

A Review of Biotechnological Artemisinin Production in Plants


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Abstract

In sub-Saharan Africa, Malaria is the deadliest disease that spread to most of the population of the country. The scientists trying their best to either treat the disease or completely remove the disease. Artemisinin, a Chinese medicinal herb by scientific name *Artemisia annua*, an active ingredient. This herb is majorly used in the therapies used for treating diseases. But, there is a shortage of global supply. As the herb has a complex structure, it's hard to chemically synthesize. *A.annua* remains similar to the perfect source of artemisinin. Latest developments in genetic and metabolic engineering leads to the advancement for the production of artemisinin, both in *A. annua* and also in other plants. There are a huge number of researches being done in bioengineering in order to produce higher amounts of artemisinin in *A.annua*. The recent researches and the improvement hikes hope in the increased production of the plants.

Keywords: Biotechnology, Artemisinin, cell suspension, methyl jasmonate

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Introduction

Malaria is the reason recorded for millions of cases yearly and deaths seen mainly in the younger population of the world. This disease is caused by *Plasmodium* sp. Particularly *Plasmodium falciparum* that is present in the female *Anopheles* mosquitoes. There are certain drugs to the malaria disease that have contributed to the reduction of the disease in malaria mortality and morbidity. Even now research is being done to discover the antimalaria drug from the traditional medicine in order to cure the disease.

Generally, a popular malarial drug artemisinin is an example of this and originates from *A. annua* which is a Chinese medicinal plant known as wormwood. There is a shortage of this herb for the world's population to treat malaria and continuous efforts are being made to improve the production of the medicinal herb artemisinin. *A. annua* is now the predominant source used for the production of the artemisinin in the breeding procedures. These led to the higher production of the plant. *A. annua* has a similar

genetical properties to that of the artemisinin which can yield the plant effectively. Identification of *A. annua* superior parental lines with required traits from these parental outputs has given two types of the hybrid plants which help cure malaria disease.

There is also this variation of hybrid variety due to the segregation of the heterozygous wild type progeny leading to a variant of genetic background than the original plant. It's very important to understand the genetical formation of the *A. annua* at the chemical and molecular level, will increase the artemisinin production. This definitely require a high acceptance of crops to fulfil the requirement in a global level. Other hybrid plant breeding methods such as plant tissue culture has also been used to increase the production of the artemisinin in *A. annua* through different artificial techniques. A lot of other necessities are also taken into consideration while growing these plants such as the light conditions, Ultra violet radiation and others to fully help the growth of the artemisinin plants. Thus these researches are helping the global population to meet the medicinal drug requirement of the malaria disease.