Next FGX3

Applications in Agriculture

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Next FGX3

Summary uses in:

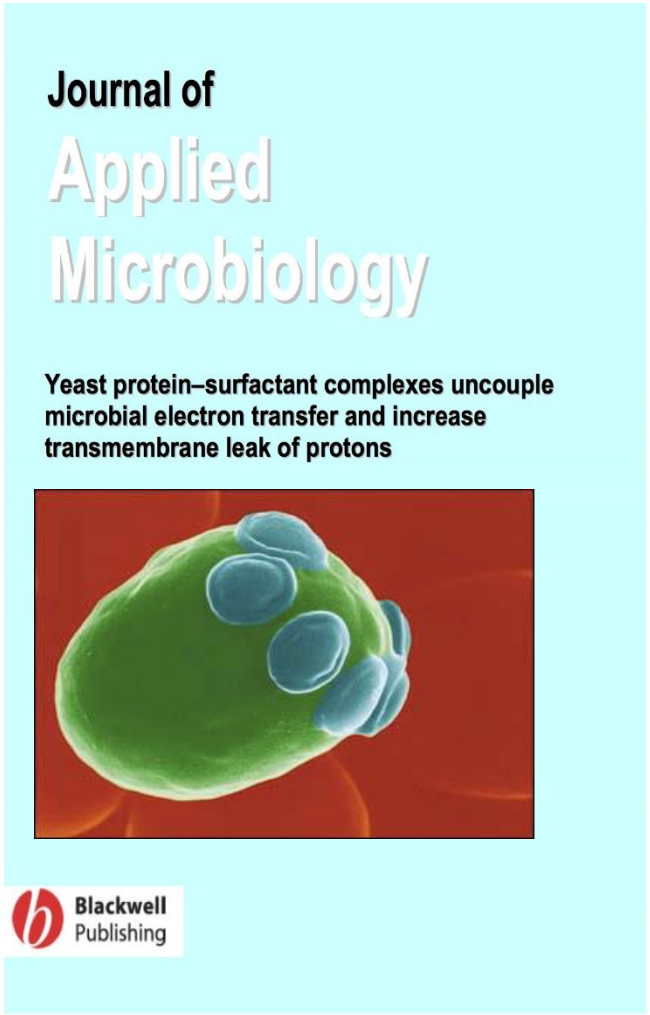
- Wastewater treatment to improve activated sludge processes saving energy, removing COD, potential to remove Phosphate and ammonia reducing final effluent BOD, P and NH3.
- In sewer removing (FOG) Fats, Oil and Grease restoring hydraulic capacity removes hydrogen sulphide odours and reduces organic matter in septic tanks.
- In irrigation systems removing biofilm and enhancing nutrient take up and aiding the effectiveness of herbicides if sprayed on plants.
- In hydroponics removing biofilms and enhancing nutrient take up.
- biofouling In MBR treatment removes biofilm and enhances the membrane flux.
- in soil removes oils reducing Total Available Hydrocarbons and Polyaromatic Hydrocarbons.
- Bio-reduction of odours enhanced in wet media odour reducing plants.
- food preparation cleans work surfaces and floors and the treated surfaces remain far easier to clean. Cleans HVAC systems and maintains them easier to clean with less down time

Next FOG STOP - Yeast derived Surfactant Synergist

Developed at University of Irvine US
Formulation based on bakers yeast
Made up of proteins released from heat Stressed Fermentation plus synthetic surfactants.

Experiments with membranes prove blend is equivalent to 2,4 Dinitrophenol and Lauric acid as protonophore type uncouplers in phosphorylation ATP energy cycle.

In agriculture the formulation can be regarded as a Protein Surfactant Synergist PSS™



