Static Wear Characteristics of CP Polypropylene Aerial Nozzles

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OBJECTIVE

Determine the effects of nozzle wear on

- Flow rate
- Spray quality

resulting from CP-03 nozzles (.125 orifice & 30° deflector) that atomized

- Simulated wettable power for 384 hours
  abrasive, worse case
- Tap water for 576 hours
  non-abrasive, best case

TEST PROCEDURE

Three CP-03 nozzles atomized kaolin clay (0.5lb/gal) in water at 30 psi for 384 hours

- Tank mix was changed at 24 hour intervals
- Flow rates & spray quality measured at
  0, 24, 48, 96, 144, 192, 240, 288, 336 & 384 hours of use
- Flow rates determined at 30 psi (.125 orifice) with water
- Spray quality measured in wind tunnel at 30 psi (30°) with water, 120 mph airspeed

Three CP-03 nozzles atomized tap water at 30 psi for 576 hours

- Flow rates & spray quality measures at
  0, 24, 48, 96, 144, 216, 288, 360, 432, 504 & 576 hours of use
- Flow rates determined at 30 psi with water
- Spray quality measured in wind tunnel at 30 psi (30°) with water, 120 mph airspeed

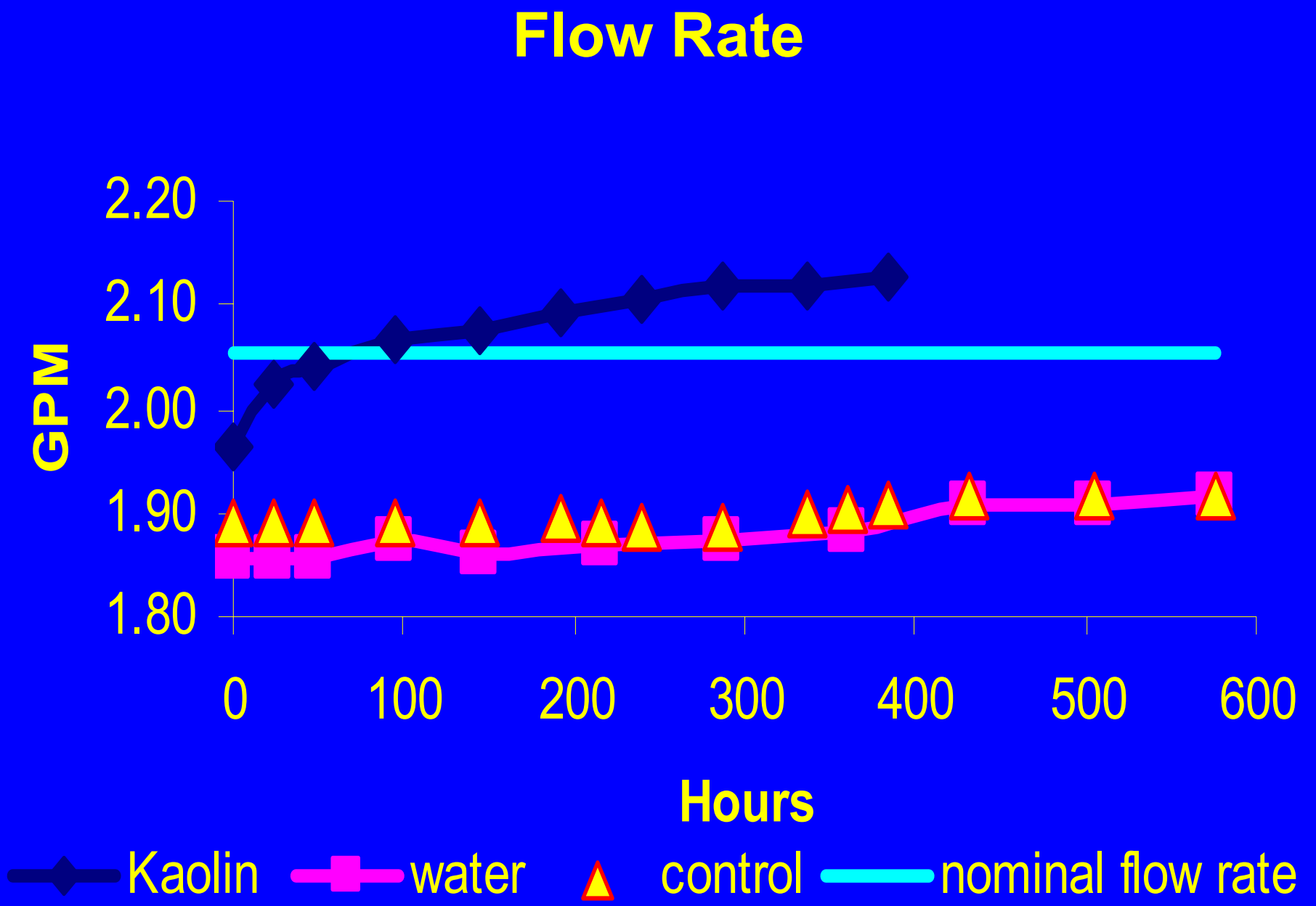
Three CP-03 nozzles atomized nothing (control nozzles)

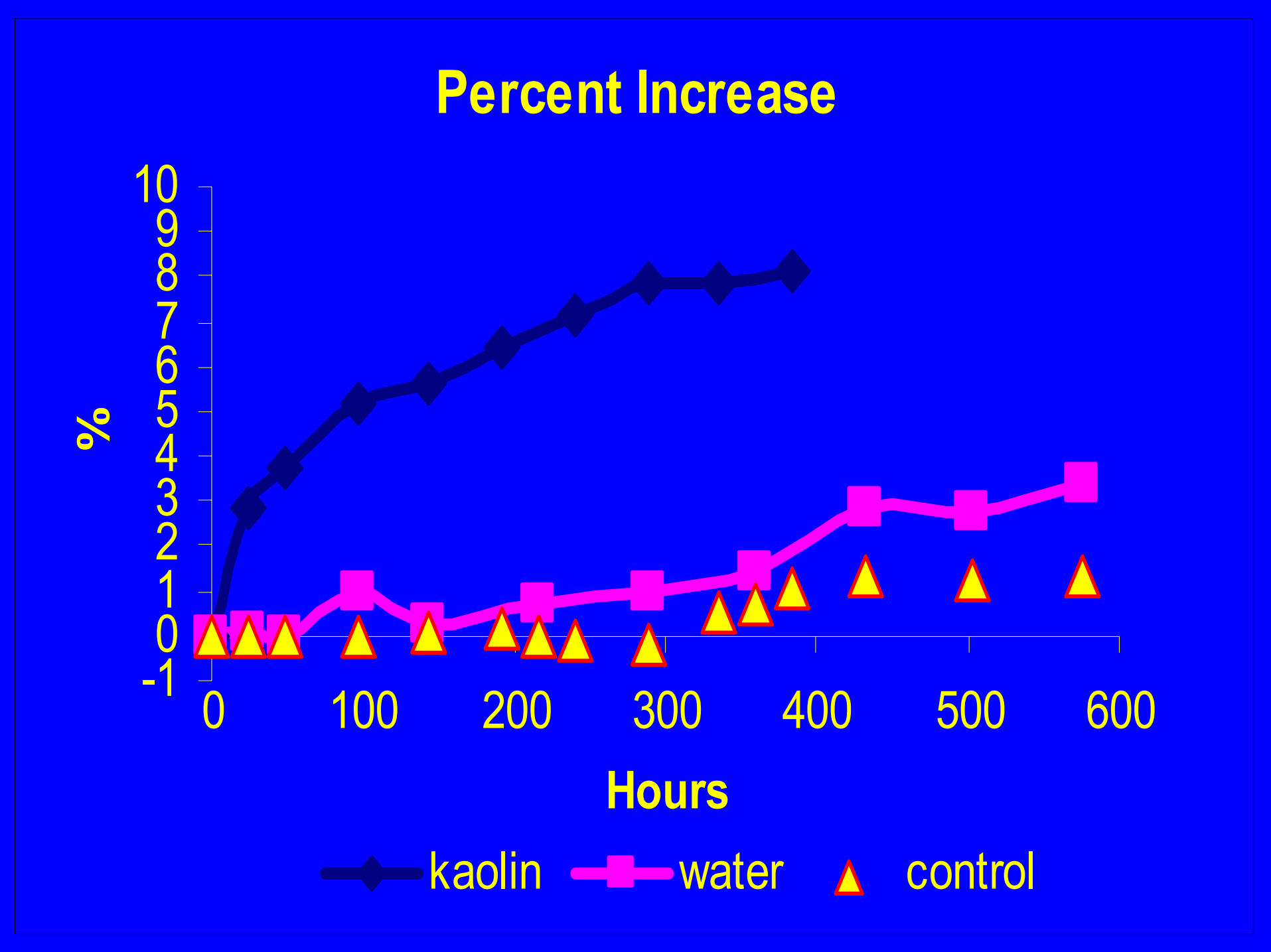
- Flow rates & spray quality were measured at any corresponding times that nozzles used to atomize kaolin or water were evaluated
- Flow rates determined at 30 psi with water
- Spray quality measured in wind tunnel at 30 psi (30°) with water, 120 mph airspeed

