A Review of Biotechnological Artemisinin Production in Plants

Malaria is still an eminent threat to major parts of the world population mainly in sub-Saharan Africa. Researchers around the world continuously seek novel solutions to either eliminate or treat the disease. Artemisinin, isolated from the Chinese medicinal herb Artemisia annua, is the active ingredient in artemisinin-based combination therapies used to treat the disease. However, naturally artemisinin is produced in small quantities, which leads to a shortage of global supply. Due to its complex structure, it is difficult chemically synthesize. Thus to date, A. annua remains as the main commercial source of artemisinin. Current advances in genetic and metabolic engineering drives to more diverse approaches and developments on improving in planta production of artemisinin, both in A. annua and in other plants. In this review, we describe efforts in bioengineering to obtain a higher production of artemisinin in A. annua and stable heterologous in planta systems. The current progress and advancements provides hope for significantly improved production in plants.

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