Evaluation of adjuvants to determine effect on droplet size and potential use as “anti-evaporants” as substitutes for crop oil.

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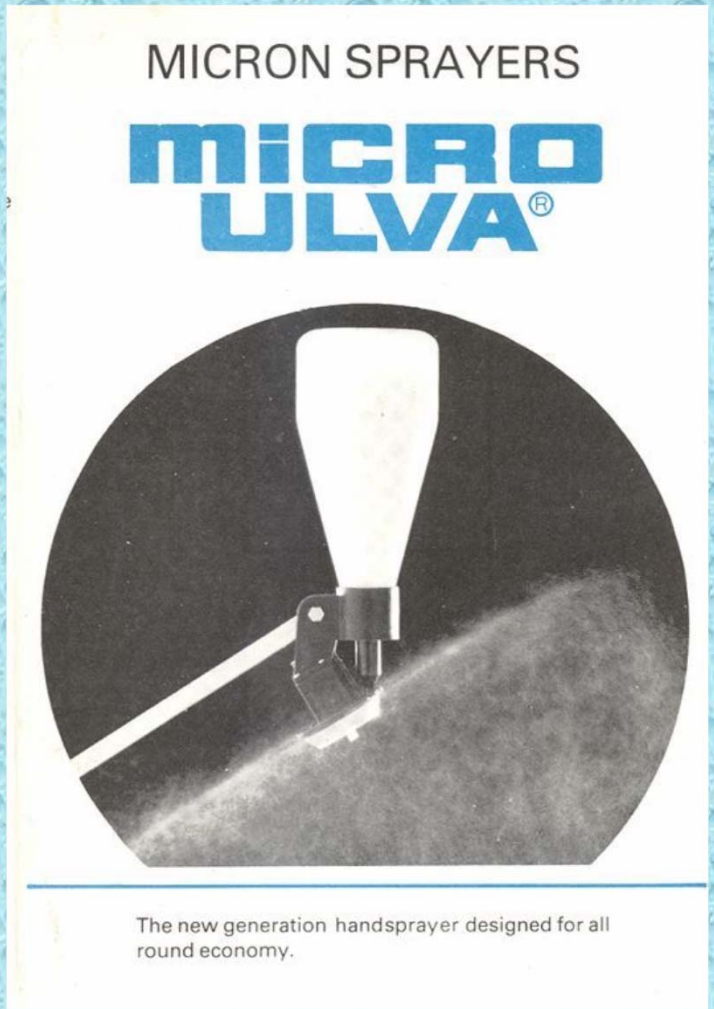
Abstract:

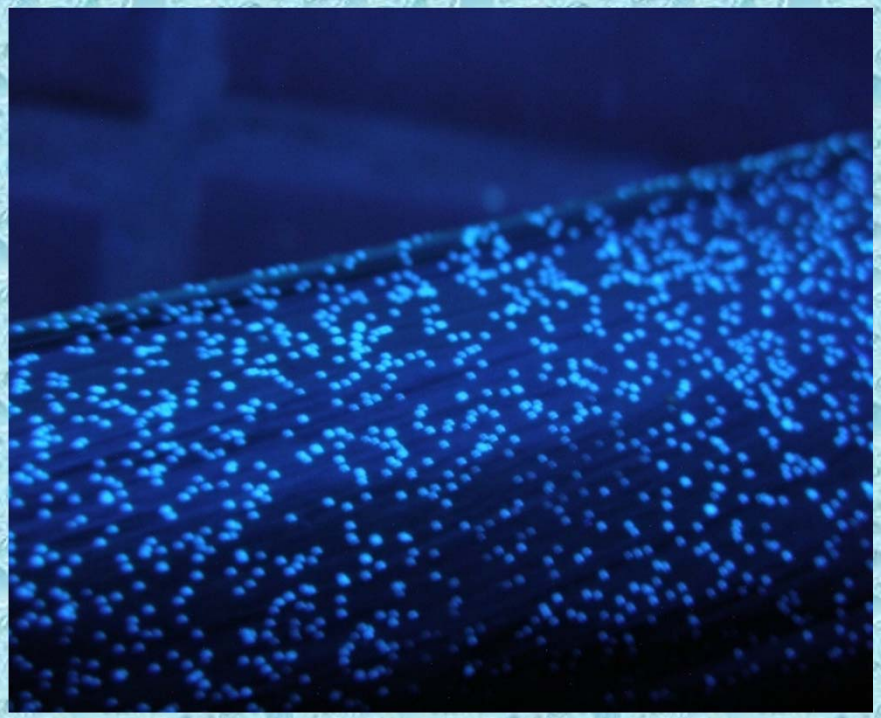
This presentation reports on preliminary results of the use of "Adjuvants" for improvement in the deposition of spray droplets thanks to their effect in reducing losses due to evaporation.

