



# Agrochemical R&D and Manufacturing

Veteran team, nimble R&D and  
manufacturing experience in an  
extensive range of pharmaceutical,  
industrial, and agricultural chemicals



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## Vulpes's U.S. Beginning:

30+ years of chemical R&D and manufacturing

Reshoring all R&D and manufacturing to the U.S. (especially in St. Louis)

New product line just for the U.S. market



## Vulpes's Chinese Presence:

Deep supply chain integration

Dedicated team & factories



**20+** key  
R&D employees.



**4** factories,  
**~200** contract FTE.



*Chiral Amino Acid manufacturing equipment at Shangyu manufacturing plant*



*o-Cresol derivatives manufacturing equipment at Wuhai manufacturing plant*



*Alkylhydroxylamine manufacturing equipment at Chuzhou manufacturing plant*

## L-glufosinate Technology

- Novel chiral source material
- Novel process to protect Amino throughout the synthesis
- Simple manufacturing process

## L-glufosinate Technology

	BASF/AgriMetis	Hoechst	Lier	Meiji Seika	Vulpes
<b>Cost</b>	High	High	High	Very High	Low
<b>Environmental Impact</b>	High	High	Mild	Prohibitive	Low
<b>Industrial Readiness</b>	Developing	On Pause	Operational	On Pause	Developing

## O-alkylhydroxylamine Technology

- Novel process for alkylhydroxylamine hydrochloride operational
- Addressing all the existing problems with yield, byproduct, and environmental impact



## O-alkylhydroxylamine Products

- Clethodim
- Sethoxydim
- Kresoxim-methyl
- Dimoxystrobin
- Orysastrobin
- Trifloxystrobin
- Metominostrobin
- Fluoxastrobin

## Fluorinating Technology

- Proprietary fluorinating agent that can be recycled
- Simple separation of product and byproduct
- Simple manufacturing conditions (no volatile, toxic, etc. reactions)

## Fluorinating Products

- Pyroxasulfone
- Inpyrfluxam
- Fluindapyr
- Fluxapyroxad
- Bixafen
- Isopyrazam
- Penthiopyrad

## Fluorinating Products

- Benefin
- Ethalfluralin
- Fluazinam
- Flumetralin
- Oryzalin
- Pendimethalin
- Prodiamine
- Trifluralin

## Aminopyrimidine Technologies

- Two decades of experience
- Second generation of proprietary technologies

## Aminopyrimidine Products

- Chlorsulfuron
- Ethoxysulfuron
- Flazasulfuron
- Foramsulfuron
- Halosulfuron-methyl
- Imazosulfuron
- Iodosulfuron-methyl
- Metsulfuron-methyl
- Rimsulfuron
- Sulfosulfuron
- Trifloxysulfuron-sodium

## Custom R&D & Manufacturing

- Mepiquat Pentaborate
- Cyclanilide
  - 2 months from initial interest to sample and proprietary IP during COVID

## New Supply Chain Unit

- Founded by core team of the agrochemical unit of ZMC
  - ZMC is a top 10 medical & health product importing and exporting service in China
- Extensive supply chain relationship
  - Logistics services (including container availability)
  - Deep procurement networks





## Agrochemical R&D and Manufacturing

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