

Editorial

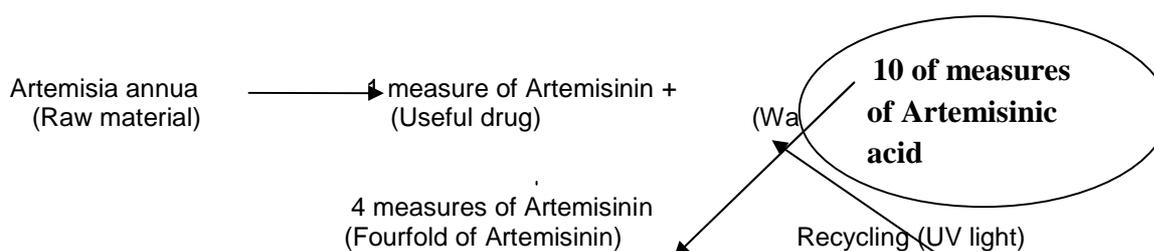
Chemists at Max Planck Institute (Germany) regenerate Artemisinin from its waste product.

With malaria parasite developing resistance to chloroquine, mefloquine, halofantrine (halfan) Sulfadimidine/pyrimethamine (fansidar) and a host of other anti-malarials, the window was closing on the opportunity to reduce malaria and suddenly, the world remembered the ancient Chinese therapy for malaria. Artemisinin, derived from the plant Qinghaosu (*Artemisia annua*), became the frontline drug against malaria. According to Youyou Tu (2011), an excerpt from the Chinese medical literature mentions both the dosage of herbs and the method of preparation of qinhaosu for malaria as far back as 284-346 CE ([A Handbook of Prescriptions for Emergencies by Ge Hong \(284–346 CE\)](#)).

With about 247 million cases of malaria worldwide (WHO, 2009), keeping pace with the natural raw material (*Artemisia annua*) for the continued production of artemisinin became an insurmountable task. Artemisinin became scarce and expensive. Because of the scarcity, criminal drug manufacturers flooded the market with sophisticated counterfeits especially in the far East-Asia (Ibekwe, J., IJMMS editorial 2009). According to the World Health Organization, studies showed that 40% of the artesunate based malarial medications were proved to be counterfeits. The counterfeit drug business caused a lot of avoidable deaths. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC557259/>.

Here comes a relief. Recently, the chemists at Max Planck Institute announced that they have succeeded in re-generating artemisinin from its waste product artemisinic acid by passing it (the waste product) through the ultraviolet ray and recouping a fourfold quantity of new artemisinin.

The scenario could be imagined in this way (editor's speculation, not from Max Planck Institute)



What does this mean? It means that in processing the raw material, *Artemisia annua*, for 1 measure of Artemisinin produced, there are 10 measures of the waste product, Artemisinic acid. Rather than throw away the waste (artemisinic acid), it is passed through ultraviolet light which removes the carboxyl group (-CO-OH) from artemisinic acid and converts into artemisinin in a fourfold quantity. This is not a chemical equation to be balanced; rather it shows the relative quantitative production of different fractions.

If we define recycling as processing used material (waste, trash) into new products to prevent waste of potentially useful raw material, then this is the real recycling. Here, we are preserving the raw material, *Artemisia annua*, while producing four or fivefold of new artemisinin.

Artemisinin will now be readily available and affordable. The prototype machine for this process, the Max Planck machine, would be the size of a suitcase and at a cost of about US \$132,000 which is affordable by any rural cottage hospital in malaria endemic regions. This is the most cost effective technology ever applied in the fight against malaria in recent time. Let us not forget that the reduction of malaria in the past 10 years came about because of artemisinin-combination therapy with increased distribution of insecticide-treated bed nets and the destruction of breeding sites for mosquitoes.

In the interim, the governments in the malaria endemic regions should buy the Max Planck machines and start recycling and churning out as much artemisinin as possible. Combined with adequate mosquito control, millions of lives will be saved. I do hereby call on the doctors and the scientists from malaria endemic regions to talk to their local governments, state governments and even their national governments to persuade them to take advantage of the Max Planck innovation and invest for life.

Editorial comment from:

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International Journal of Medicine & Medical Sciences.
(March 2012).