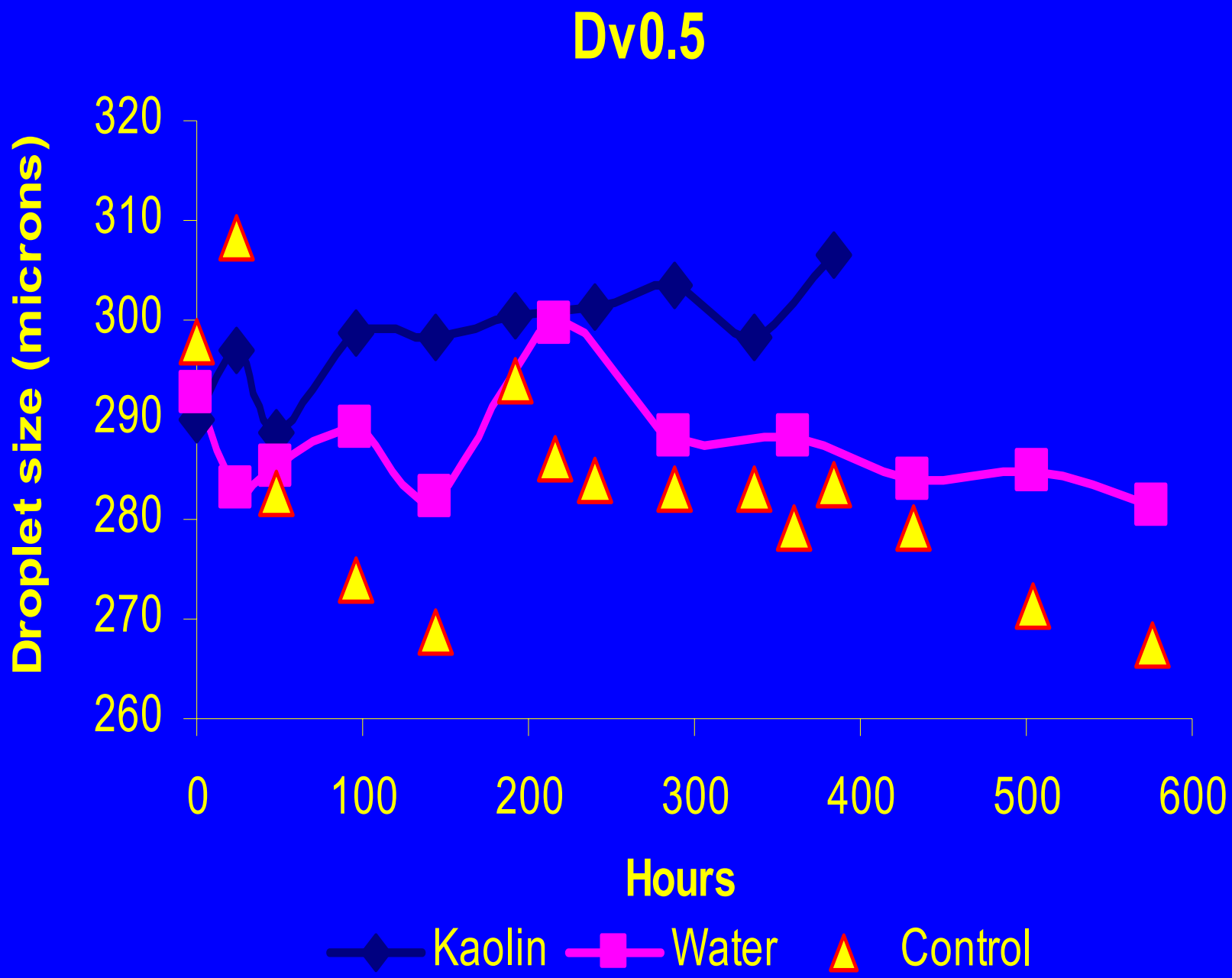

1
2
3

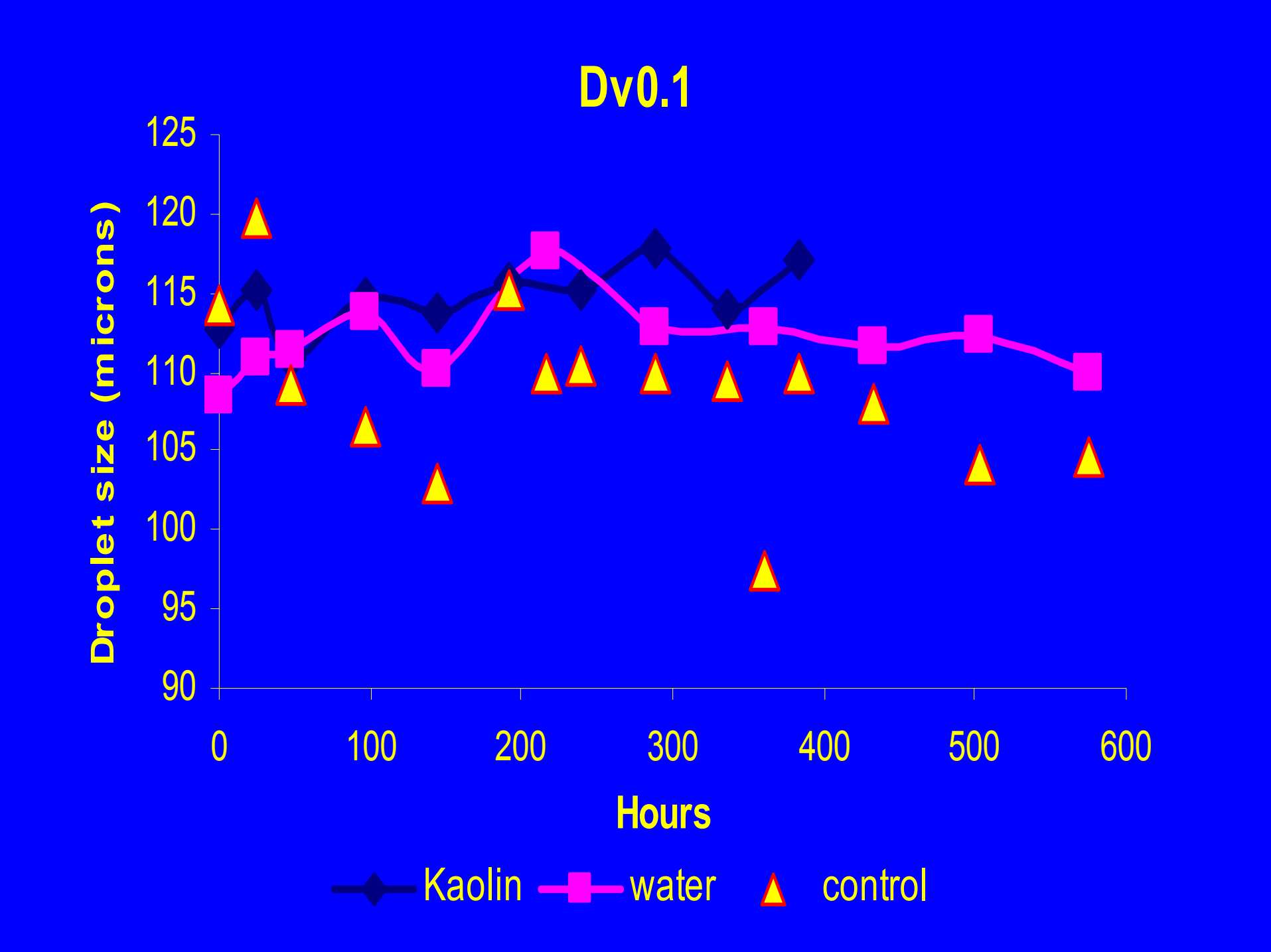

1
2
3

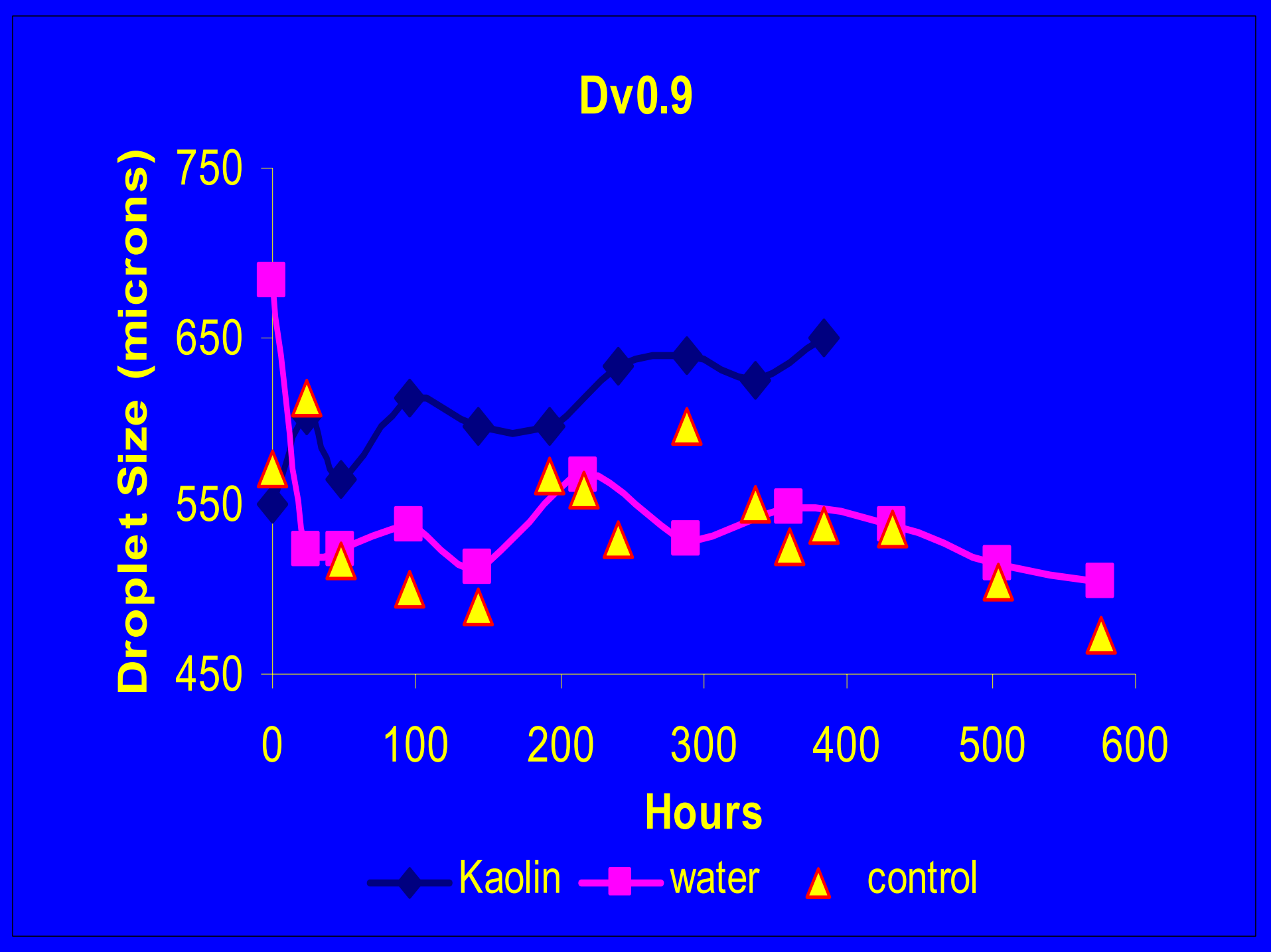

4
2
6
3