Effect of PSS™ on Surfactants

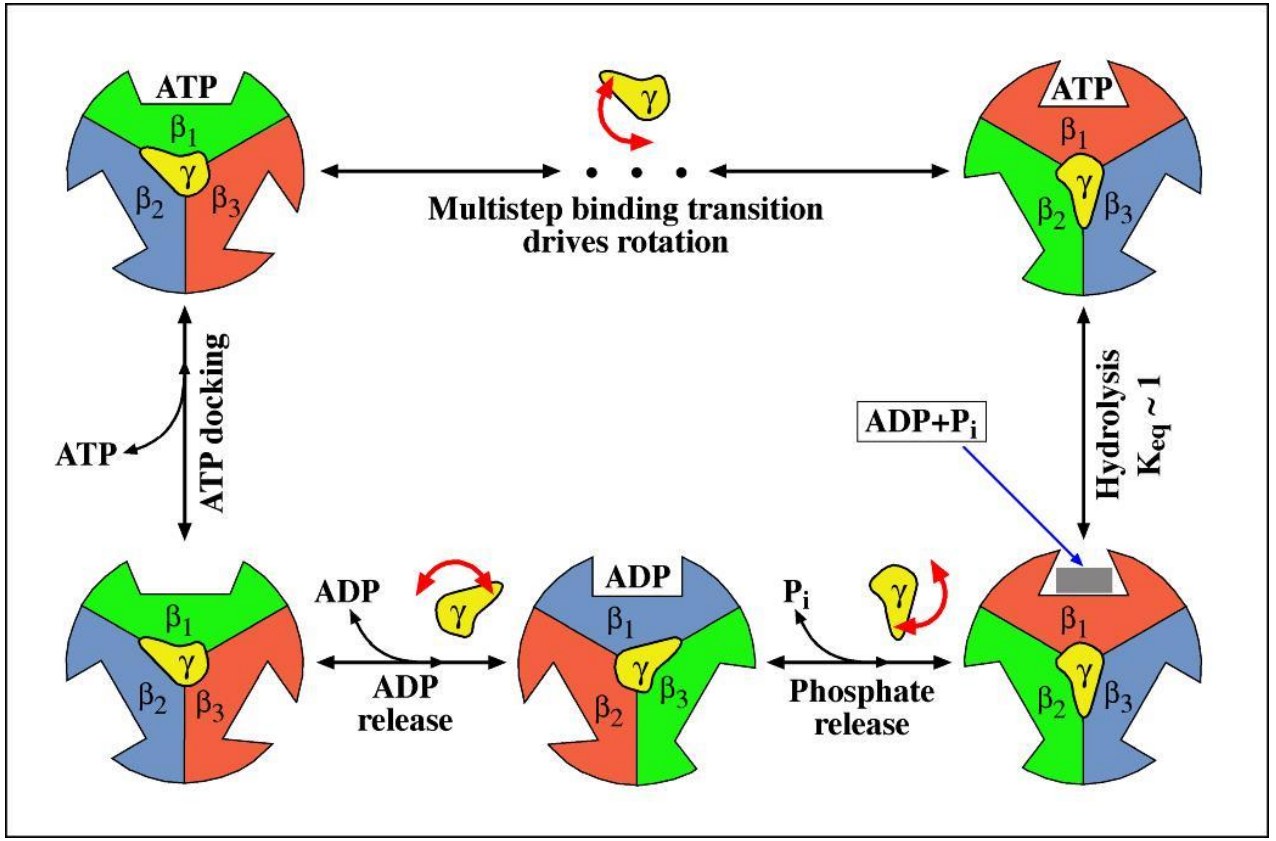
- Reduces Critical Miscelle Values CMC delivering greater wetting of soils and enhanced moisture retention with less use of surfactants diminishing use of adjuctants
- Reduces Interfacial Tension and surface tension of Surfactants for improved wetting including foliar and soil applications
- Has applications across a broad spectrum of surfactants and end use applications

Microbial Interaction (i)

ATP Cycle

Next fog STOP enhances the metabolism of Indigenous bacteria in toxicologically and environmentally safe means by disrupting conversion of ADP into ATP, resulting in more oxidation of organic matter into CO_2 rather than growth of microbial biomass

25% Catabolism and 75% Anabolism



Microbial Interaction (ii)

