

## Measuring Floc Size Evolution During Jar Tests

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## Introduction

Many parameters affect the flocculation dynamics such as input water quality, temperature, pH, concentration or type of coagulant, rate of stirring, etc.

## Objective

In this work we observed how coagulant concentration affects final floc size and the speed of flocculation

## Experimental Setup

We used a specialized imaging device, Jar FlocCAM<sup>®</sup>, that fits on a standard rectangular jar.

During the course of a jar test the Jar FlocCAM<sup>®</sup> collects images of flocs and from them calculates floc size, number of flocs, shape of flocs, floc average velocity, etc.

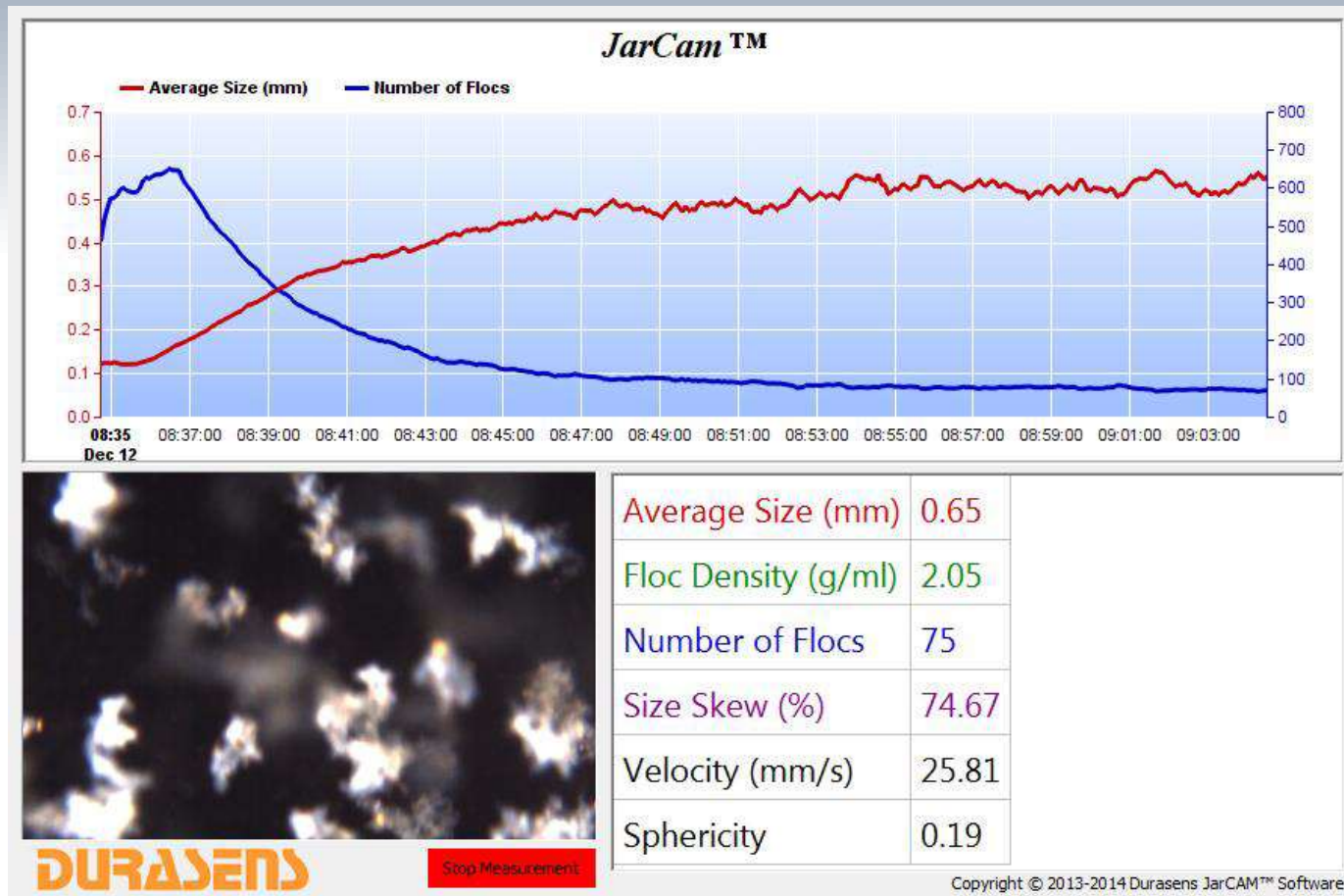
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[www.floccam.com](http://www.floccam.com)