8

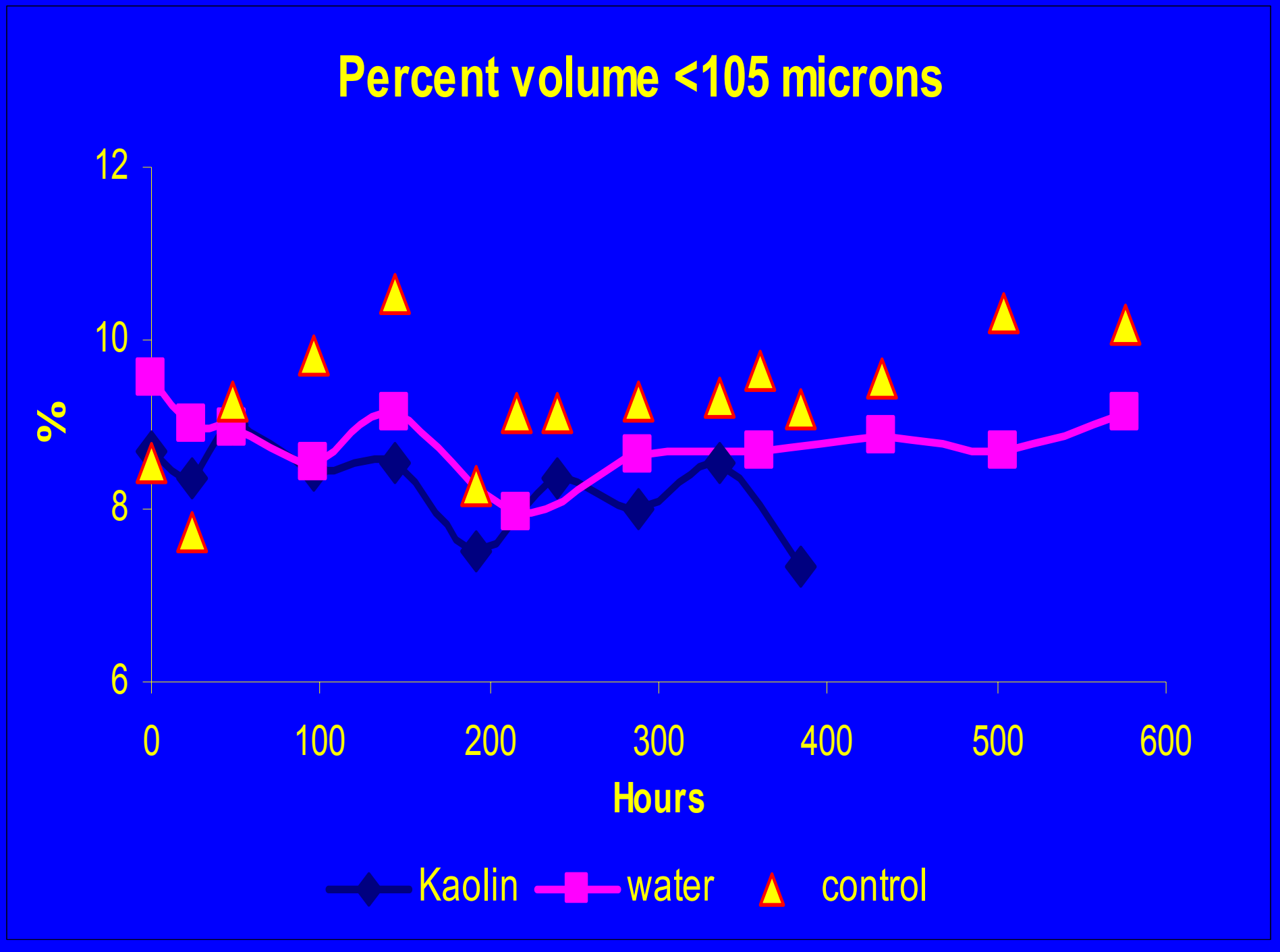

Flow Rate
GPM
2.20
2.10
2.00
1.90
1.80
0
100
200
300
400
500
600
Hours
Kaolin
water
control
nominal flow rate

