New malaria method could boost drug production

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German scientists have developed a new way to make a key malaria drug that they say could easily quadruple production and drop the price significantly, increasing the availability of treatment for a disease that kills hundreds of thousands every year.

Chemists at the Max Planck Institute take the waste product from the creation of the drug artemisinin - artemisinic acid - and convert it into the drug itself.

The entire apparatus is compact, about the size of a carry-on suitcase, and inexpensive. That means it can be easily added to production sites anywhere around the world.

"Four hundred of these would be enough to make a world supply of artemisinin," said unit director Peter Seeberger, pointing to the machine on a table in his lab in Berlin's Dahlem neighborhood. "The beauty of these things is they're very small and very mobile."

A paper on the new technique was published this month in chemistry journal Angewandte Chemie.

Artemisinin is extracted from sweet wormwood, a plant that primarily grows in China and Vietnam and varies in its availability according to the season. In the extraction process, for every part artemisinin produced, there is 10 times the amount of artemisinic acid discarded as waste.

Past attempts to convert the acid using ultraviolet light to trigger the conversion have been unsuccessful because the process took several steps in a large tank of acid, making production inefficient and far too expensive.

So the Max Planck chemists thought small - creating a machine that pumps all of the required ingredients through a thin tube wrapped around a UV lamp in a continuous process that takes 4 1/2 minutes from start-to-finish to produce the artemisinin.

The technique can convert about 40 percent of the waste acid into artemisinin - producing four times more of the drug from what had in the past been discarded, Seeberger said.

Colin Sutherland, a malaria expert at the London School of Hygiene and Tropical Medicine who was not involved in the Max Planck research, said the development could be significant in boosting production of the key malaria drug. He noted that currently very little artemisinin can be made from a large amount of the sweet wormwood, which is also difficult to grow.

"If it's a simple process, given a certain amount of plant material, you can generate more drugs, that will make things cheaper and faster," he said.

Since the end product is the same molecule, there should be no decrease in effectiveness of the synthetic product, Sutherland said.

Seeberger said a commercial prototype of the Max Planck machine could be ready in about six months and that it could go into production in about a year. He said current price estimates are around euro100,000 (US$132,000).

When it's in production, the idea is to make it available for a minimal fee to cover costs, he said.

"The goal is to make sure that the drug is produced and made available to as many people as possible," said Seeberger, a former Massachusetts Institute of Technology professor who now teaches at Berlin's Free University.

Sabine Haubenreisser, a spokeswoman at the European Medicines Agency, said that if the new drug is close enough to the original, its producers could apply for it to be considered as a generic product or use older data proving artemesinin's effectiveness - which could speed the approval process.

Malaria cases and deaths have been dropping since 2004, due largely to campaigns to distribute bednets, spray homes with insecticide and make better drugs available. The World Health Organization estimates that at least 655,000 people die of malaria every year, mostly children under 5 in Africa.

At the moment, artemisinin-based therapies are considered the best treatment, but cost about $10 per dose - far too much for impoverished communities.

Former U.S. President Bill Clinton's Clinton Foundation currently has a program to purchase the treatments, then sell them at a deeply discounted 50 cents to communities where they're most needed.

Cutting the price further while increasing production could "make a big difference," said Sutherland.

"Many times more children will have access to the right drug early in their disease and that's likely to have an impact on mortality."