Location and conditions in Argentina

- ✓ In various provinces including, La Pampa, Cordoba, Salta, Santa Fe and Entre Rios
- ✓ Corn stubble in most cases
- ✓ Weather Conditions:
  - Temperatures: 28-34°C [58-70°F
  - Relative humidity range:22-45%
  - Wind speeds:
    - Range: 5-8 mph
    - Average: 7 mph
    - Close to 90 degrees ref line of flight

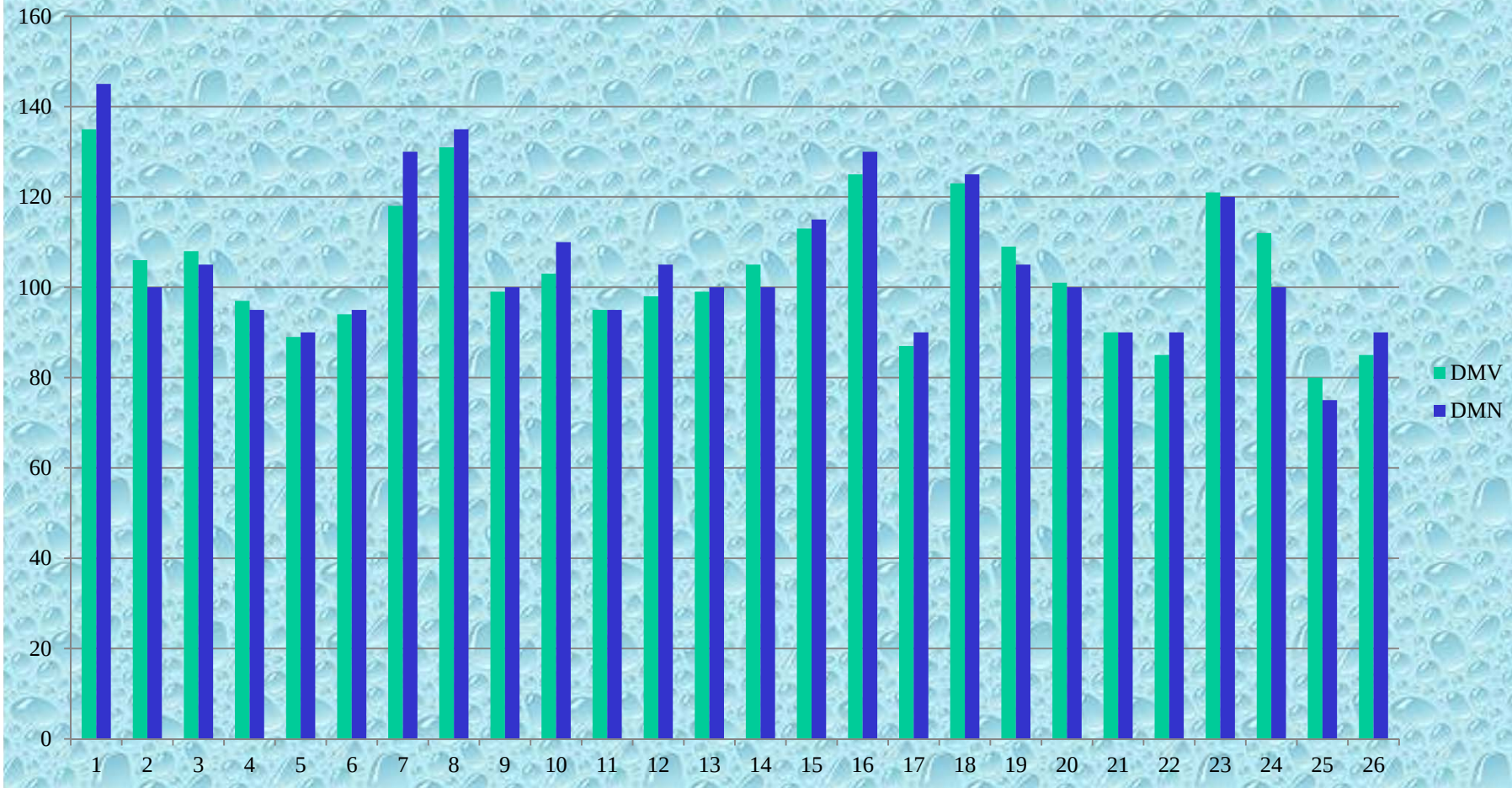
Preliminary tests using Ultra Low Volume Controlled droplet pplicator