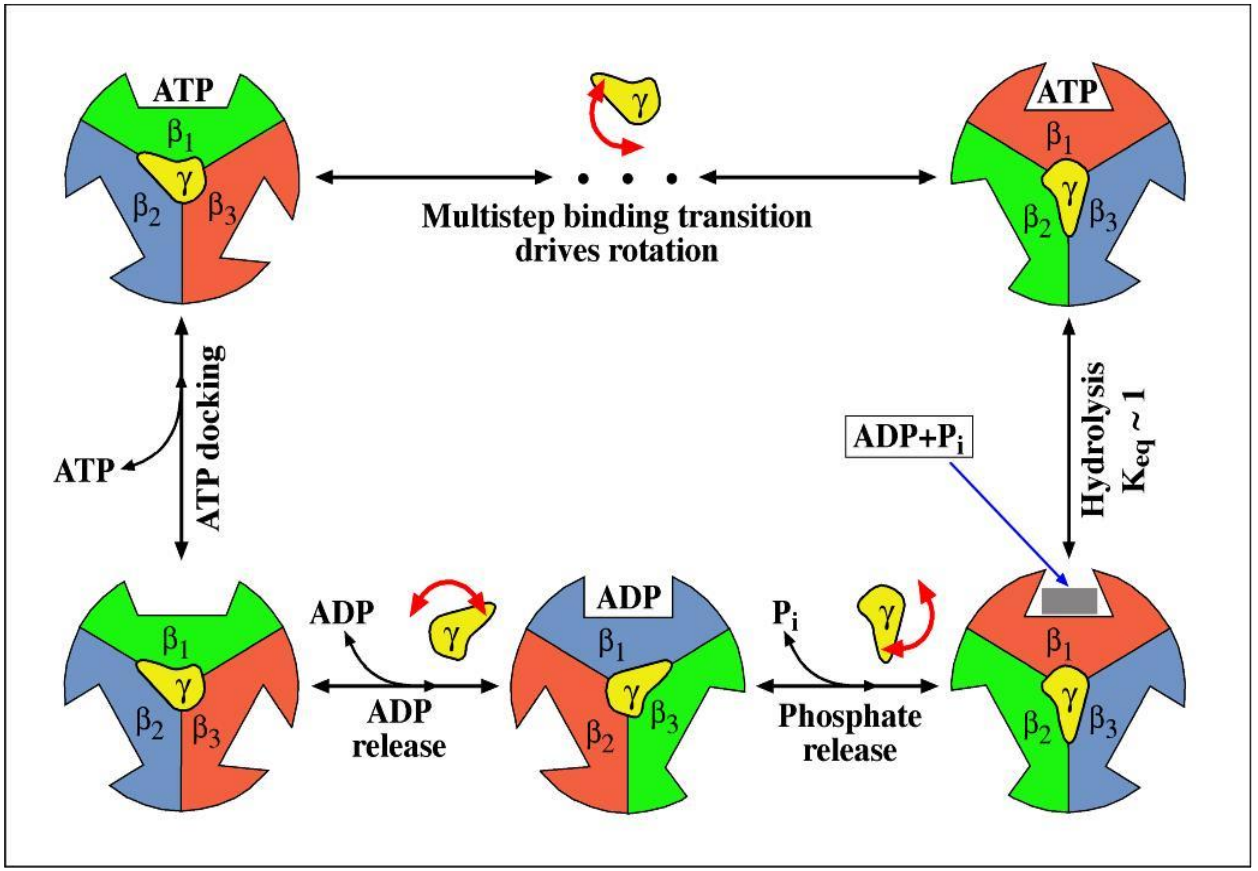
ATP Cycle

Decoupling is brought
About by yeast proteins
That fit active sites
mimicking
Transferase and other
enzymes

The synthetic detergents
(increased miscelles)
Insert into the cell wall
Decreasing the effectiveness
Of Proton pump that drives
ATP to ADP rate

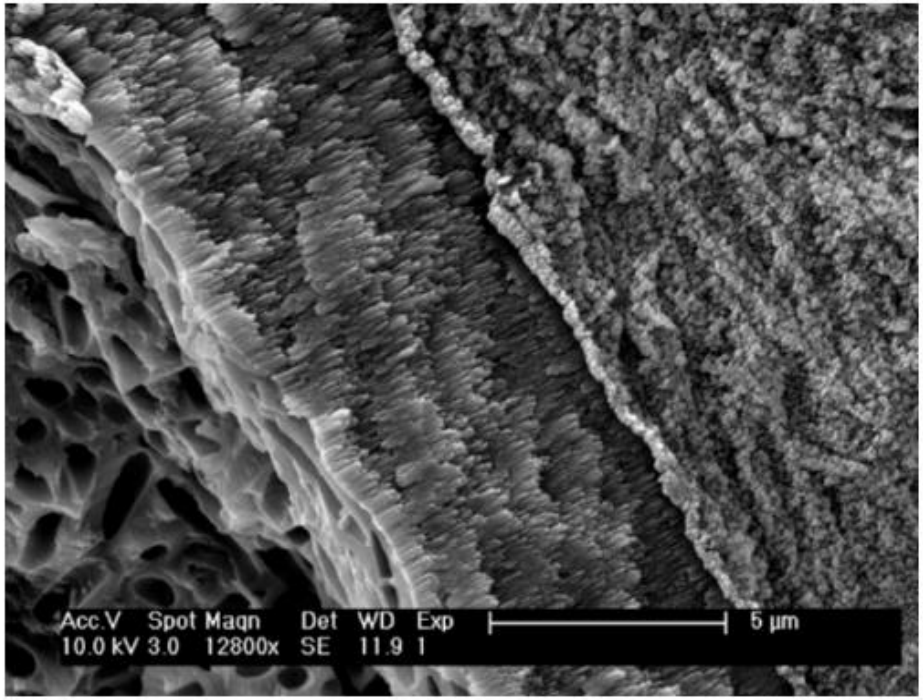
Results in rapid increase
In nutrient uptake with
Less associated biomass
Growth (anabolism)

75% Catabolism and 25% Anabolism



Next fog STOP approvals

Certifications and Approvals



Purified Calcite from bacterial colony examined using scanning electron microscope (SEM). The rods on the left are "scars" of the bacteria reside within the calcite.

Effect of PSS™ on CMC values

	CMC Values ppm	
Surfactant	No PSS	With PSS
Lauramine Oxide	99.78	13.03
Na Lauryl Ether Sulphate	642.6	115.2
1:2 LO - SLES	146.1	7.72

What is: next F.O.G. STOP™

What it's not:

- An enzyme
- A Bacteria
- A toxic chemical

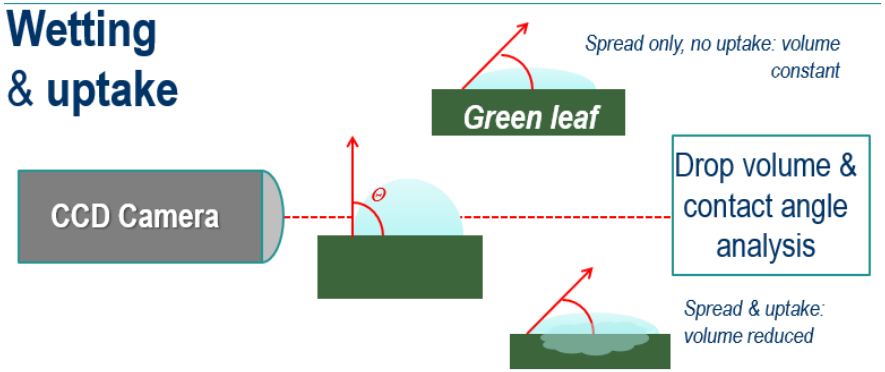
What it is:

- A complex of low molecular weight metabolites with surfactants
- Affects only existing bacteria
- A liquid with pH of 7 and requires only eye protection and gloves it has a two-year shelf life

Foliar Uptake

Facilitating Wetting, Spreading and Uptake of Micronutrients and Bioactives

Contact angle and drop volume



Importance of Wetting

Facilitates spreading and foliar uptake of biocides

Example of two aqueous solutions on cabbage leaves

- Same scale and time frame

0.25% CD on Cabbage leaf

- Commercial detergent versus Next fog STOP formulation

0.25% NFS on Cabbage leaf

Leaf Wetting on Cabbage Plant

0.25% CD

t=0 sec

t=120 sec.

t=360 sec.

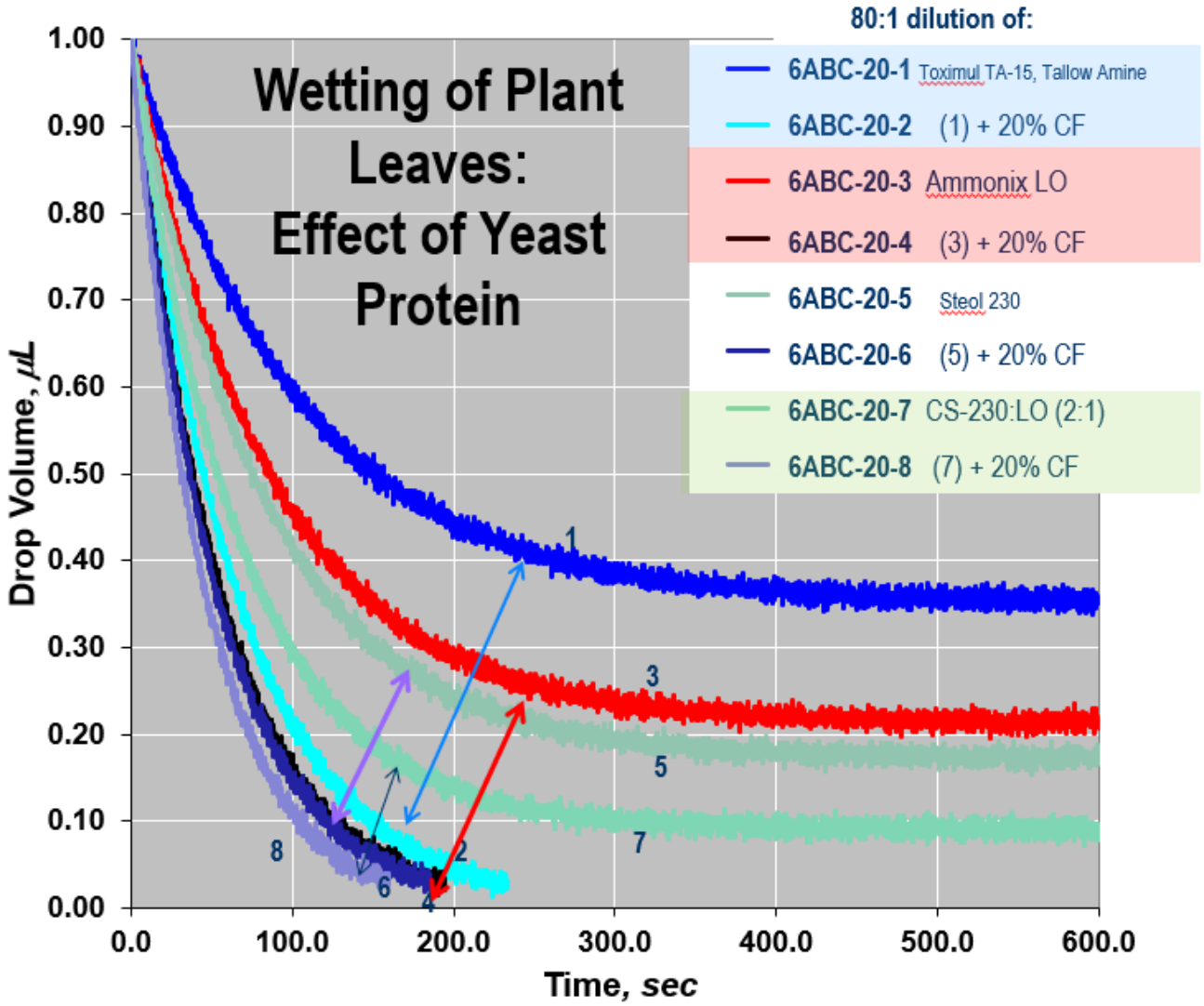
0.25% NFS

t=0 sec.

t=10 sec.

t=120 sec.