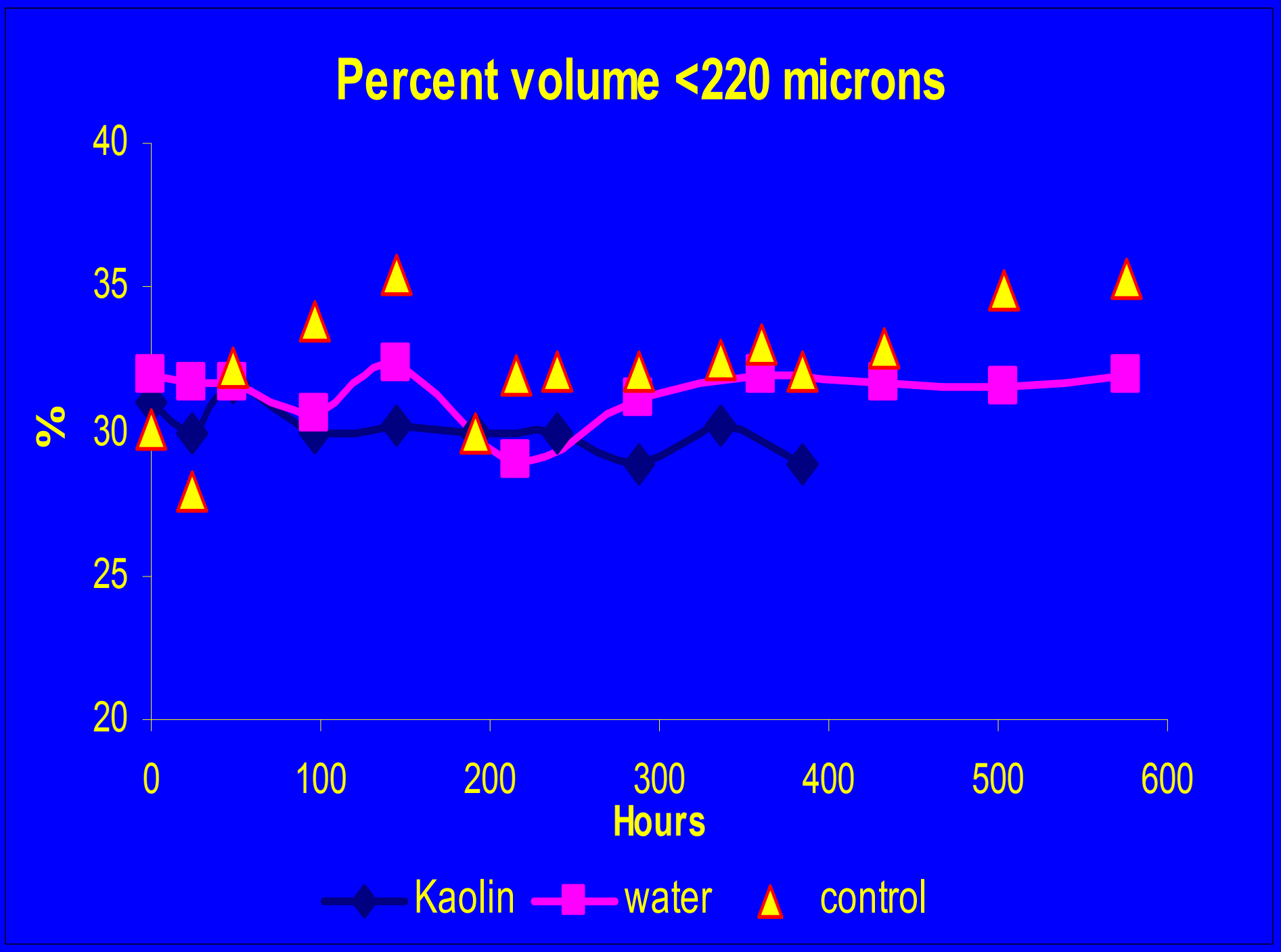

Percent Increase
%
10
9
8
7
6
5
4
3
2
1
0
-1
0
100
200
300
400
500
600
Hours
kaolin
water
control

