

Topical Research (0+2)

Use of magnetic water and polymer in agriculture

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Objectives

- To study the use of magnet for problematic water in agriculture.
- To study the influence of magnetic water on the incidence of pest and diseases
- To assess the effect of magnetic water on growth parameters and yield

HARD WATER FACTS

- Water has the capability to entrap other substances.
- Water's capacity to entrap substances results in its high mineral content.
- The amount of these dissolved minerals being carried by the water determines its hardness.
- One of the most common minerals in water is calcium carbonate.

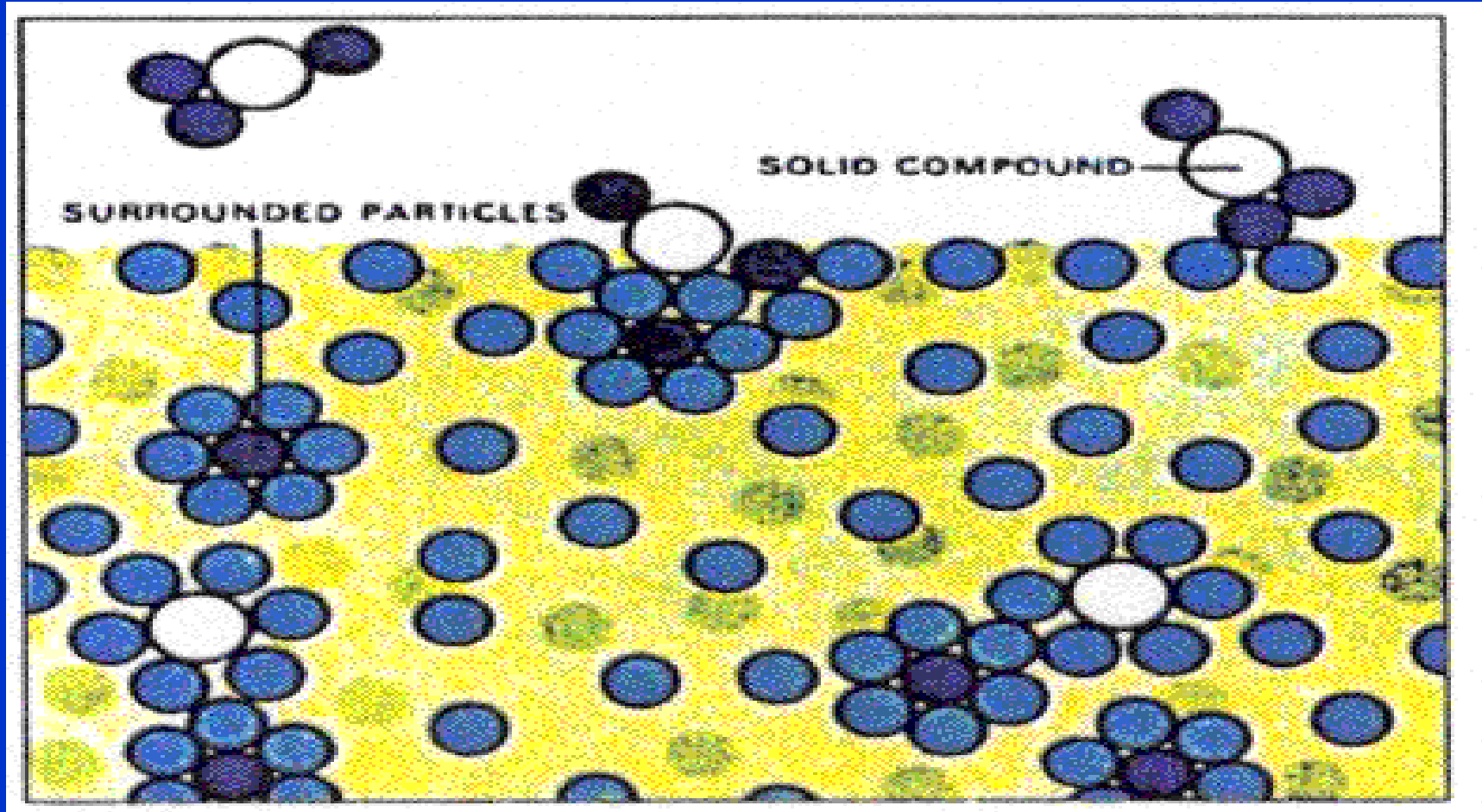
What is magnetic water treatment?