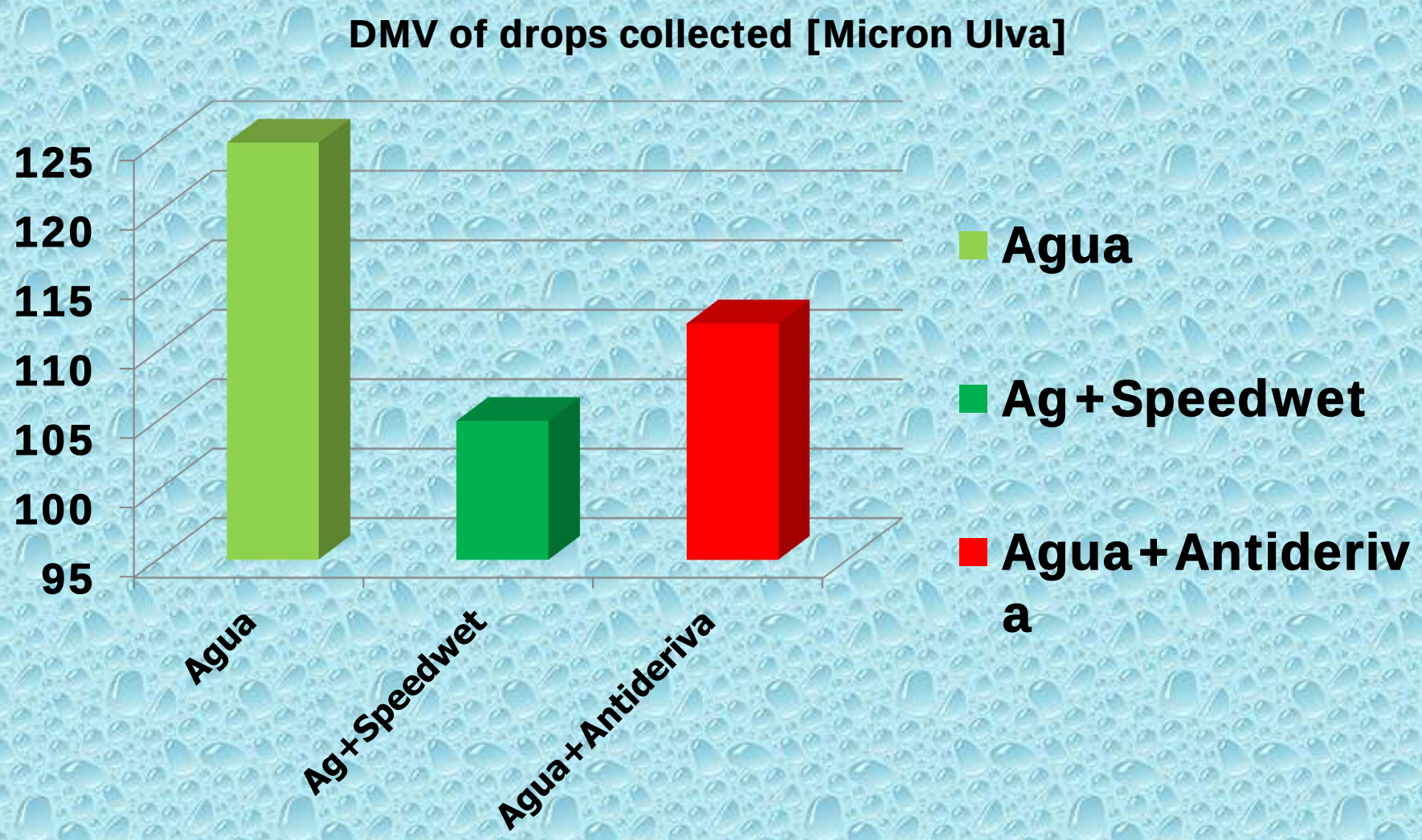


CDA: 1 liter/ha product "Tester"

Effect of various adjuvants on droplet size: Tests using a MICRON -ULVA controlled droplet applicator



Effect of products on droplet size using CDA applicator



Materials and Methods:

- ✓ **Aircraft types:**
- ✓ Ayres Turbine Thrush
- ✓ Cessna 188
- ✓ KRUK-106
- ✓ AT 401, AT-402
- ✓ Thrush 600
- ✓ **Spray equipment:**
- ✓ 3 types of rotary atomizers,
- ✓ Ceramic Hollow cone, and CP09 nozzles
- ✓ **Spray volumes:** 0.3 - 1.2 gals/acre
- ✓ **RED Dye** added to enhance droplets/visual effect

Droplet sampling:

