

Accomplice®

Deposition Aid, Drift Reduction Aid, and Evaporation Control

Accomplice® is a new and innovative adjuvant scientifically formulated to improve the delivery of agricultural chemicals by unleashing the diverse functionality of natural gums. Attune, the makers of Accomplice, are relying on over 100 years of experience developing and commercializing natural gums in the food industry as the foundation for launching unique gum combinations to the agricultural market.

Natural gums are derived from a wide variety of plants and bacteria and as such, provide tremendous diversity in their functionality. In general, gums work by dramatically altering the physical characteristics of water-based solutions. For example, gums can change the thickness of a solution to alter droplet size, increase adhesion so droplets stick to surfaces more readily, and provide film formation for an added layer of protection against overhead water.

The objective here has been to apply this extensive gum knowledge to create new and innovative technologies by focusing on:

- delivering more spray volume to the target,
- keeping the active ingredient on the target, and
- maximizing the inherent functionality of the active ingredient



Proven Science

We believe it is essential to understand the forces impacting spray tank ingredients starting at the nozzle and continuing all the way through deposition of droplets. Ultimately, we are most focused on ensuring that the active ingredients are capable of performing at their peak. This systematic approach is critical to determining which functional attributes are necessary to improve the performance of an agricultural spray by the inclusion of a delivery system. Studies focusing on the impact of changing the physical characteristics of tank mix sprays using natural gum combinations and their subsequent effectiveness have been examined. From this research, several opportunities were identified whereby changing the physical characteristics of tank mix solutions improved agricultural spray delivery and unleashed the full potential of active ingredients.



Precise Performance

Accomplice has been extensively evaluated utilizing laboratory, greenhouse, spray chamber, wind tunnel, field research and commercial demonstration trials. The compilation of this extensive research program demonstrates that Accomplice enhances the precision of pesticide performance by:

- Increasing on target spray volume – less drift
- Maximizing the inherent functionality of active ingredients
- Providing resistance to wash off from rainfall or overhead irrigation

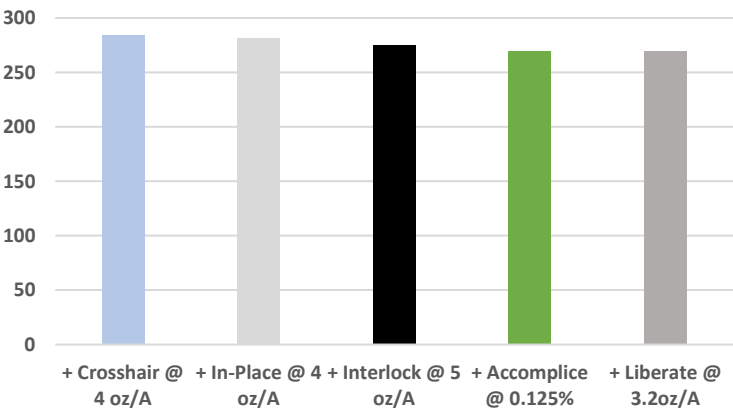
Drift Reduction Testing

Because of the inherent ability to control droplet size due to the gum component of the formulation, Accomplice was tested at the University of Nebraska – North Platte to determine how effective of a drift reduction agent it would be when combined with typical herbicide products (dicamba and 2,4-D). Tank mixes were tested using both low and high speed wind tunnels to help simulate the effects of ground spray and aerial applications respectively. Leading DRA adjuvants were used as control products to determine how effective Accomplice was relative to the current market standards. As expected, Accomplice was able to effectively increase the droplet size when compared to products formulated specifically to address drift issues. For ground spray simulations, Accomplice performed equally to all other DRA specific adjuvant formulations. And when run through the high speed tunnel, Accomplice was superior to all tested DRA adjuvants when looking at the DV10 values of the droplet distributions.

