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35 YEARS OF EXCELLENCE IN MEDICAL PUBLISHING

In-planta enhancement of Artemisia annua bioactive compounds as an affordable cure in treatment of malaria and cancer

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Artemisia annua, a herbaceous plant commonly known as sweet wormwood, is the only medicinal, commercial and economical source of the sesquiterpene lactone artemisinin which is currently represented as the starting point for an unprecedented discovery in the treatment of cerebral malaria fever worldwide. *Artemisinin* along with its derivatives are the best antimalarial therapeutics presently delivered as artemisinin combination therapy (ACT). Beyond the therapeutic value as antiparasitic agent against Plasmodium parasites. the compound atremisnin along with *Artemisia* leaf flavanoids have potential as antiviral and anticancerous agent. But the having about 0.01 to 1.2 % dry weight (DW) *in-planta* concentration restricts its availability and makes artemisinin relatively expensive to meet global demand. High medicinal potential, large demand, low yields of artemisinin and annual life cycle of the species are prompting significant research efforts on *A. annua*. Making it increasingly popular for the molecular and physiological dissections for its sesquiterpene metabolism. Although artemisinin is a major bioactive component present in the herbal parts of plants, leaf flavonoids, have a variety of biological activities and may synergize the effects of artemisinin against malaria and cancer. The combination of dihydroartemisinin with ferrous sulfate has been recorded as tumor suppressor due to this characteristics iron is often administered several hours before artemisinin to enhance targeting of the cancer cells while sparing normal cells. Significant efforts have been made for enhanced production of artemisinin and flavanoids *in-planta* which includes diverse approaches such as abiotic elicitation, genetic manipulation and role of transcription factors regulating secondary metabolism in this plant. However, further efforts should be addressed toward enhanced, cost-effective approaches for synthesis and production of these bioactive compounds.

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