

# From Plant to Pill: Producing Malaria Medication in Kentucky

**Artemiflow**

[www.artemiflow.com](http://www.artemiflow.com)

# Overview

## LEADER

Artemiflow will become a major player in producing artemisinin-derivatives and ACTs

## SUPERIORITY

Achieved through technological superiority and capturing the entire supply chain

## EXPANSION

Rapid, modular expansion – covering Malaria market, then cancer medications

## MARKET

Artemiflow initial target: 1/3 global procurement level  
Demand for artemisinin combination therapies expected to dramatically increase in coming years  
Access limited due to supply volatility, limited resources for procurement

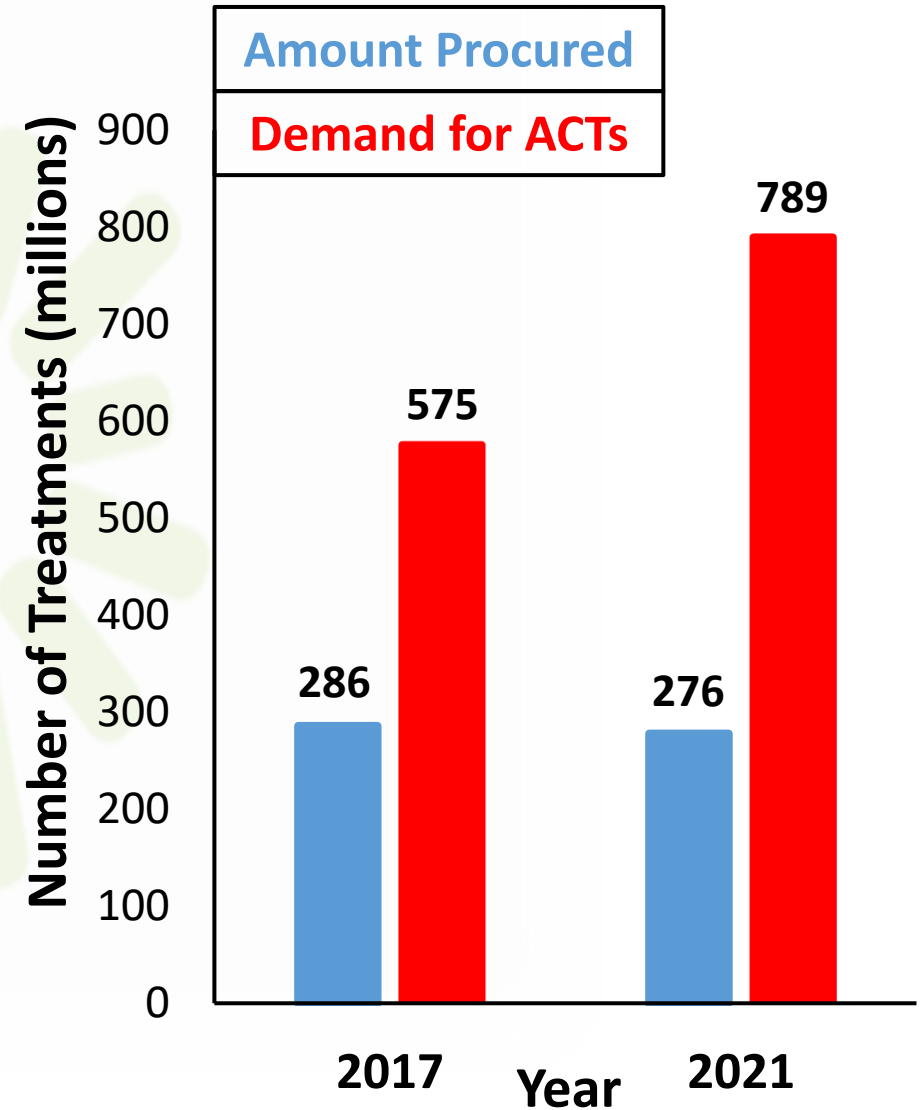
# Global Demand for Malaria Medicines is Rising Faster Than Current Production Levels Allow For

ACTs = ~**36%** of 2017 global antimalarial demand, **growing to ~47%** by 2021

Procurement levels based on availability of financing, not underlying changes of disease burden

What is needed:

Better use of funds: a lower cost, scalable source of ACTs



# The Pillars of Artemiflow



**Malaria  
Medication**

**Patented  
Technology**

**Farming**

Artemisinin-combination therapies **ALREADY**  
WHO-recommended first-line treatment for malaria

Artemiflow eliminated issues: high costs, poor production,  
variable-quality, distributed supply chain

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Processes for extraction, synthesis, and purification  
**ALREADY** performed industrially

Artemiflow eliminated issues: poor extraction, wasted  
materials, inefficient and expensive batch syntheses

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*A. annua* **ALREADY** grown worldwide in small plots  
(mostly China, Vietnam)

Artemiflow eliminated issues: low/variable amount artemisinin  
per acre, non-standardized practices, unstable market



# The Pillars of Artemiflow: Farming

Malaria Medication

Patented Technology

**Farming**



*A. annua* already grows well in Kentucky

Kentucky Tobacco Research and Development Center continues to make significant improvements at each stage of biomass production

### **Growth Plan:**

Year 1 (2019): 30 acres  
Year 2 (2020): 3,000 acres  
Year 5 (2023): 6,000 acres  
Year 8 (2026): 12,000 acres

