



The use of non-pharmaceutical forms of *Artemisia*





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WHO POSITION ON THE USE OF NON-PHARMACEUTICAL FORMS OF ARTEMISIA



WHO does not support the promotion or use of *Artemisia* plant material in any form for the prevention or treatment of malaria.

This position is based on the following considerations:

- **The content of the *Artemisia* herbal remedies given for malaria treatment and prevention varies substantially.**

The content and quality of the *Artemisia* herbal remedies are affected by variations in the content of the plant material and the preparation method.

A range of factors can affect the content of *Artemisia*, including genetics, at what point in the season the harvesting takes place, temperature, nutrient availability, and from where on the plant the leaves are harvested. Processing, drying procedures, and storage conditions further influence the content of plant materials. It is not feasible to implement the required level of quality control for cultivation, harvest and post-harvest aspects of *Artemisia* in the context of home-grown or small-scale cultivation.

The preparation method will cause further variation. The content of *Artemisia* tea is highly influenced by factors such as the temperature of the water. Even given in tablet or capsule form, the content of these will differ from the original source material.

- **Content in *Artemisia* herbal remedies is often insufficient to kill all malaria parasites in a patient's bloodstream and to prevent recrudescence.**

To achieve high efficacy rates, sufficient levels of artemisinin need to be administered and absorbed over seven days. The pharmacological properties of artemisinin mean that higher levels of artemisinin need to be administered on the last days of treatment than on the first days in order to achieve the same artemisinin blood levels. Too short treatments or too low blood levels of artemisinin will result in either failure to clear parasites from the blood or high levels of recrudescence. *Artemisia annua* contains varying levels of artemisinin. Herbal remedies prepared using *A. annua* with significant artemisinin content may improve symptoms, but are likely to result in high recrudescence rates. The available evidence does not support claims that the antimalarial activity of other plant constituents or synergism between artemisinin and other constituents will significantly increase the efficacy of non-pharmaceutical forms of *A. annua*.

Artemisia afra does not contain artemisinin or any other compound identified as having significant antimalarial activity in vitro.

- **Widespread use of *A. annua* herbal remedies could hasten the development and spread of artemisinin resistance.**

Artemisinin and artemisinin derivatives are the key compound in the artemisinin-based combination therapies (ACTs) used to treat millions suffering from malaria. The artemisinin derivative, artesunate, is used to save the lives of those suffering from severe malaria. Resistance causing the loss of the effectiveness of these drugs would be a disaster. In 2007, WHO Member States adopted World Health Assembly resolution WHA60.18 calling for a

progressive removal of oral artemisinin-based monotherapies from markets and deployment of ACTs instead. This decision was made to help protect artemisinin drugs from resistance. If consumption of *A. annua* becomes widespread, any potential weak antimalarial activity of other compounds in *A. annua* would not be sufficient to protect artemisinin from resistance. Resistance is more likely to develop and spread when a parasite population is exposed to sub-therapeutic levels of an antimalarial drug. The varying artemisinin content of *A. annua* herbal remedies means that widespread use of these remedies could lead to many people having such sub-therapeutic levels of artemisinin in their blood.

- **Artemisinin in any form does not work well as prevention against malaria.**

Artemisinin has a short elimination half-life, meaning that it only remains in the blood at therapeutic levels for a short time. Therefore, artemisinin is not recommended for use in malaria chemoprophylaxis in any form.

- **Affordable and efficacious treatments for malaria are available.**

WHO recommends ACTs for the treatment of uncomplicated *P. falciparum* malaria. Artemisinin partial resistance and resistance to some partner drugs do pose a challenge in parts of South-East Asia. However, there are still highly efficacious treatments available that can cure all strains of malaria. All those affected by malaria must have access to ACTs. Countries should strengthen their regulatory systems to protect patients from counterfeit and substandard treatments; this includes any products promoted for treatment of malaria without the necessary information in terms of their content, quality, safety and efficacy.

Herbal medicines have been a key source for the discovery of antimalarial medicines. It is possible that future antimalarial compounds will also be discovered through research on the herbal treatments used in the past. However, any research needs to respect the ethical principles for medical research involving human subjects and be approved by local ethical committees. The well-being of the individual research subject must take precedence over all other interests. Medical research involving human subjects must conform to generally accepted scientific principles and be based on thorough knowledge of the scientific literature, other relevant sources of information, and adequate laboratory experimentation*.

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