New process would make anti-malarial drug less costly

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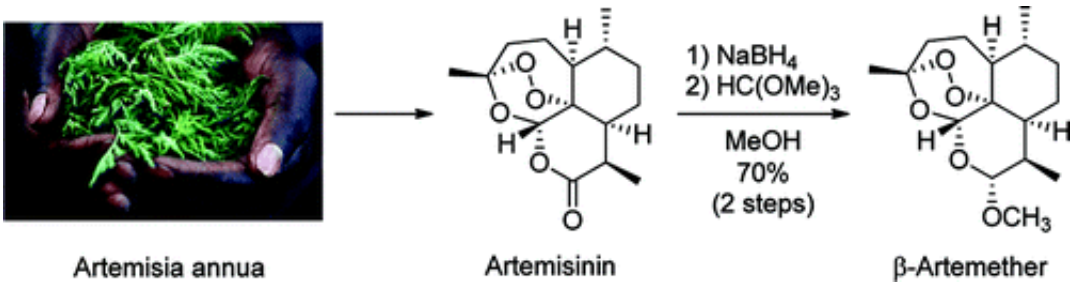

Scientists are reporting development of a new, higher-yield, two-step, less costly process that may ease supply problems and zigzagging prices for the raw material essential for making the mainstay drug for malaria. That disease sickens 300-500 million people annually and kills more than 1 million. The report on the process, which uses readily available substances and could be easily implemented by drug companies, appears in ACS' journal *Organic Process Research & Development*.

David Teager and Rodger Stringham of the Clinton Health Access Initiative explain that artemisinin combination therapy (ACT) is the most effective treatment for malaria, a parasitic infection that is transferred to humans from the bite of an infected mosquito. Artemisinin, which is used to produce the key ingredient in ACT, comes from *Artemisia annua*, a medicinal plant grown in China. In recent years,

the price for artemisinin has undergone huge market fluctuations, ranging from about $180 to $410 per pound, due to weather conditions and the demand for ACT. Keeping costs down is important because most cases of malaria occur in developing areas in the tropics and subtropics. The researchers reasoned that one way to help stabilize prices would be to improve the current ACT manufacturing process, which consistently yields less of the ingredient than expected. That improvement would reduce the amount of *Artemisia annua* needed to make ACT.

The new process is much simpler and generates less potentially hazardous waste than the current method. It also reduced the amount of artemisinin required to make ACT, which makes the process less costly. A "semisynthetic" version of artemisinin also worked well as a starting material in the new method. "We are in the process of sharing this procedure with manufacturing partners in our global fight to combat malaria," say the researchers.

More information: Streamlined Process for the Conversion of Artemisinin to Artemether, *Org. Process Res. Dev.*, 2012, 16 (5), pp 764–768. DOI: 10.1021/op300037e

Abstract
We report an improvement to the previously published manufacturing process for artemether, a key antimalarial drug, utilizing readily available reagents, easily controlled manufacturing conditions, and a greatly simplified workup and isolation. New analytical methods and in-process controls allow for optimization of yield through control of side product formation. A 70% overall yield from the two-step conversion of naturally or synthetically derived artemisinin to pure β-artemether is obtained. This corresponds to a usage factor of 1.35 kg of artemisinin needed to produce 1 kg of β-artemether, compared to the current industry average of 1.59 kg.