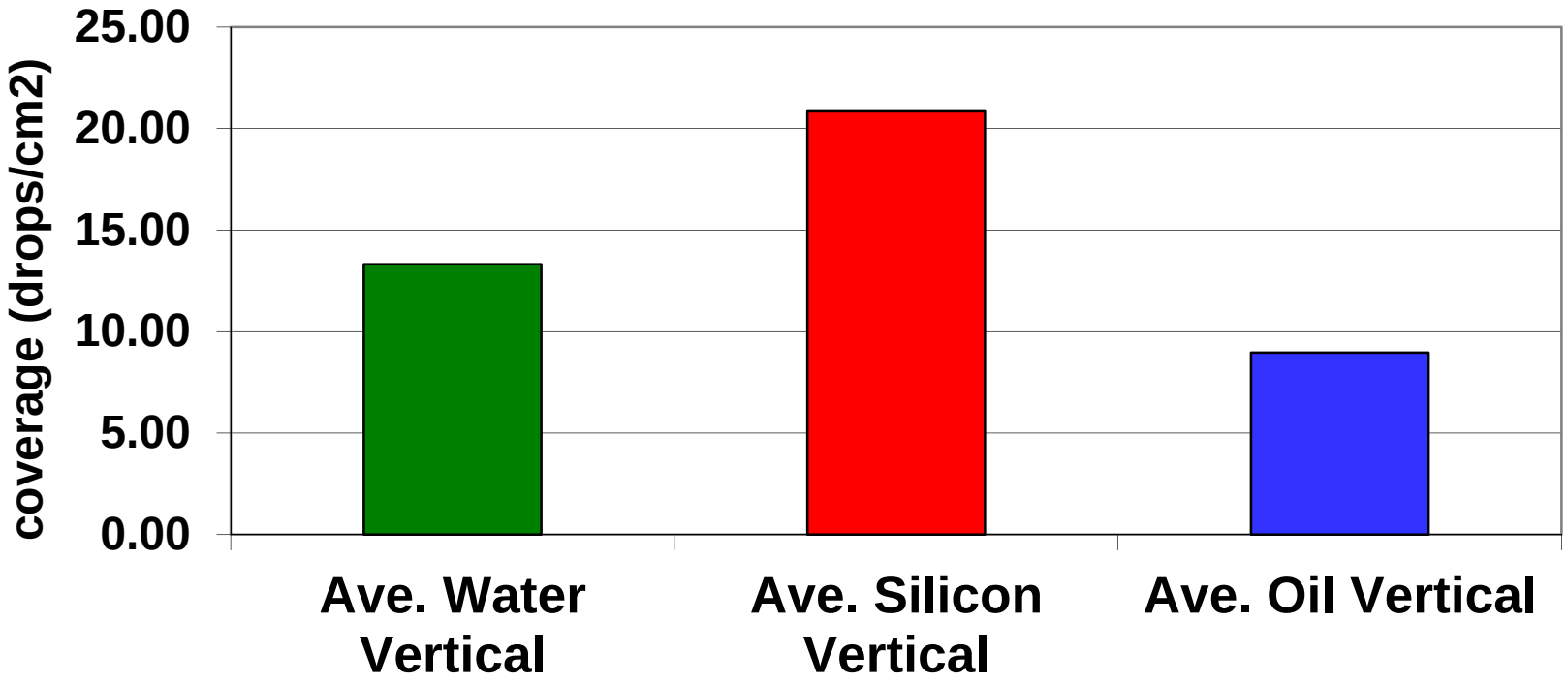
- ✓ 4 swaths per treatment
- ✓ Water sensitive cards 25mm
- ✓ x 75mm
- ✓ placed at 20 cm height,
- ✓ To compare efficiency of droplet collection
- ✓ Horizontal for large drops
- ✓ 45 degrees –median size
- ✓ Vertical for smaller drops