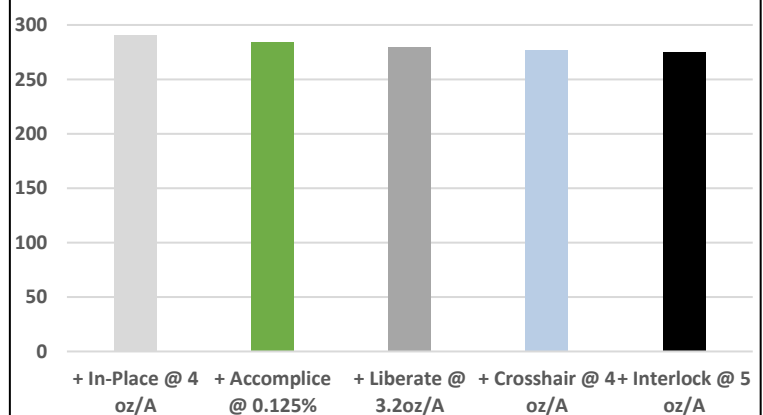
Simulated Ground Spray

Air speed = 16 mph
Nozzle = AIXR11004

Engenia (dicamba) DV 10 values



Enlist (2,4-D) DV 10 values

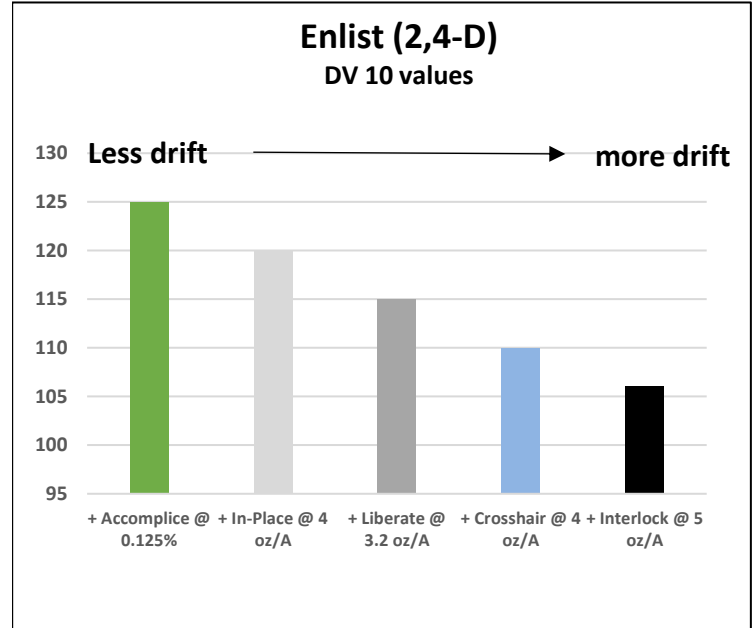
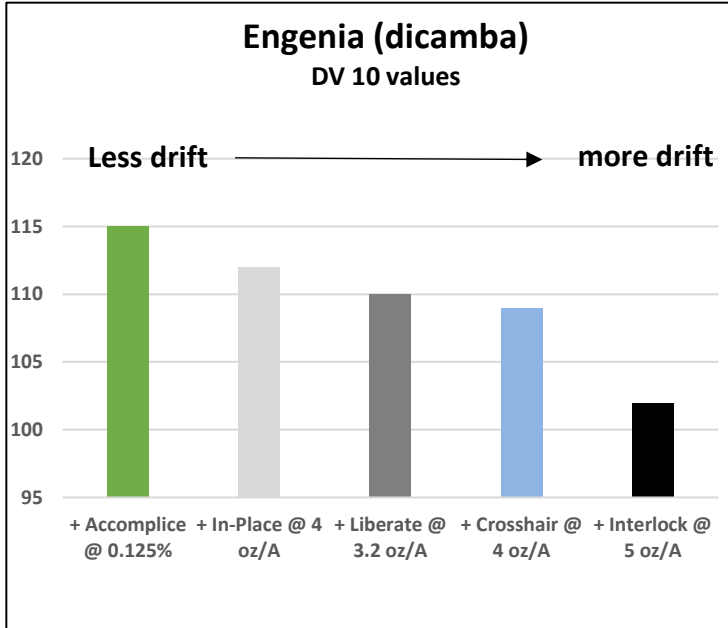


Accomplice performs similar to drift control standards at simulated ground spray application.

Simulated Aerial Spray

Air speed = 125 mph

Nozzle = AIXR11004



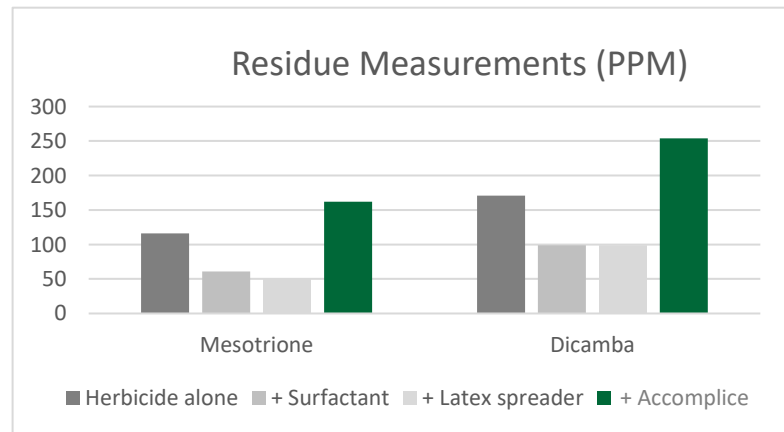
Accomplice outperforms drift control standards at simulated aerial spray applications