- Magnet water treatment does not change the chemistry of the water.
- It alters the structure of liquid water.

How does magnetic water treatment work?

- No effect on **super-molecules** in normal water
- However, in a magnetic treatment device, as the water passes through the magnetic field, all **super-molecules vibrate**
- This will intensify the internal vibration of these super-molecules to the **breaking point**. These super-molecules **fracture and release** their encaged particles

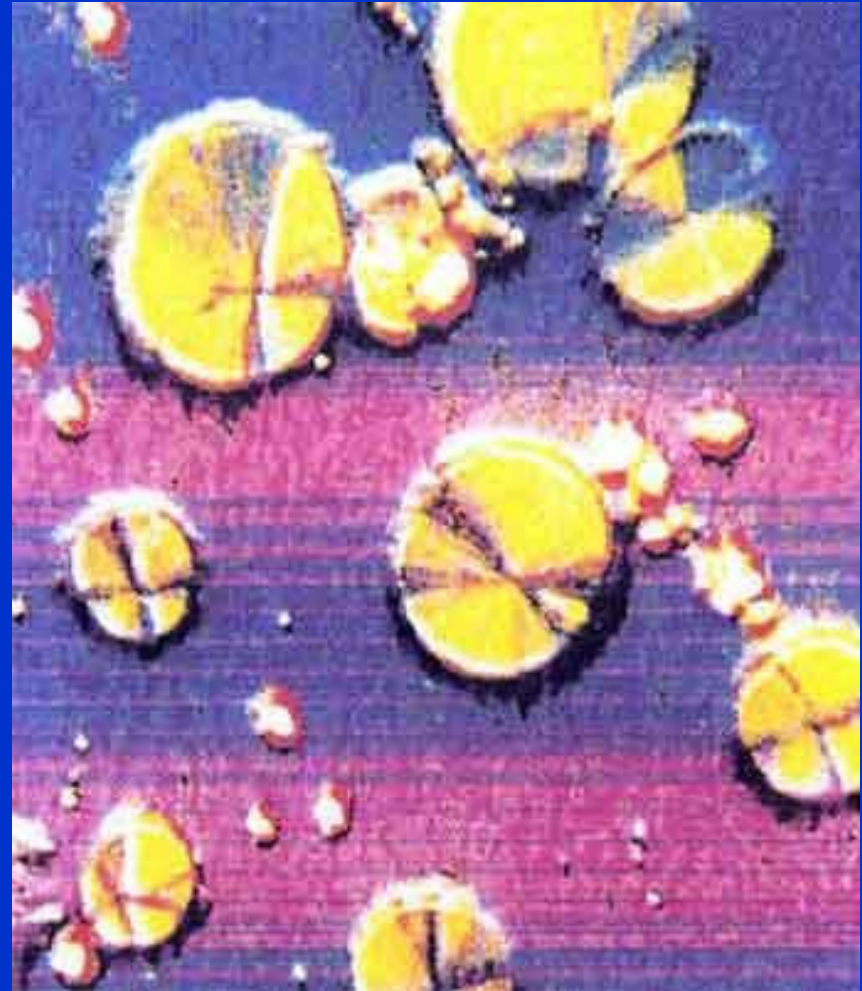
super-molecules



Untreated Water
(Magnified 1100 times)