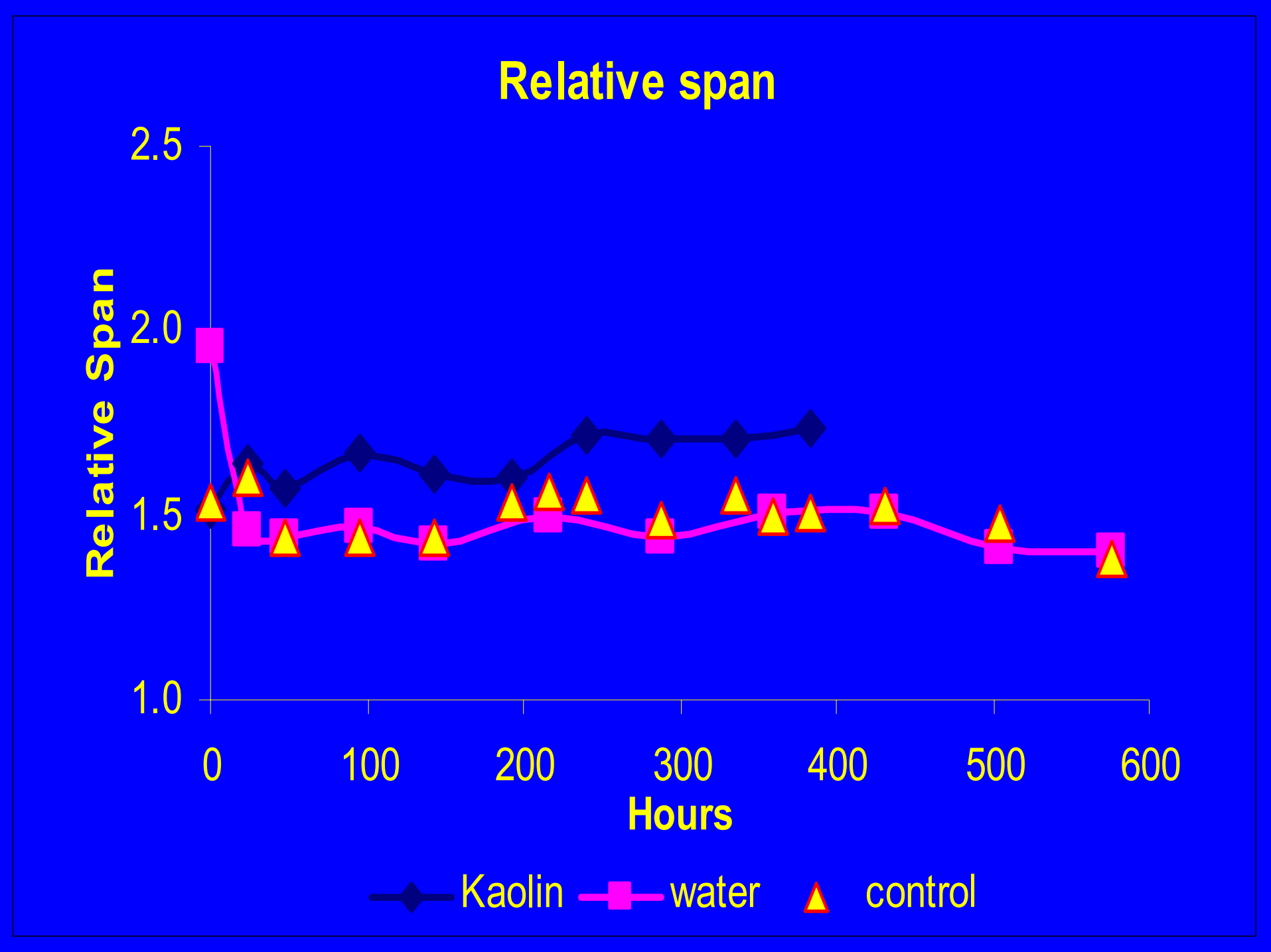

Dv0.5
Droplet size (microns)
320
310
300
290
280
270
260
0
100
200
300
400
500
600
Hours
Kaolin
Water
Control


Dv0.1
Droplet size (microns)
125
120
115
110
105
100
95
90
0
100
200
300
400
500
600
Hours
Kaolin
water
control