Droplet analysis: Stainmaster 1.0.9

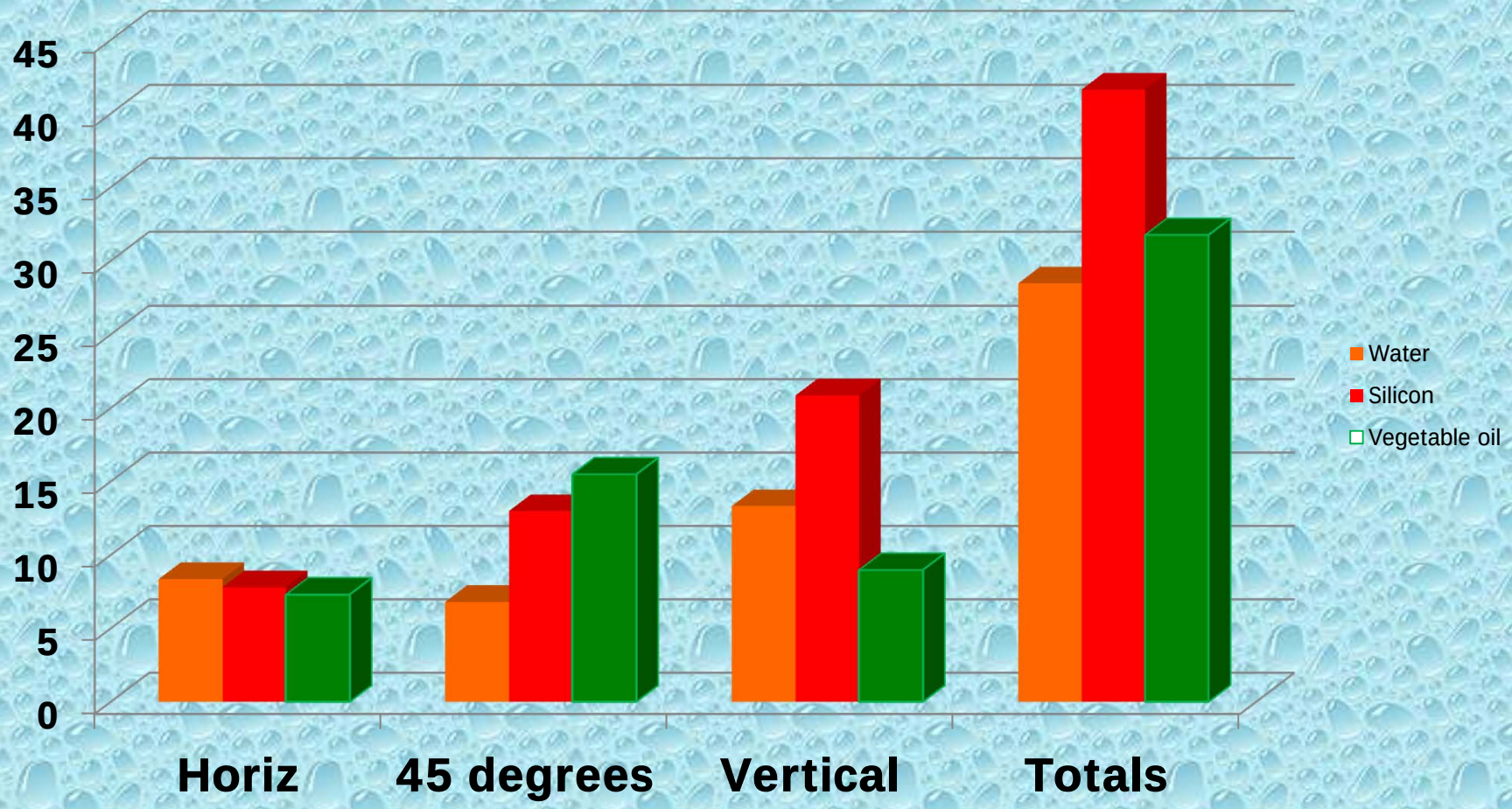
Examples equipment

Collection effiency of cards -

Ayres Turbine Thrush-Tecmolig rotary atomizers, 5 liters/ha



Test with Tecmolig rotary atomizers. Average Nos of droplets/cm² [averages] collected with 5 liters/hectare



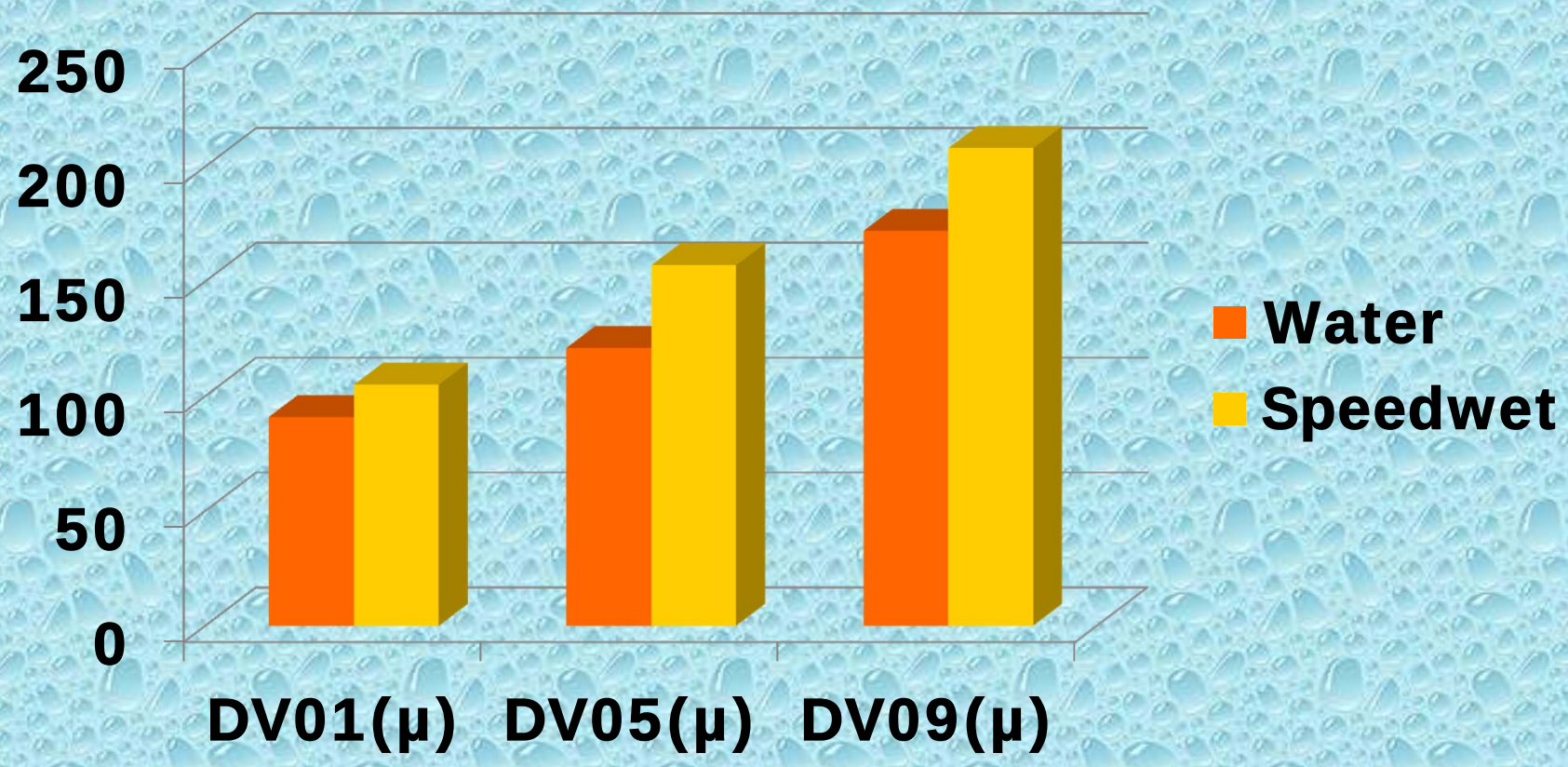
KRUK-106 Hollow cone nozzles at 90 degrees and 12 lts/ha [1.1 gpa]