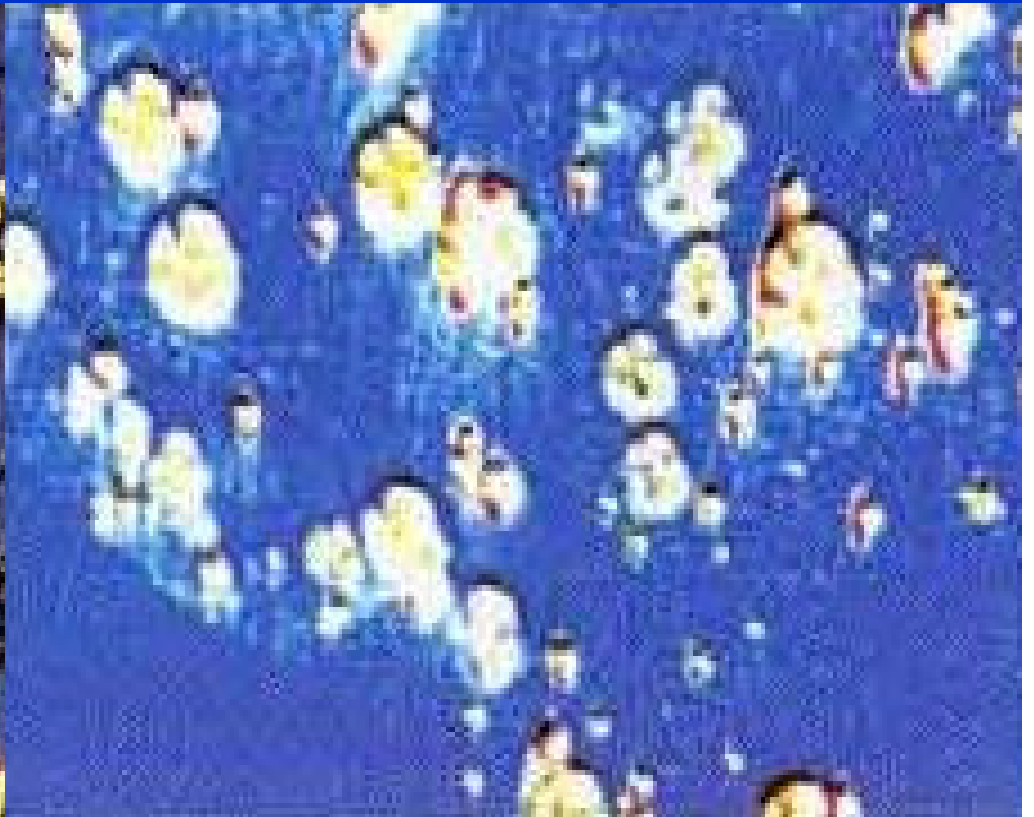
GMX Treated Water
(Magnified 1100 times)



Untreated Water
(Magnified 200 times)



GMX Treated Water
(Magnified 200 times)



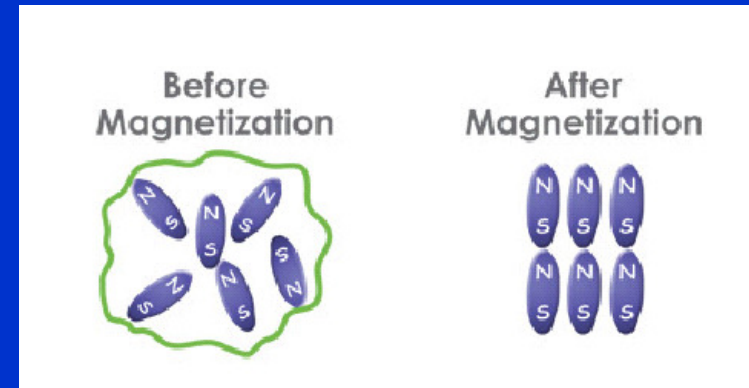
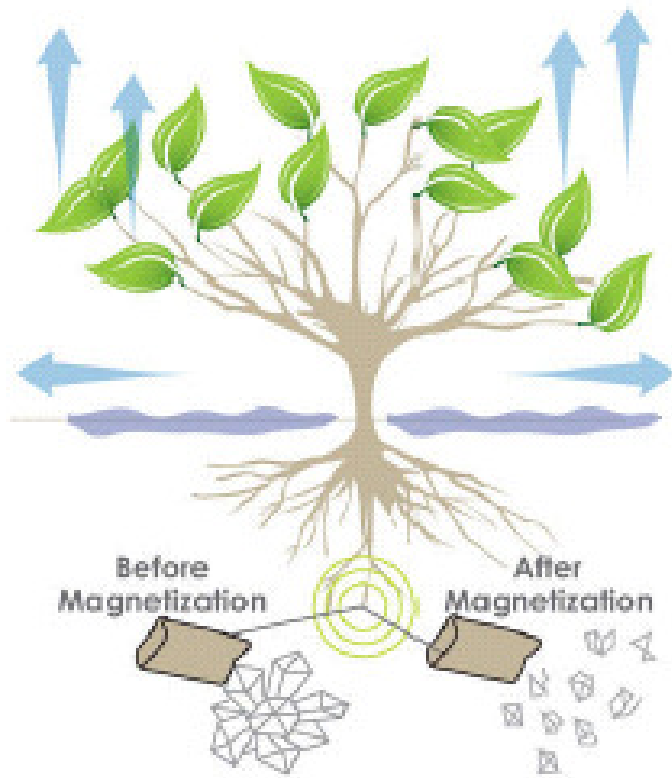
- Thus the two ions (positive and negative, or cations and anions, respectively) of a kind needed to form scale are never able to come close enough together to initiate the scale-forming reaction.