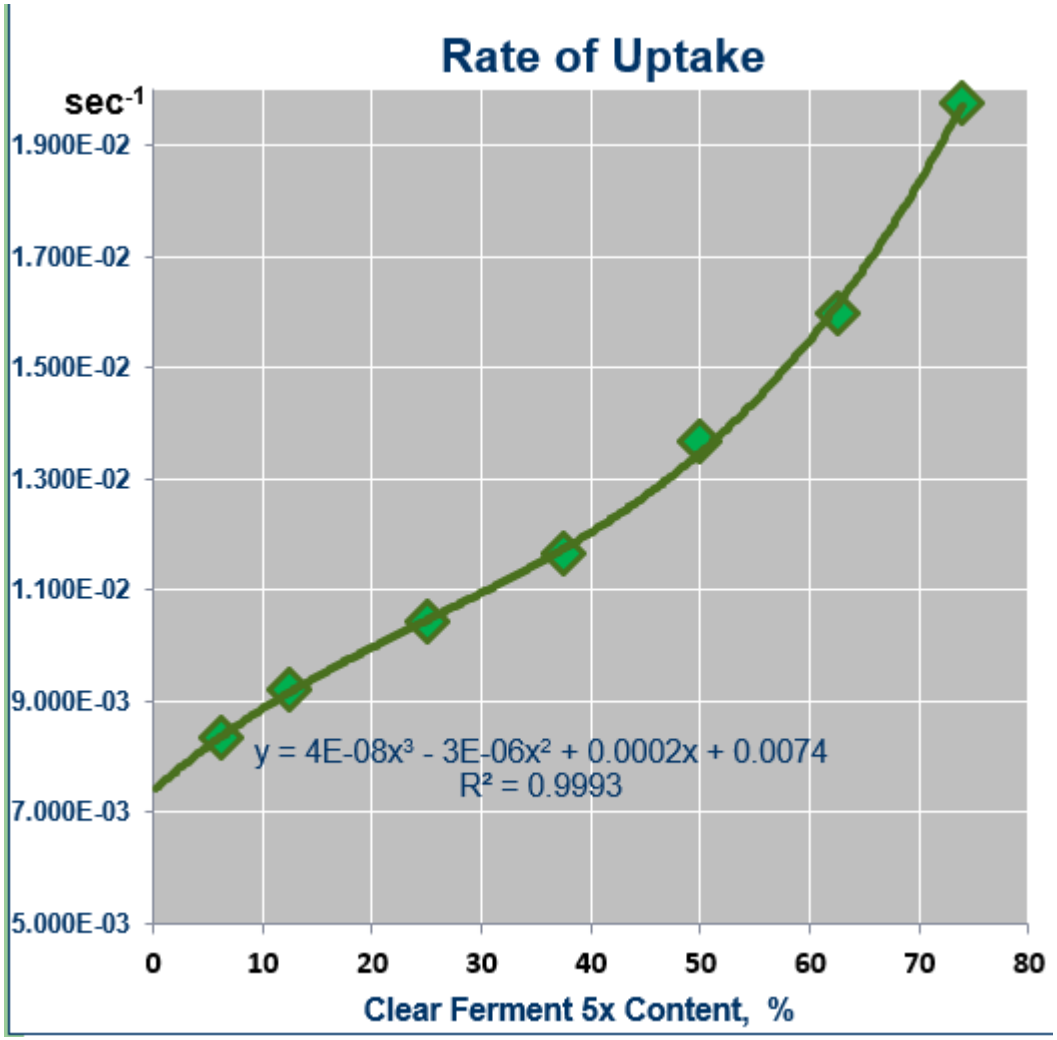
Drop Volume after Cabbage leaf application



Wetting/ Spreading/ Uptake on Cabbage Leaves

	Average Time to Complete Droplet Penetration (s)	Equilibrium Non-Penetrated Drop Volume (µL)	Equilibrium Contact Angle (degrees)
TOXIMUL® TA-15 (Tallow amine)	600+	0.35	28.6
TOXIMUL® TA-15 + Protein	233	0	0
AMMONYX® LO	600+	0.21	18.8
AMMONYX® LO + Protein	194	0	0
STEOL® CS-230	600+	0.18	18.1
STEOL® CS-230 + Protein	185	0	0
CS-230:LO (2:1)	600+	0.09	12.5
CS-230:LO (2:1)+ Protein	159	0	0

