

# OIL MICROENCAPSULATION

DATA SHEET

BENEFITS INCLUDE STRUCTURATION,  
ACTIVE PRESERVATION, TASTE  
MASKING AND CONTROLLED RELEASE

## Traditional Drying Approaches

Microencapsulation uses an emulsion comprised of three components: a solvent (like water), a carrier (starch), and a core/active (oil or vitamin). Microencapsulation via traditional spray drying forms the carrier around the active while drying off the solvent with a heated drying gas.

One hindrance of spray drying is the intense heat will degrade the product, thus defeating the intention of microencapsulation.

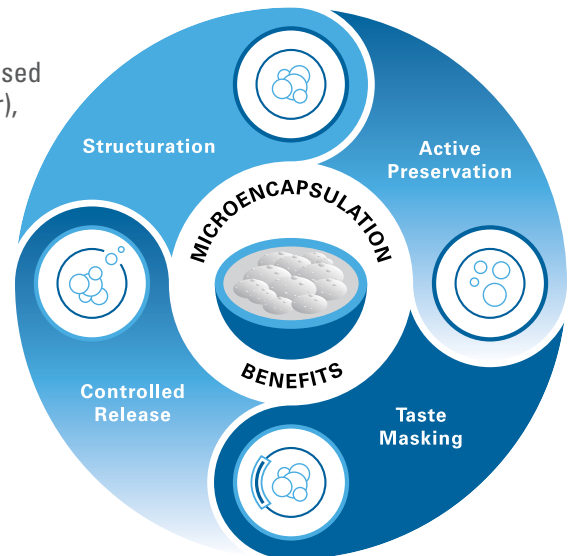
## Traditional Drying Commonalities

- **Spray drying** = high temperatures and low product preservation
- **Freeze drying** = long production cycles and extensive batch processes

These two approaches to oil microencapsulation share high energy costs, high surface oil, short shelf life, high loss of volatiles, and low oil yield.

## Electrostatic Charge Application

In microencapsulation, each emulsion component has differing polarities. And when an electrostatic charge is applied, the solvent and carrier, which are the most polar of the trio, share the largest dipole moment. The active, being less polar, has a smaller dipole. And this forces the solvent and carrier to migrate to the outer surface of the droplet, while the active remains in the center.



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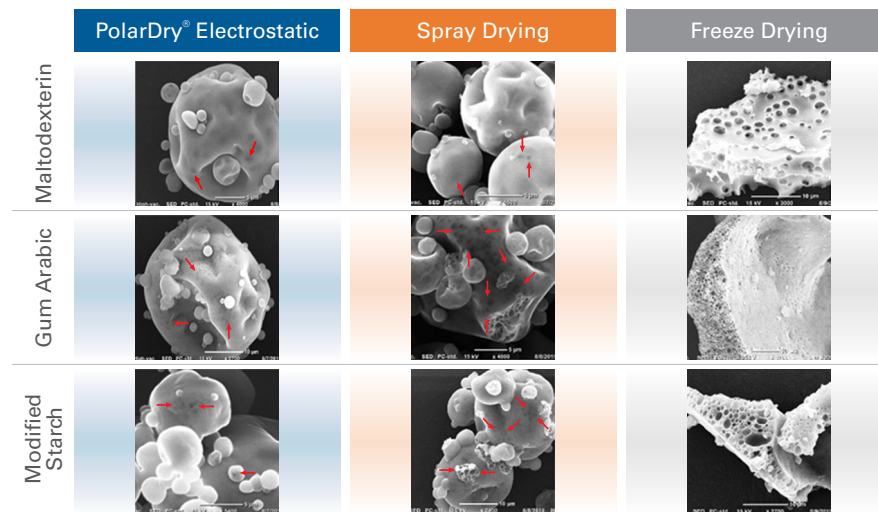
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# THE POLARDRY® ELECTROSTATIC SPRAY DRY DIFFERENCE

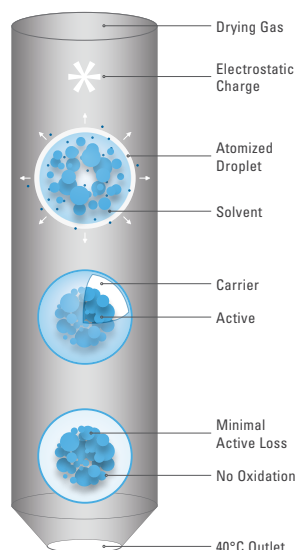
Pushing the solvent to the outer surface creates a superior drying condition, leading to a near-perfect encapsulation of the active without the use of high evaporation temperatures. Today, this is only possible with electrostatic spray drying. And Fluid Air's patented PolarDry® technology is the only solution to deliver true electrostatic spray drying.

- Electrostatic charge applied to the spray drives solvent to the outer surface of the droplet
- Increased oil load (30% higher = vegetable oil, 25% higher = essential oil)
- Reduced active evaporation loss by 12%
- Decreased inlet temperature by 59% (220°C to 90°C with the same yield)

## As Compared to Traditional Spray Drying and Freeze Drying



The red arrows point to microencapsulation surface oil.



### PolarDry® Electrostatic Spray Dryer Nozzles

- Use an electrostatic field
- Feedstock is charged as it comes down the liquid tube of the nozzle, forming a negative electrostatic field around the nozzle, resulting in a high-efficiency evaporation rate
- Patented design, two Fluid Air atomizers (feedstock + compressed air: nitrogen)