More spray volume on the target

Accomplice delivers more spray volume than competitive adjuvants by:

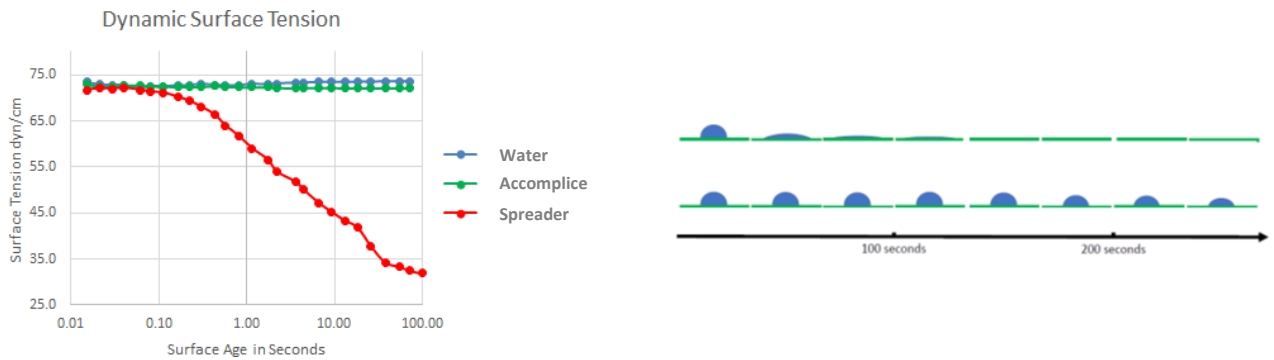
1. reducing small drops being formed at the nozzle,
2. reducing evaporation as drops travel to the plant,
3. reducing the loss due to drop bouncing, shattering and runoff.

Research trials were conducted in which plants were sprayed with a herbicide, herbicide + Accomplice, and herbicide + competitive adjuvants. Leaf discs were cut from treated plants and analyzed for herbicide residues. Herbicide sprays using Accomplice had up to 3 times more herbicide residues than competitive adjuvants.



Increased absorption potential

Many active ingredients today are systemic or translaminar which implies that they must be absorbed into the plant for optimum effectiveness. The absorption of most active ingredients stops when drop residues dry on the leaf surface. Consequently, drop evaporation rate plays a significant role in determining the amount of active ingredient that is absorbed into the plant. Drop evaporation is heavily influenced by environmental conditions like temperature and relative humidity as well as droplet characteristics like size and the contact angle of a drop on a leaf. Surface tension of the droplet will dictate how high the contact angle is: higher surface tension = higher contact angle. Sprays with high contact angles will have minimal spread which can increase the amount of time active ingredients have for absorption by as much as 50%. Most competitive deposition aids contain surfactants which quickly reduce a drop's surface tension causing the drop to spread and thereby accelerating evaporation.



Accomplice employs two modes of action to increase the amount of time for active ingredient absorption. First, Accomplice is designed to produce droplets with higher contact angles which minimize spread and maximize droplet volumes. Second, Accomplice uses humectants to further reduce droplet evaporation rates which in turn increases the time available for the active ingredient to be absorbed into the leaf.

Smarter Agriculture

Smarter Agriculture involves getting the most out of every input the farmer employs. And in doing so, ensuring the safety of the workers directly exposed to the ingredients. In that light, Accomplice has been developed using only food grade ingredients that have been extensively tested to have the lowest toxicity rating, Category IV. No signal words are required for labeling this product and no special PPE or handling is required. Accomplice can be a valuable component of an innovative farming approach.

Directions for Use:

The suggested use rates are 1 pint to 2 quarts of Accomplice per 100 gallons of spray volume (0.125 – 0.5% v/v). For improved spray deposition, use 1 pint to 1 quart of Accomplice per 100 gallons (0.125 – 0.25% v/v). For wash-off prevention, use 1 to 2 quarts of Accomplice per 100 gallons (0.25 – 0.5% v/v).

Mixing

Water should be the first ingredient added to the mix tank. If necessary, chelating agents such as AMS should be added next in order to bind any excess minerals. Accomplice should then be added to the spray tank with agitation to disperse the adjuvant throughout the tank. Allow Accomplice to circulate through the tank for a few minutes to ensure complete dispersion of the adjuvant. Active or other ingredients should then be added as per label recommendations with agitation.

Storage

For best results, store containers above 4°C. Storage at lower temperatures will result in a thicker solution that may require longer mixing time. Do not allow to freeze.