Monash has developed a directed delivery system that targets leaves and can be used to deliver specific protected payloads such as pesticides, insecticides, fungicides or nutrients directly to plants.

### THE TECHNOLOGY
This new encapsulation technology focuses on functionalized encapsulation of specialty agricultural chemicals with a targeted release. Our strong outer shell remains intact until triggered to release the payload. Our encapsulation technology can be functionalized to adhere to plant cuticle wax. This adherence triggers the targeted delivery of the payload into the leaf rather than to roots or soil, through a broadly applicable, yet strong and stable interaction. The encapsulation technology increases the accuracy of desired chemical deployment; release can occur slowly to provide sustained action or can be triggered to provide a burst in response to external stimuli such as water, pH, CO2, or salt (Figure 2). The technology is based on materials commonly used in agricultural contexts that are known to biodegrade.

The research team have the expertise to modify this technology for the delivery of a number of specialty chemicals for agricultural use. They have used fungicide as a demonstration. The technology can be used for delivery of a broad range of agricultural products including:
- Fungicides
- Insecticides
- Pesticides
- Nutrients

### THE OPPORTUNITY
We seek an industry partner able to assist in the scale-up of production and marketing of the encapsulation technology. This includes both chemical companies and end-use companies associated with agricultural products.

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- **Targeted delivery to leaves**
- **Improved delivery**
- **Targeted release**
- **Reduced wastage and overspray**
- **Decreased run-off pollution**
- **Decreased intensity of use**
- **Less use and decreased CoGs**

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**THE CHALLENGE**
Key current issues with agrichemicals include:
- The over use of goods needed for effective concentrations in plants, taking into account spray and dusting delivery
- Run-off costs to the farm and the environment
- The cost of goods for high value specialty products

The value of our product is the direct foliar delivery of chemicals (Figure 1). This improves the efficiency of deposition over current dusting methods while also decreasing polluting run-off from overspray, reducing the intensity of use, and reducing the development of ‘tolerance’ (caused by inefficient heavier chemical usage) in fragile agricultural settings. Our system provides an efficient process for the delivery of expensive agriculture specialty items, thereby reducing waste and the cost of goods used.

The major share of the existing microencapsulation market is for delivery of insecticides. Our technology provides an ideal solution for the targeted delivery of insecticides to the leaves of plants, as well as a range of other agricultural products.