TEST	No of drops	CV %	DV0.1	Dv0.5	Dv0.9
Water	79	90	175	305	425
Speedwet	72	66	149	260	361
Nimbus oil	57	106	120	190	263

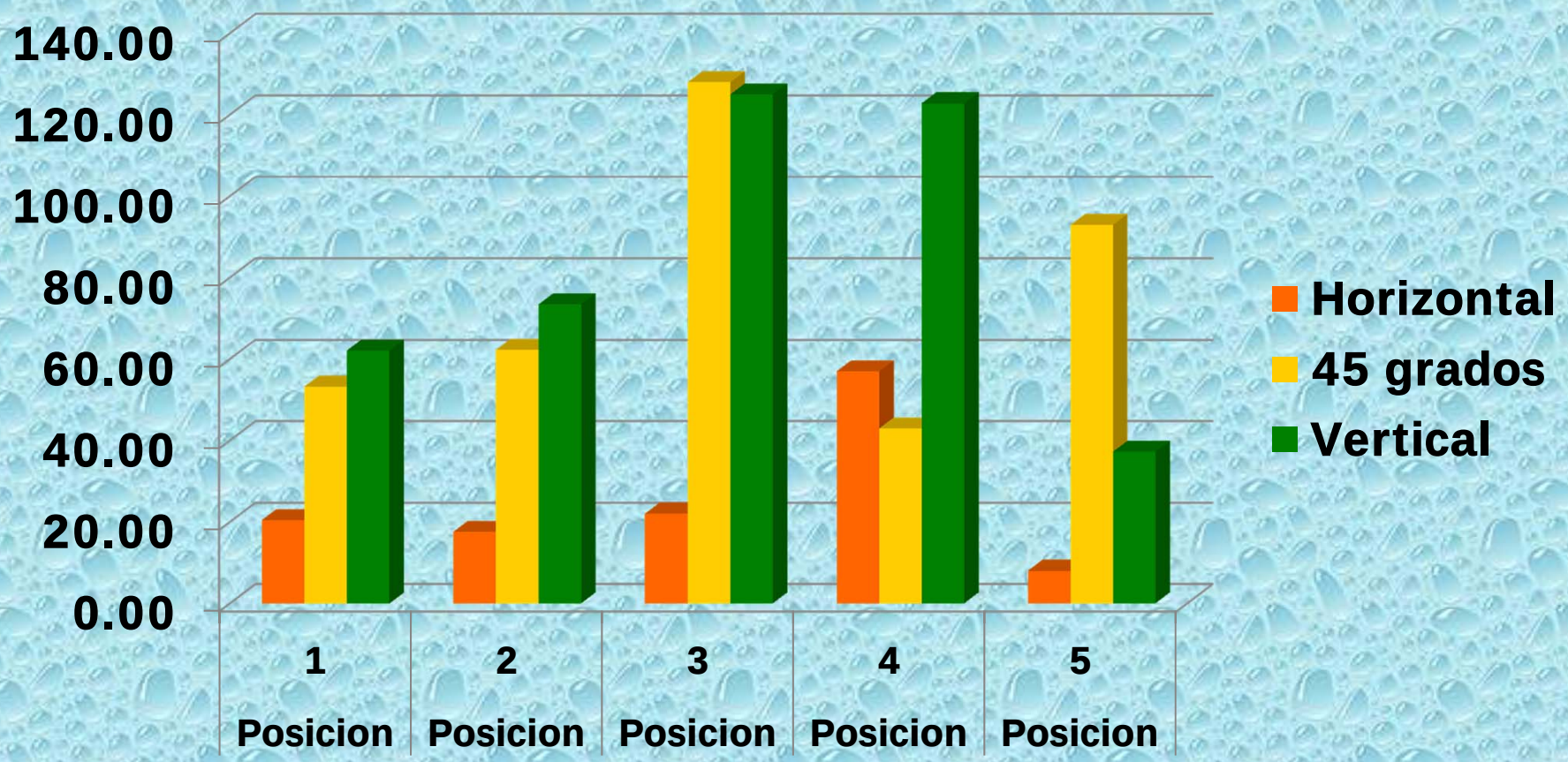
AT-402 with CP09 Nozzles, 8 liters/hectare [0.75gpa]