## Multi Jar-FlocCam<sup>®</sup>



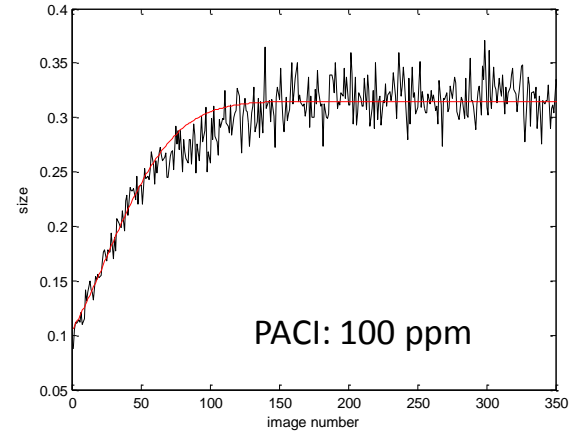
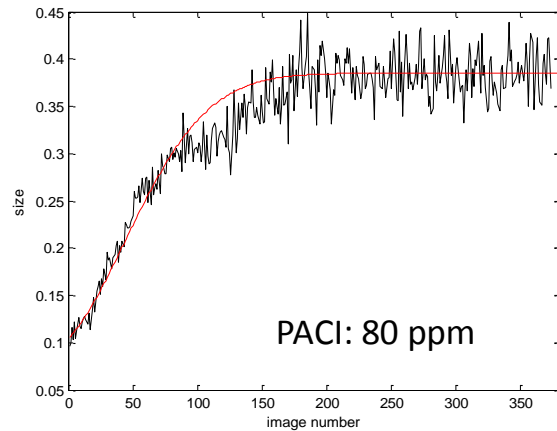
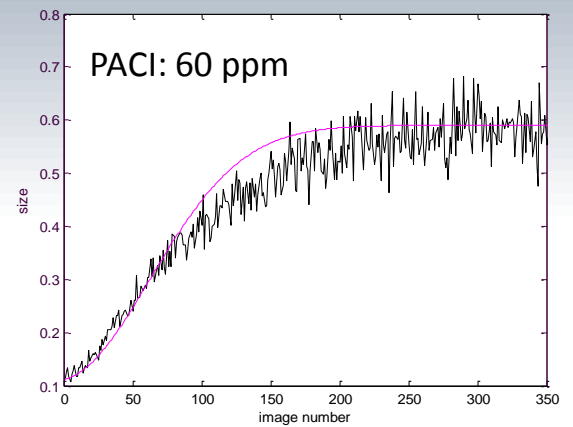
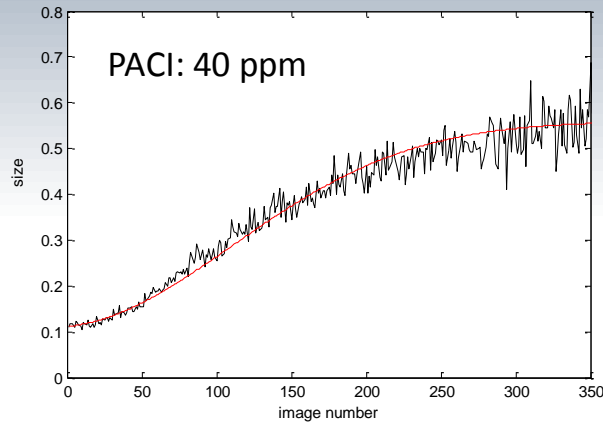
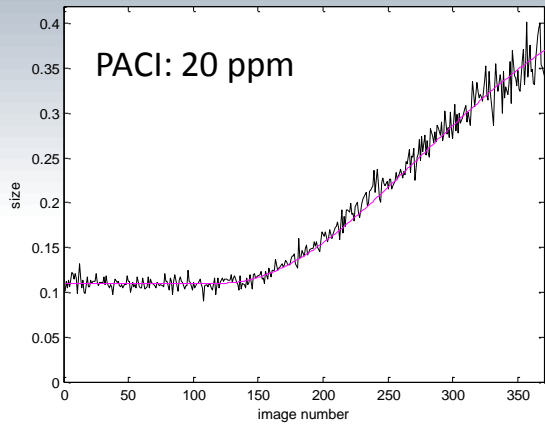
## Jar FlocCam<sup>®</sup> Software Interface