Values for production of anti-malarials

# The Pillars of Artemiflow: Extraction & Synthesis

Malaria  
Medication

*Artemisinin* already extracted from plants

Medicinal derivatives already synthesized from artemisinin

Patented  
Technology

Artemiflow's patented technology and knowhow represents significant improvements at all stages

Continuous flow manufacturing is safer, cheaper, faster, greener, more efficient, and FDA recommended

Farming

GMP-certified pharmaceutical manufacturing facility in KY

Utilizing 2 patented processes

Better technology = bringing manufacturing back to US

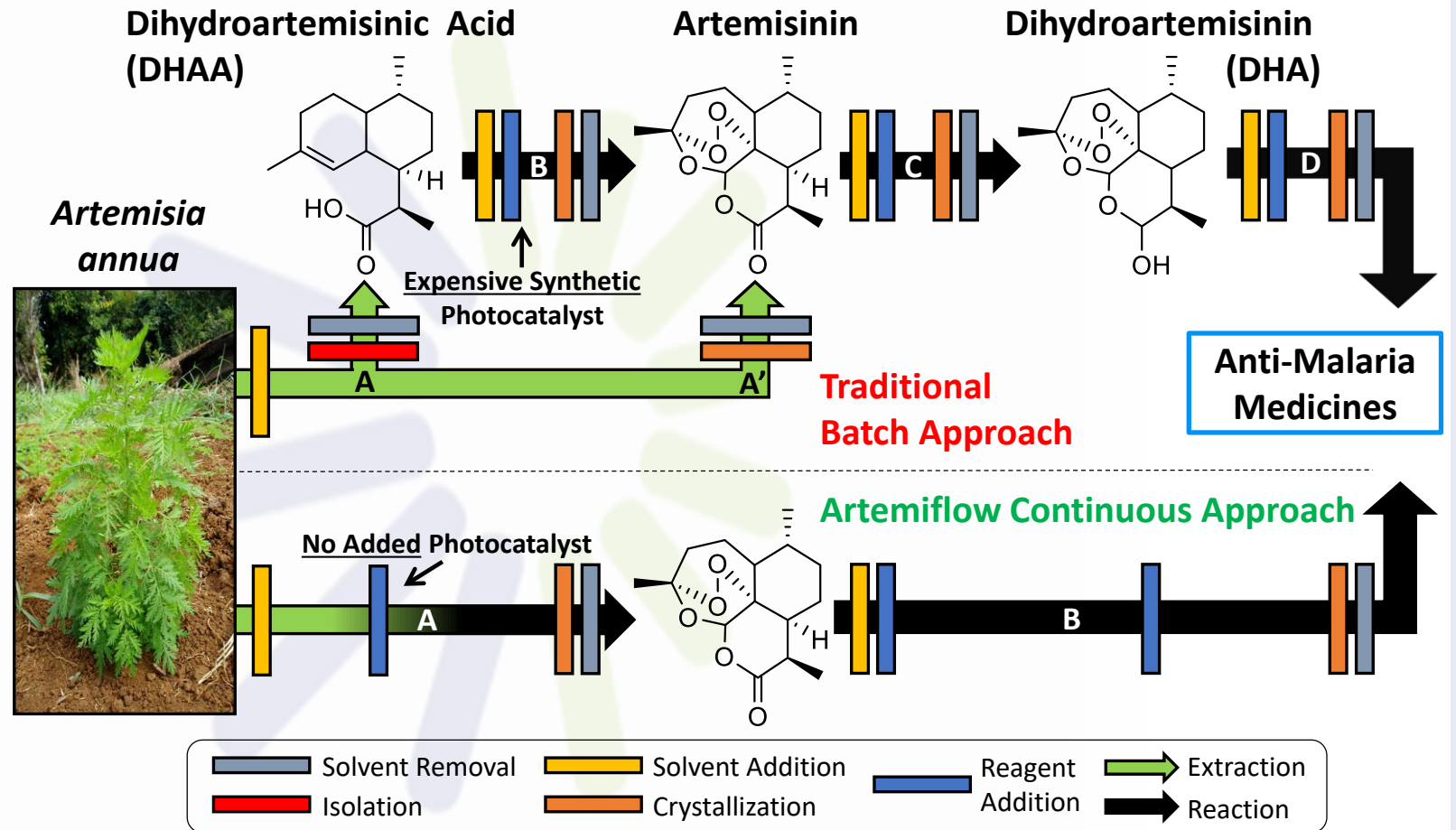


# Artemiflow Manufacturing: Simpler, Cheaper, Greener, Faster

Malaria Medication

Patented Technology

Farming



Extraction: more artemisinin per plant than anyone

Synthesis: Scalable manufacturing, exceeds FDA/WHO quality standards

# The Pillars of Artemiflow: Safe, Effective Medicines via Scalable Production



**Malaria Medication**

**Patented Technology**

**Farming**

Market for artemisinin-based medicines already established

Significant global unmet need for quality, cheap medicines

Increasing production levels easy due to scalable, modular technology and quality farming practices

All current and future artemisinin derivatives can be made using same equipment



# The Pillars of Artemiflow: Safe, Effective Medicines via Scalable Production

**Malaria  
Medication**

**Cancer  
Medication**

**Patented  
Technology**

**Farming**

Initial human trials show that same artemisinin-derivatives highly active against breast, colorectal, prostate, cervical, and other cancers

Same minimal side effects

Goal: drug repurposement

Phase 1 trails to be conducted with Markey Cancer Center

Significant increase in production levels and acreaage farmed



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