroxycinnamic acid from *Ganoderma sinensis* and their biological evaluation. Phytochemistry. 2022 Nov 1;203:113379.