## Summary of Experiments

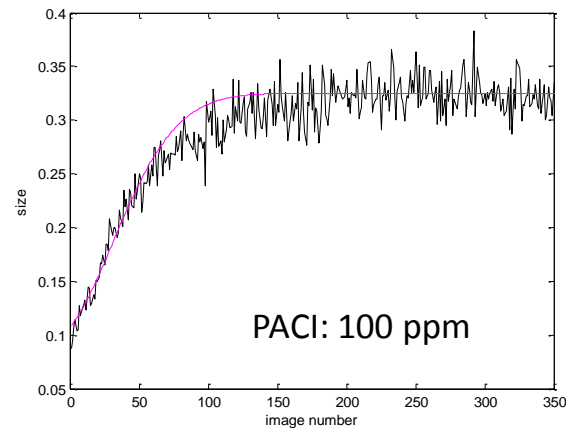
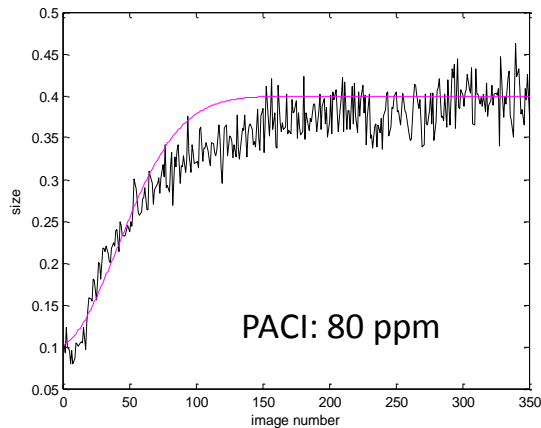
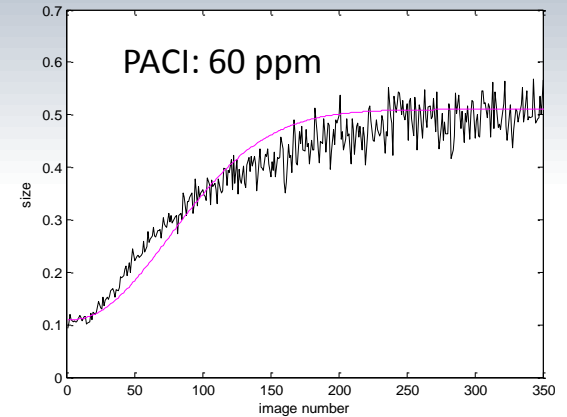
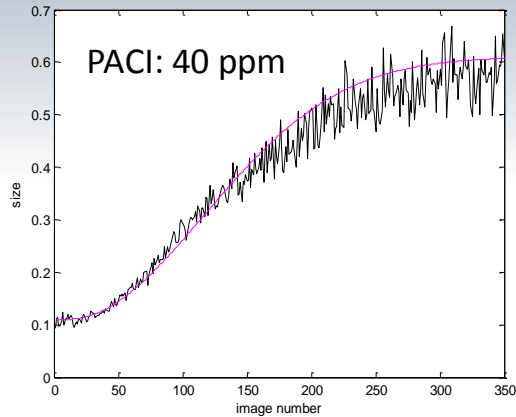
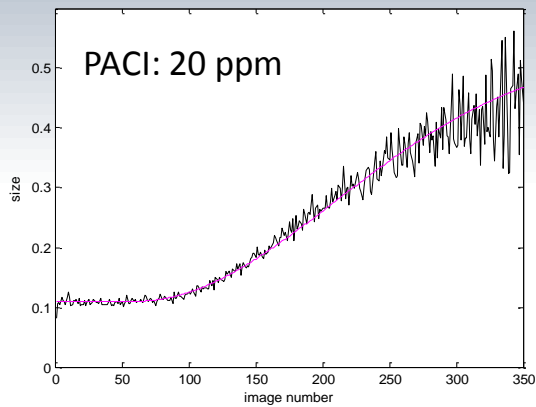
Run No.	PACI dose (ppm)	Arcylamide dose (ppm)	Pre-Test Turbidity (NTU)	Residual Turbidity (NTU)*	pC*	time T	$\Delta$	D(0)
1	20	10	1.39	1.08	0.110	17.92	0.35	0.11
2	40	10	1.42	0.48	0.471	14.17	0.45	0.11
3	60	10	1.70	0.33	0.712	7.92	0.48	0.11
4	80	10	1.79	0.25	0.855	6.25	0.29	0.095
5	100	10	1.58	0.26	0.784	5.83	0.24	0.075
6	20	10	1.50	0.73	0.313	17.50	0.42	0.11
7	40	10	1.55	0.44	0.547	12.50	0.5	0.11
8	60	10	1.43	0.30	0.678	8.33	0.4	0.11
9	80	10	1.73	0.30	0.761	5.42	0.3	0.1
10	100	10	1.68	0.36	0.669	5.42	0.23	0.095