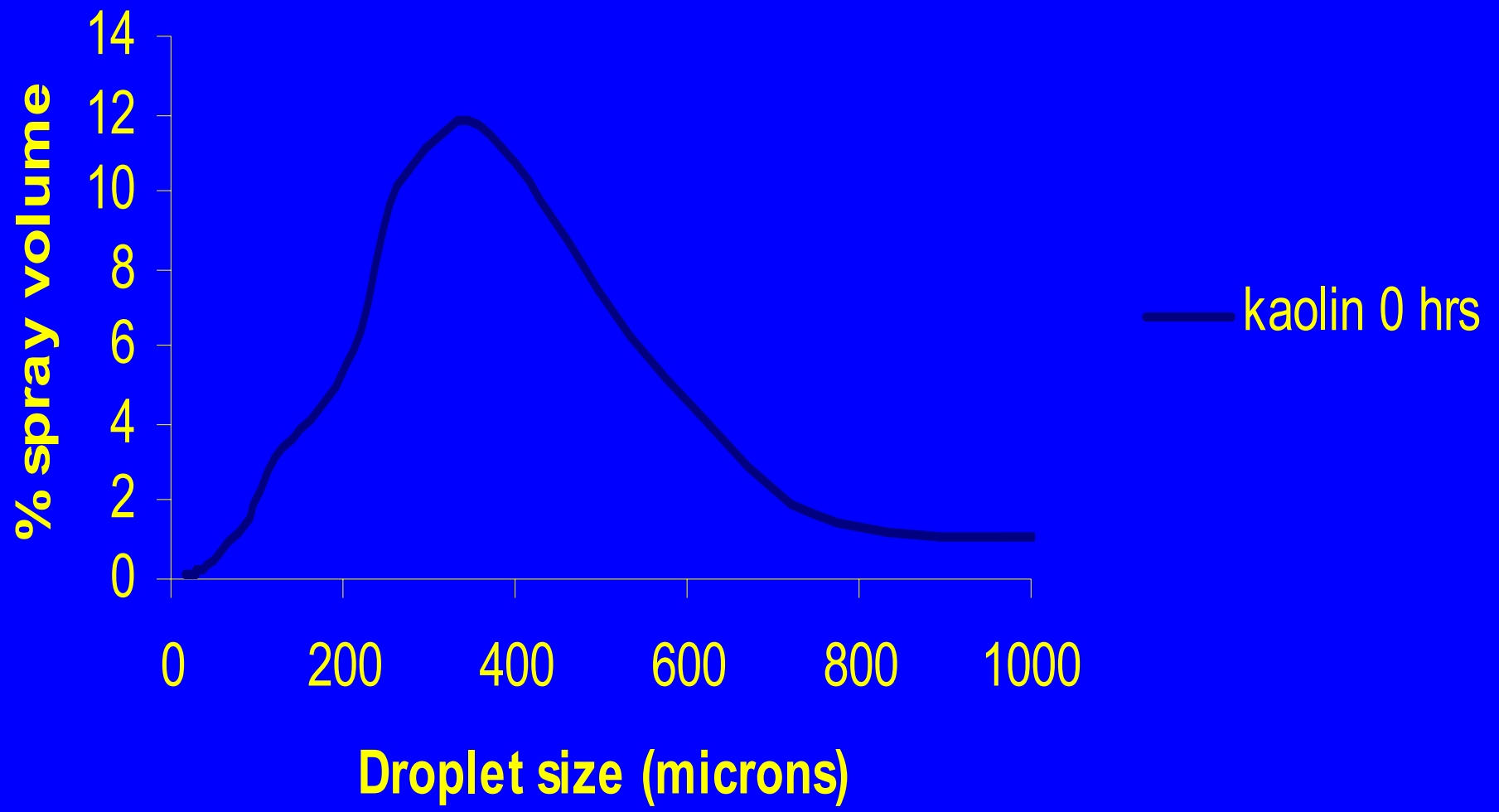

Dv0.9
Droplet Size (microns)
750
650
550
450
0
100
200
300
400
500
600
Hours
Kaolin
water
control


Percent volume <105 microns
12
10
8
6
%
0
100
200
300
400
500
600
Hours
Kaolin
water
control

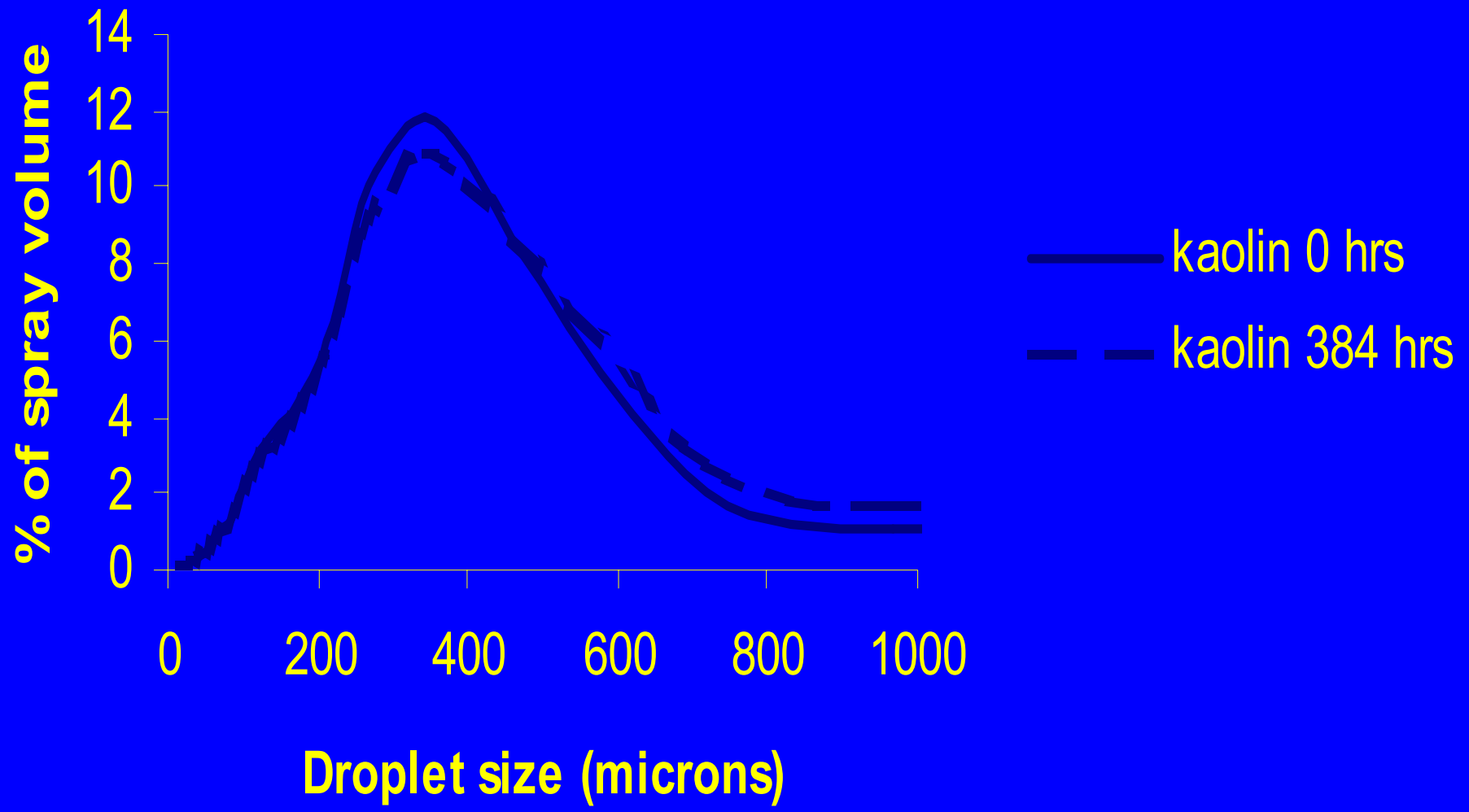

Percent volume <220 microns
40
35
30
25
20
%
0
100
200
300
400
500
600
Hours
Kaolin
water
control


Relative span
Relative Span
2.5
2.0
1.5
1.0
0
100
200
300
400
500
600
Hours
Kaolin
water
control