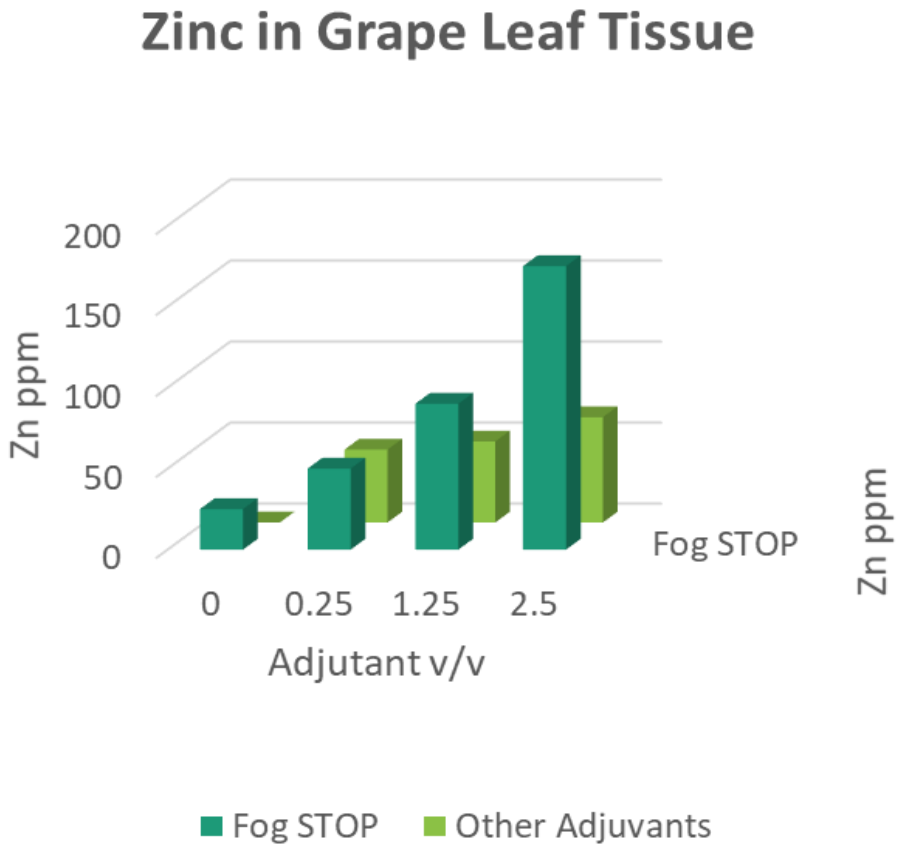
Cabbage Leaf Uptake



- Solutions contain a constant level of Surfactants and increasing amounts of PSS™
- The uptake rate increases with protein concentration increase

Grape leaf uptake of Zinc Micronutrient

- Major agribusiness company conducted tests on vine grape. Zinc is a regular micronutrient routinely applied to leaves by spray, using Foli-Gro Zinc 7% with Next Fog STOP spray adjuvant. Zinc was applied at a consistent rate in every treatment, while Fog STOP was applied at different concentrations.
- Next Fog STOP was plant safe (no observed phytotoxicity) in every treatment.



Protein Surfactant Complexes

Effects on Root and Shoot Growth Promotion

Root promotion in Spinach

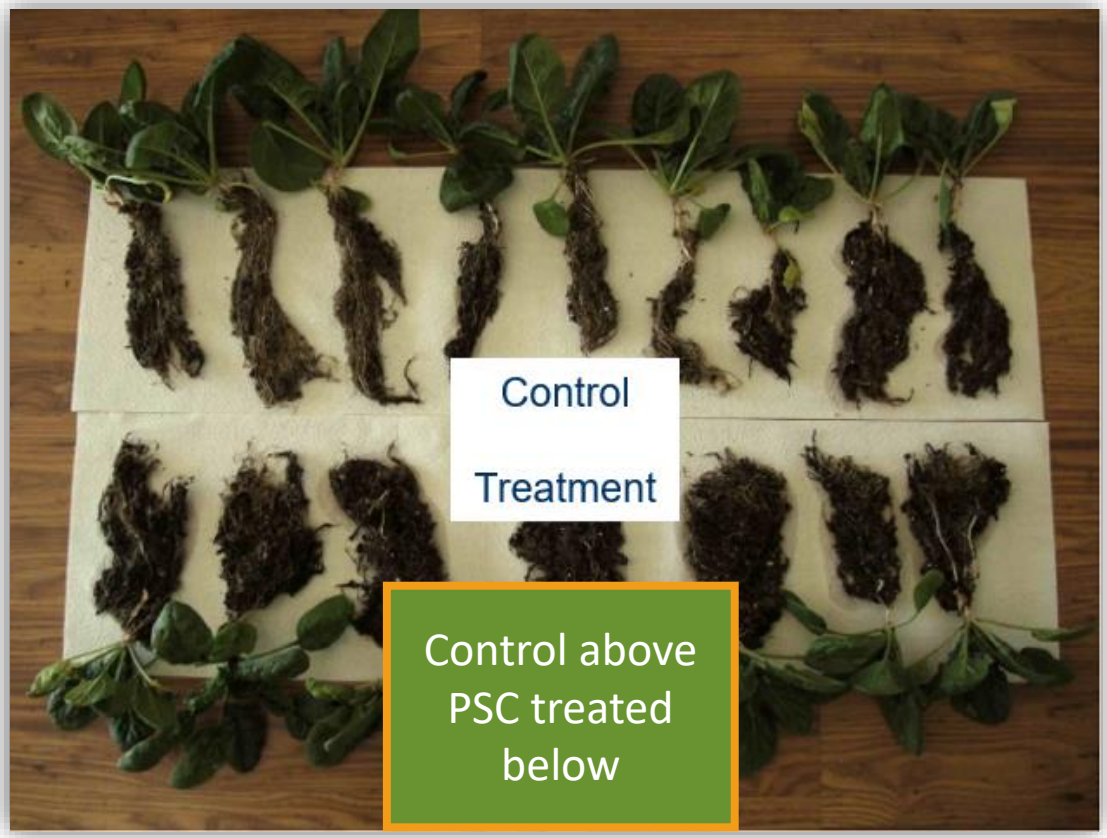
Studies were made on plants in 4 litre/1 US gallon pots in typical greenhouse conditions