Test	Drops/ cm^2	CV%	DVO.1	DVO.5	DVO.9
Water	62	65	158	278	361
Water + Speedwet	123	47	144	291	430
Water+ Oil	78	47	132	210	300

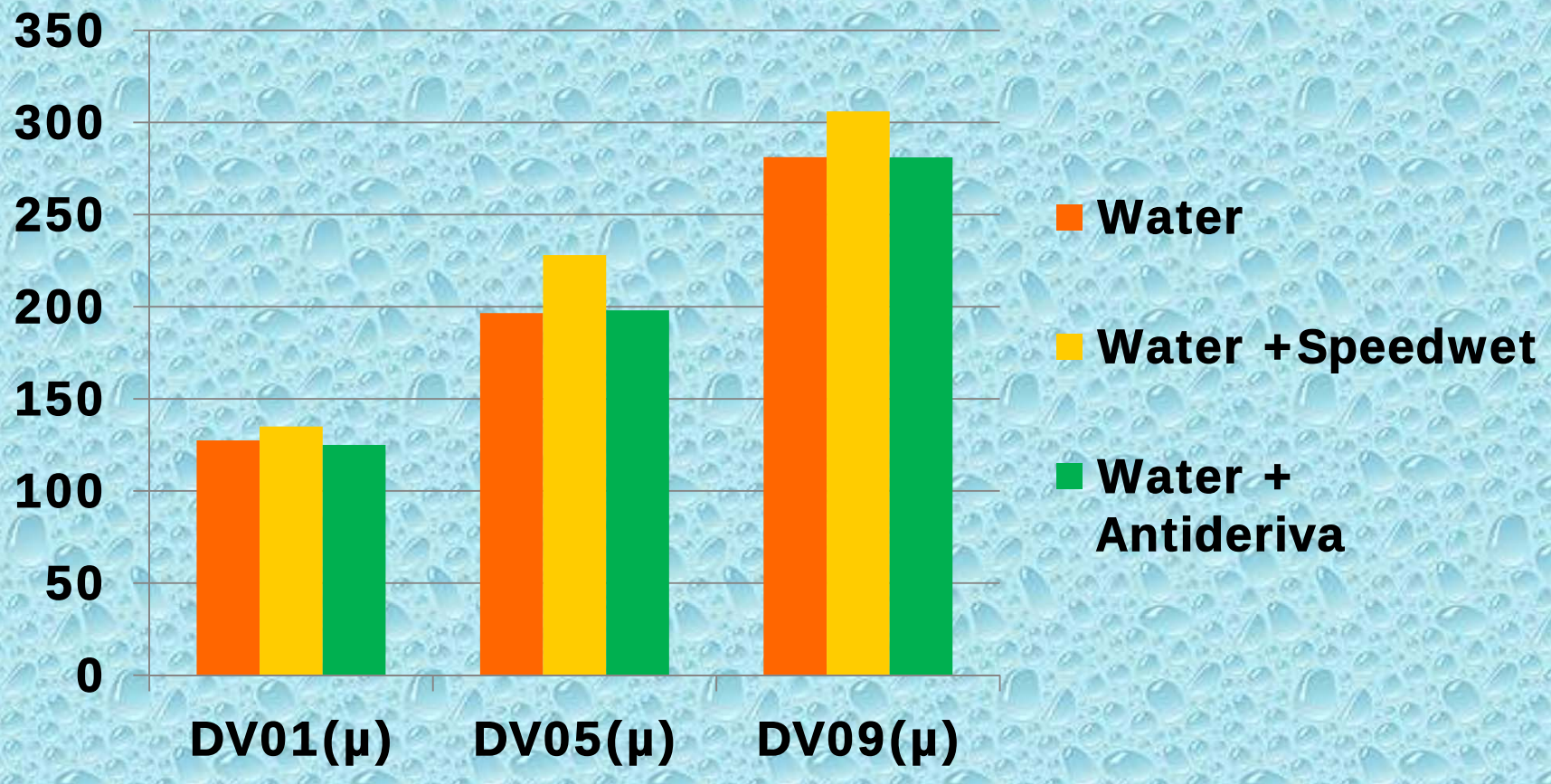
Rotary atomizers AU3000
Spray volume 3 liters/hectare