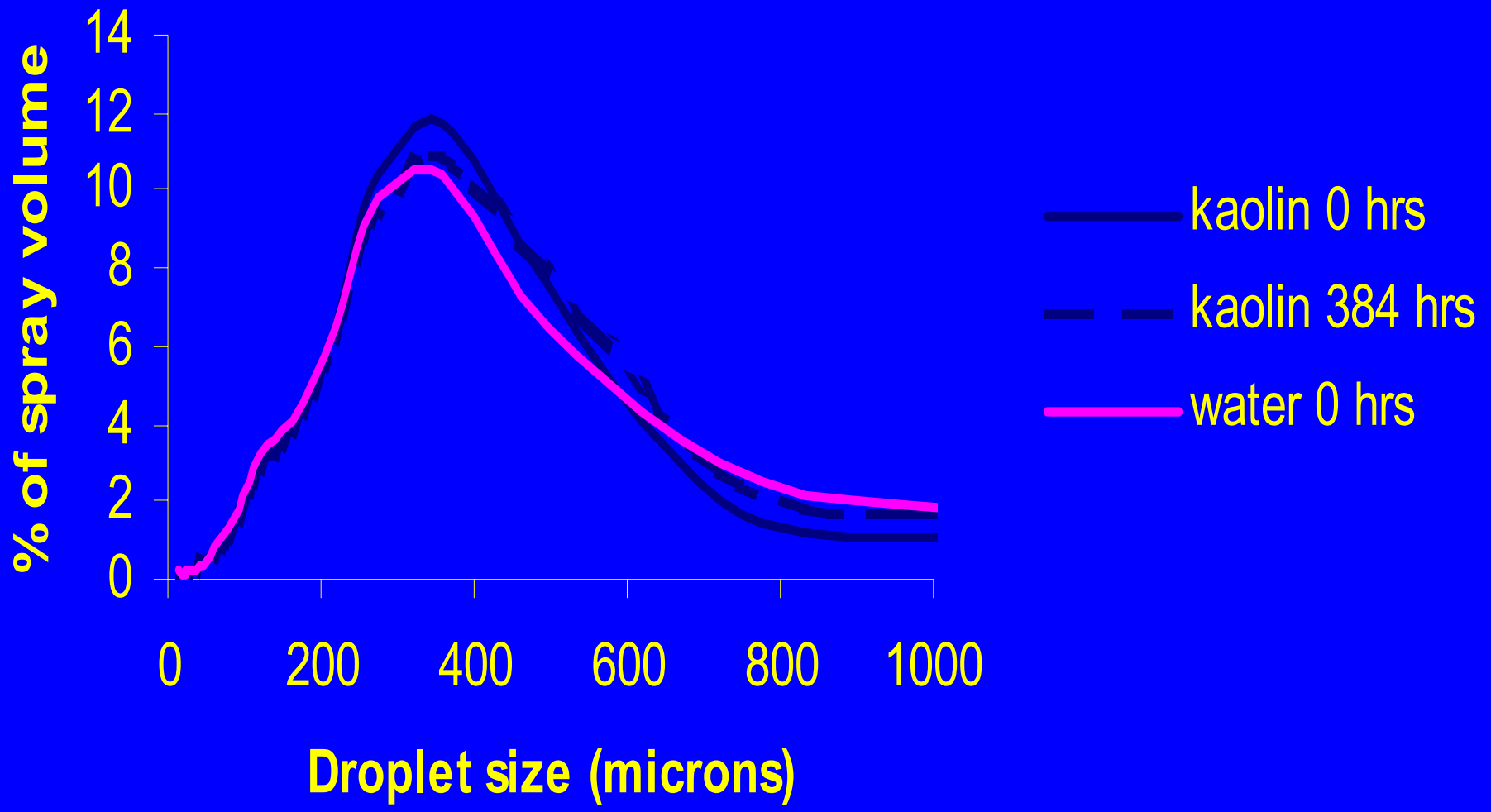
Average droplet spectra



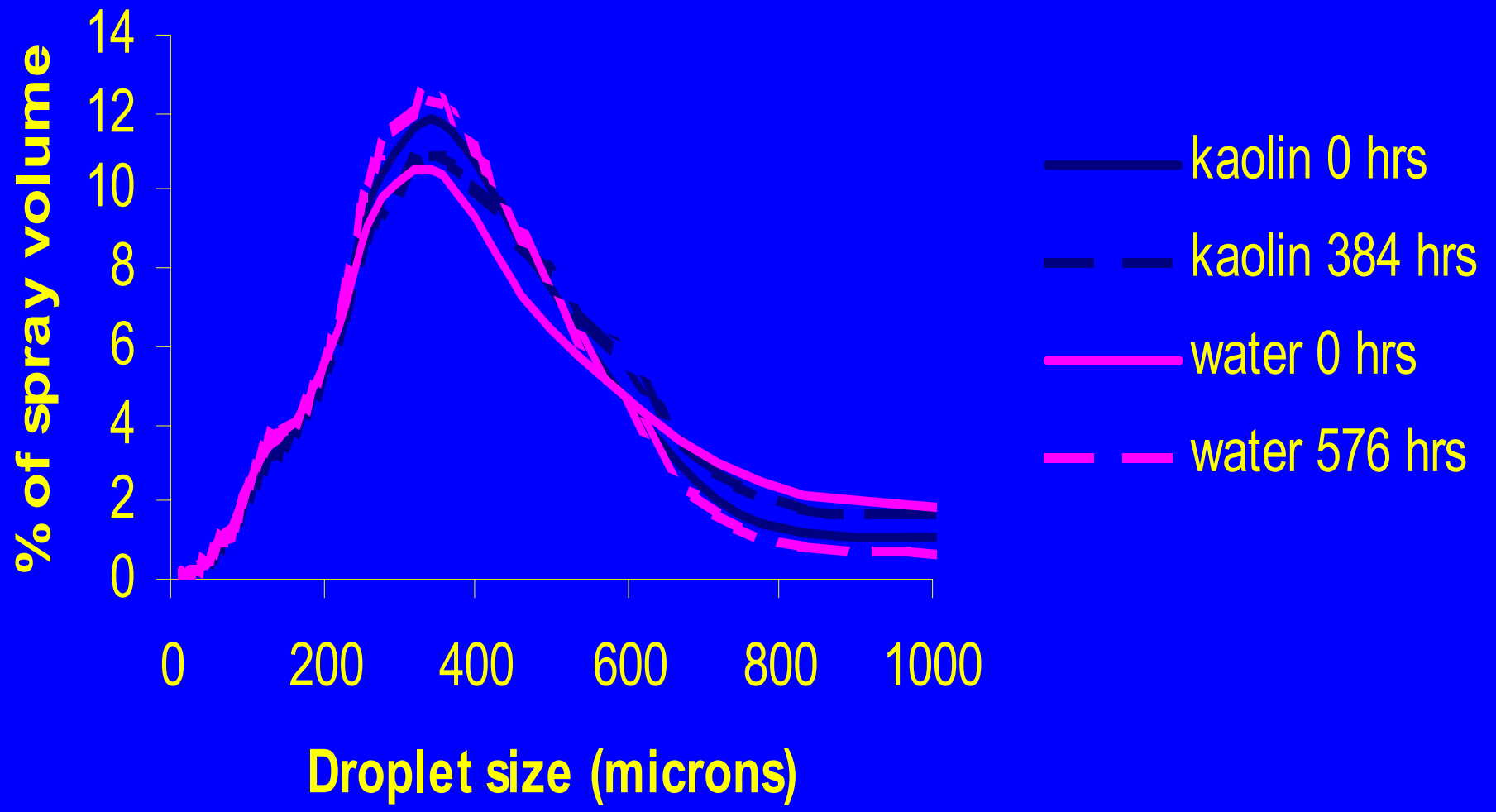
Average droplet spectra



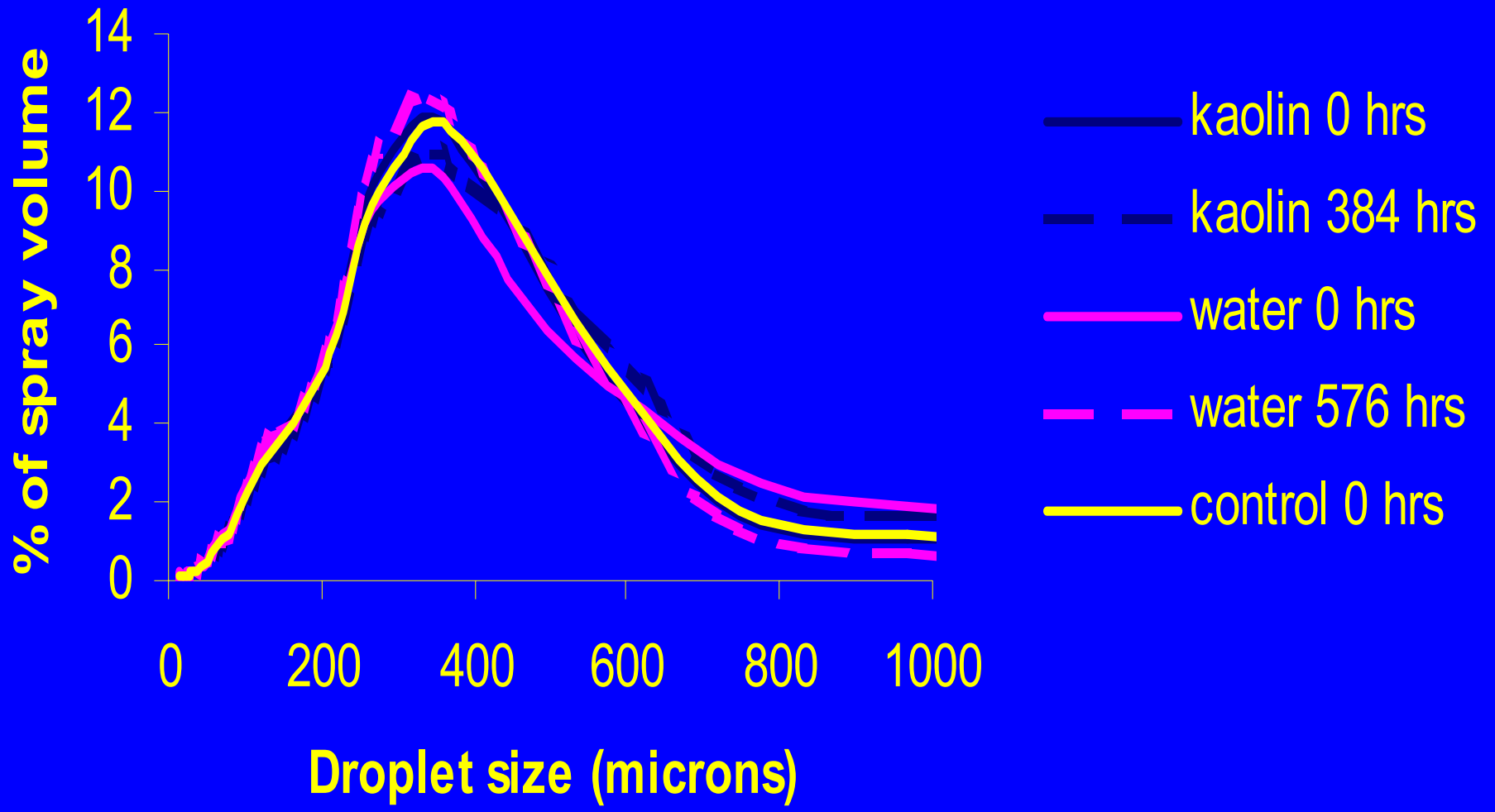
Average droplet spectra



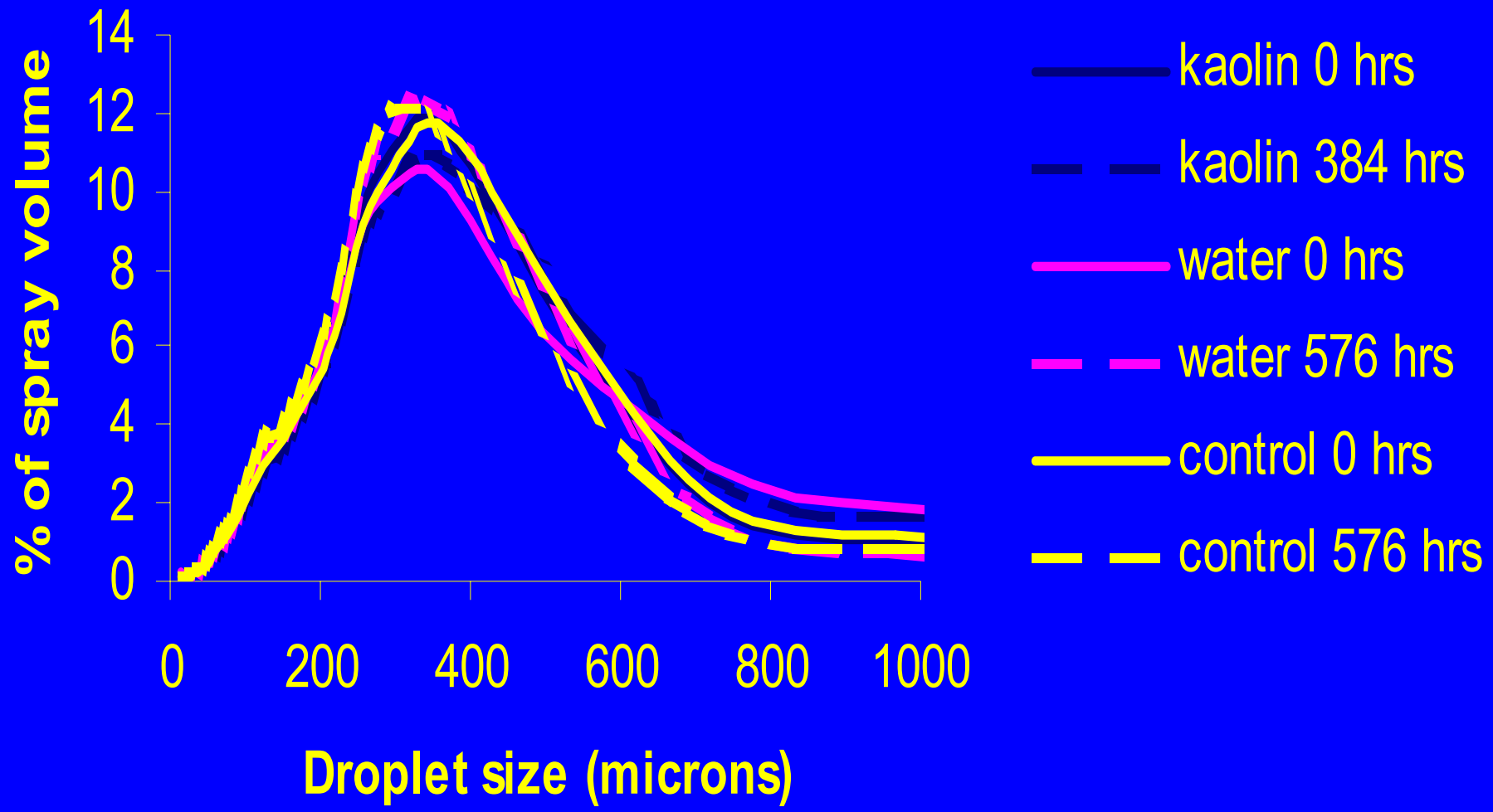
Average droplet spectra



Average droplet spectra



Average droplet spectra



CONCLUSIONS

Nozzles that atomized the simulated wettable powder (kaolin) increased 8.1% in flow rate by 384 hours of use while nozzles that sprayed water for 576 hours increased 3.4%.

CP-03 nozzles that atomized kaolin for 384 hours and water for 576 hours, under the static conditions of this test, resulted in minimal changes to spray quality.

Generally, new CP-03 nozzles resulted in more variable spray quality measurements than nozzles used for at least 96 hours.

Thanks for your attention