Spinach plants were at the cotyledon stage at the start of the studies

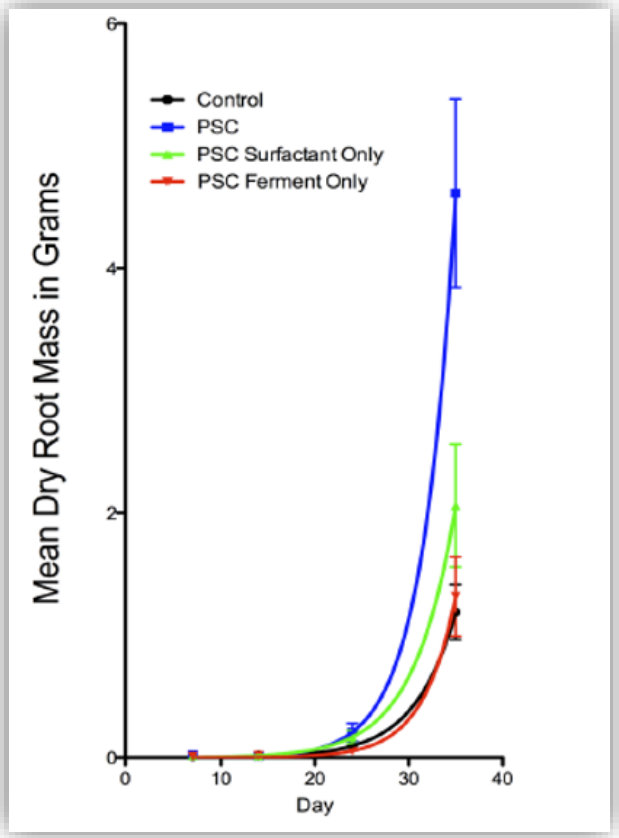
PSCs were added to every irrigation except the controls used graduated measuring cylinders

Roots were washed and dried

Results after 60 days of treatment



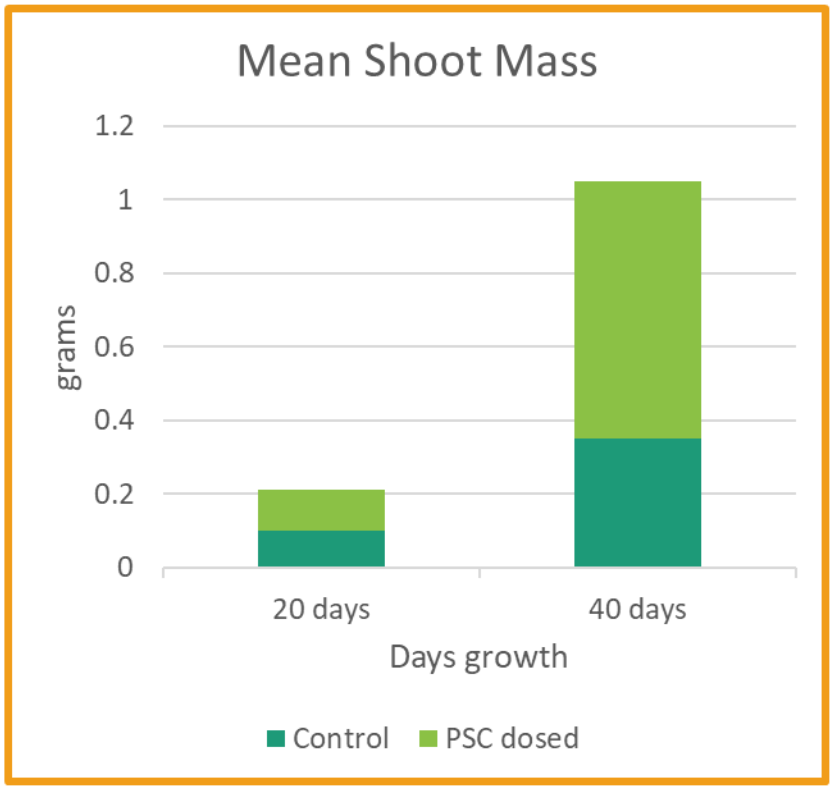
Spinach Root Growth



25 ppm PSCs treatment at each irrigation cycle except control

Mean Shoot Mass

Harmony Hybrid Spinach grown in standard media and irrigated with Next fog STOP



PEA study and Rhizome production

Treatment	Mean root dry weight[1]	Mean no. of rhizomes[2]	Mean dry weight of rhizomes[1]
PSC1	2.16 ± 0.15a	49.2 ± 12.7a	0.086 ± 0.014a
PSC2	1.78 ± 0.10b	19.3 ± 6.3b	0.045 ± 0.014ab
Control	1.93 ± 0.14ab	31.6 ± 12.6ab	0.040 ± 0.014b

[1] Means followed by different letters are significantly different, LSD (p=0.05)

[2] Means are significantly different at p=0.01, ChiSq = 5.11, df=2, P=0.0775.