## First Experiment





## Second Experiment



## Extracting relevant information from experimental data

The experimental curves were fitted to the following expression:

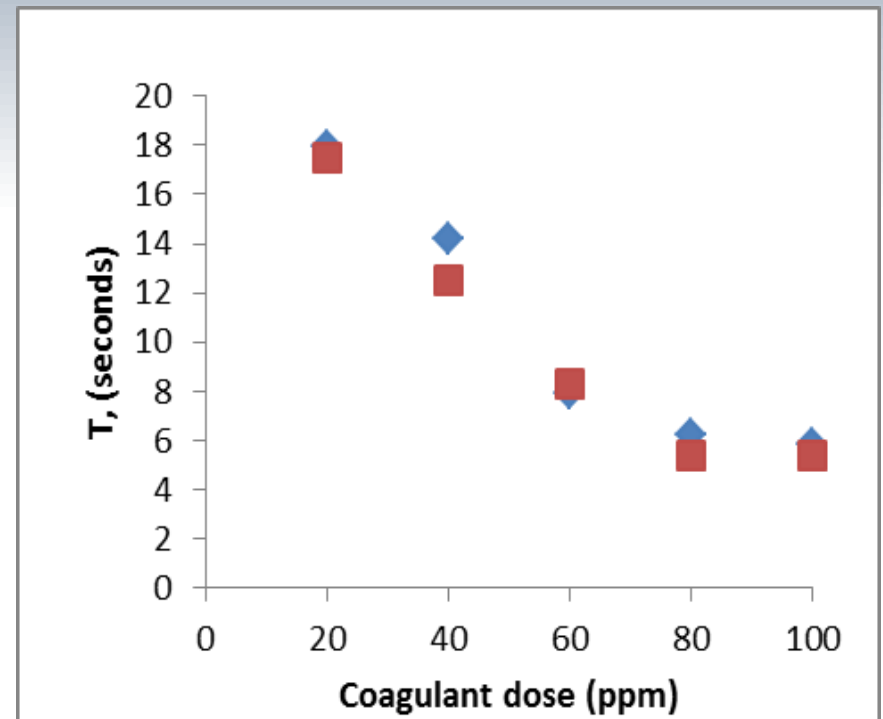
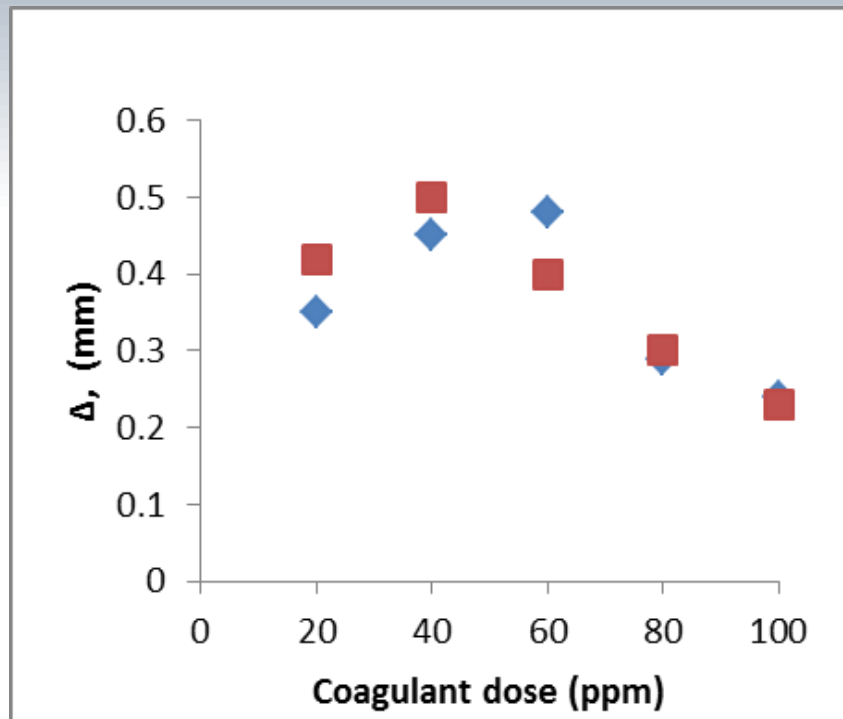
$$D(t) = D(0) + \Delta \left( 1 - e^{-\left(\frac{t}{T}\right)^2} \right)$$

$D(t)$  is floc size at time  $t$ ,

$\Delta$  is the increase in floc size during the experiment

$T$  is the time it takes the floc size to reach  $D(0) + \Delta \left( 1 - \frac{1}{e} \right) = D(0) + 0.632\Delta$ .

## Results



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