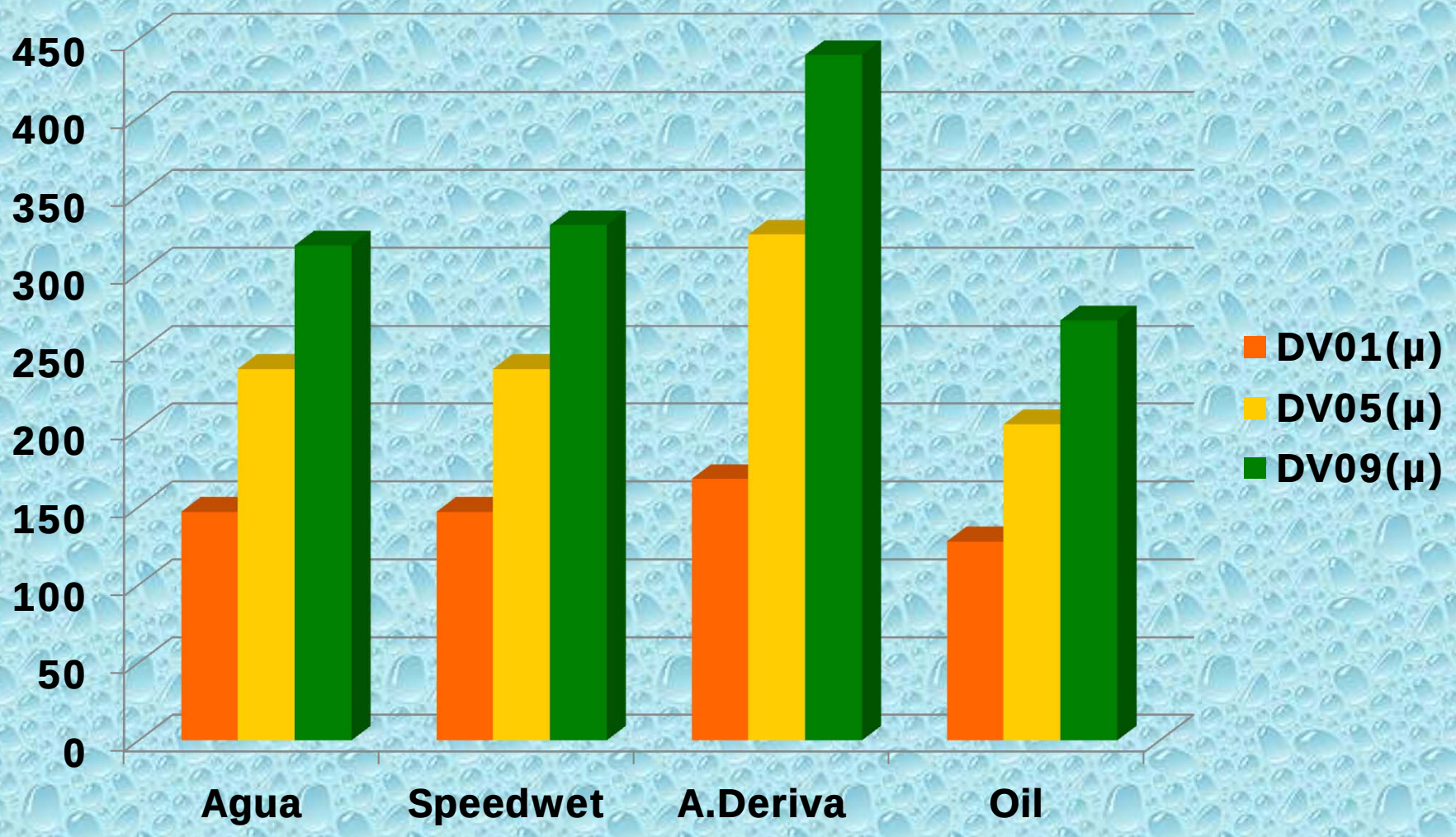
AT-402: CP09 Flood nozzles- 8 liters/hectare- Water [drops/cm^2]



AT-401 76 Hollow cone nozzles 5 liters/hectare



Cessna 188 Aleman Rotary atomizers - 5lts/ha



Summary of results:

- ✓ Adjuvants change droplet spectrum
- ✓ Reduce %CV in droplet size
- ✓ Collection cards at 45 degrees highest efficiency
- ✓ Color dye very effective identify equipment failures
- ✓ Deposition aids increased deposition under conditions of low humidity
- ✓ Equipment type and setting more important than product

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