NOTE: PSC treated nodules had deep red color whereas Control nodules were brownish-green

Soil conditioning and watering efficiency

Soil Surfactant demo Sage Farms 2012

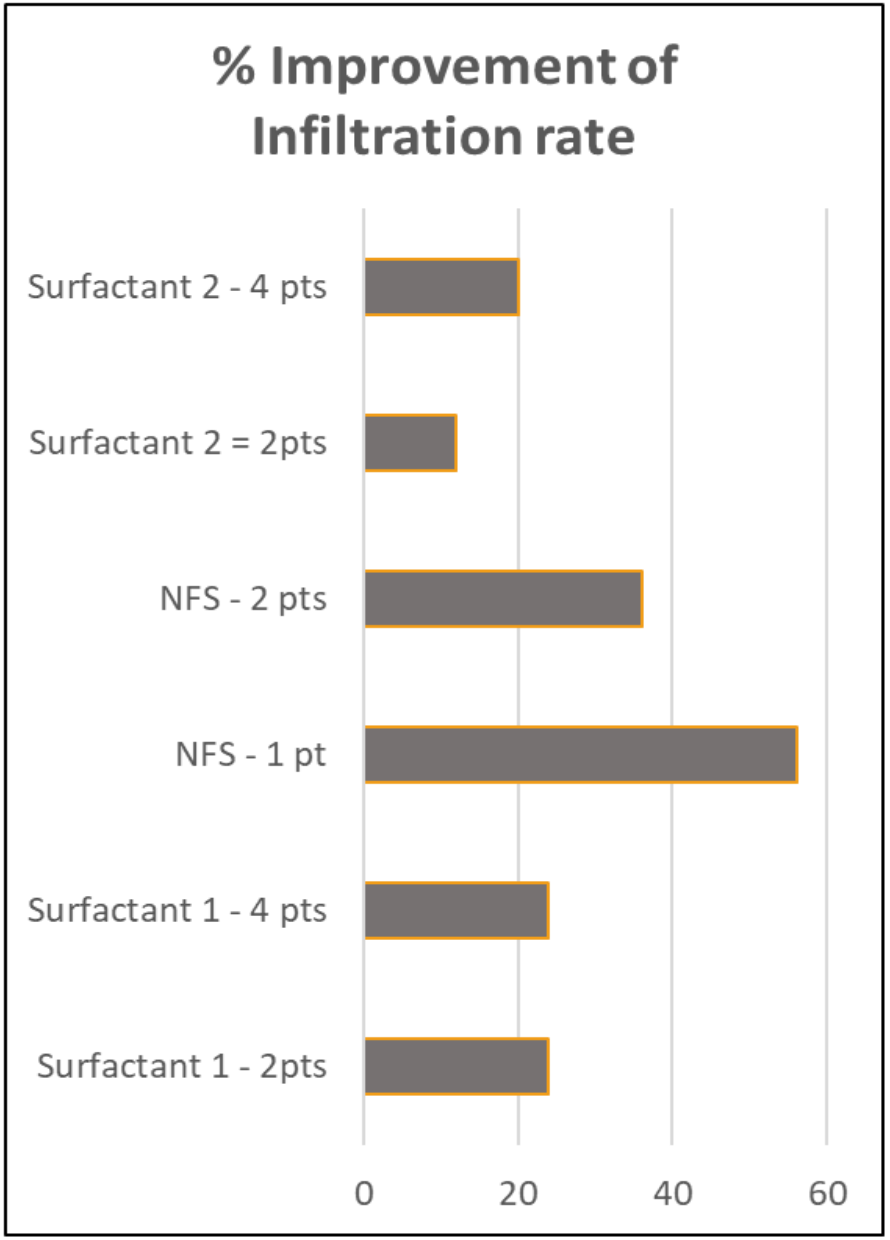
The Issue was related to poor soil infiltration and formation of crusts.

Next fog STOP prototype was compared to two other soil additives

Products were applied at 48 US gals per acre after the crusts were broken up with a rotary hoe

Soil Infiltration with comparative surfactants

Indicative Study Only



Used In UK and Europe:
Removing FOG in sewers

10 M of CCTV - dosing commenced on 23rd Aug 2016 and CCTV was repeated 29th Sept 2016.

Photo supplied by ST

Used In US, UK and Europe:

Removing Biofilm in Potable Tanks and Pipes

- Dosed at low ppm with Hydrogen peroxide
- Reference Staph Aureus greater than log 5 kill
- Irrigation nozzles kept clear in conjunctive use with Next Scale STOP
- Low ppm dosage up to 12 ppm concentrate
- Membrane Biofilm cleared and increased #flux on throughput

Next FOG STOP Next Scale STOP Next Sand