**Scale Build-up on the
Inlet of the Pipe.**



**No Scale Build-up on the
Outlet of the Same Pipe.**





After magnetization, the molecules line up in sequence “+-+” resulting in reduced surface tension, reduced viscosity, increased dissolvability, increased permeability and increased oxygen content hence making nutrients more readily available to plants

WHAT HAPPENS TO SURFACE TENSION

- The fracturing of a number of super-molecules of the treated water **decreases the surface tension**.
- Surface tension plays a key role in the effective irrigation of plants.
- Magnetically treated water runs off a cleaned surface faster and in thinner sheets because surface tension is reduced
- Due to reduction of surface tension the movement of water is fast in plant system. Hence plant absorb more water results in faster growth.

The benefits

- A savings of water
- Healthier more productive plants
- Reduction of scale build up on irrigation equipment
- Cost saving from the above items

Topical Research

Use of magnetic water in agriculture

Treatment details

T ₁	Treated water (online magnetic water)
T ₂	Treated water (online magnetic water) + Polymer
T ₃	Control –Normal irrigation water (Non – magnetized water)

Crops	
Beetroot (Susi)	Chillies (Susi)
Radish (Pusa seatchi)	Sugarbeet (Cauvery)
Bhendi (SPHB 7)	Maize (COH (M) 4)
Soyabean (CO 3)	Sunflower (CO4)
Cowpea (CO 2)	

Layout of the Field

T1 Magnet water	T2 Magnet water + Polymer	T3 Control
Beetroot	Beetroot	Beetroot
Radish	Radish	Radish
Bhendi	Bhendi	Bhendi
Cowpea	Cowpea	Cowpea
Soyabean	Soyabean	Soyabean
Chillies	Chillies	Chillies
Sugarbeet	Sugarbeet	Sugarbeet
Maize	Maize	Maize
Sunflower	Sunflower	Sunflower

Observations recorded

Water Quality	pH EC
Soil	pH EC N,P and K
Biometric observations (Crop) (30, 60 and harvest)	Plant height (cm) Leaf area Index Dry Matter Production (kg/ha) Crop maturity
Yield parameters and Yield	

Water quality

Parameters	Magnetic water (Treated water)		Control (Bore water)	
	Initial	45 DAS	Initial	45 DAS
EC (dSm ⁻¹)	2.36	2.38	2.24	2.23
pH	6.8	6.9	7.0	7.1

Soil characteristics of experimental field

Soil characteristics	Values
A. Physical properties (% on moisture free basis) (Piper, 1966)	
Clay (%)	29.2
Silt (%)	12.2
Coarse sand (%)	38.9
Fine sand (%)	19.1
Textural class	Sandy clay loam
B. Nutrient content (kg ha⁻¹)	
Available Nitrogen (Subbiah and Asija, 1956)	236.5
Available Phosphorus (Olsen <i>et al.</i> , 1954)	14.4
Available Potassium (Stanford and English, 1949)	394.6
C. Electrical conductivity (dSm⁻¹) (Jackson, 1973)	0.43
D. pH (Jackson, 1973)	8.1

Infra Red temperature at Vegetative stage (45 DAS)

Crops	T1	T2	T3
Beet root	32.9	31.5	30.6
Radish	31.4	29.2	28.8
Bhendi	29.6	30.4	25.8
Cowpea	31.2	29.1	29.2
Soybean	30.6	30.7	29.3
Chillies	30.2	32.5	30.6
Sugarbeet	33.4	34.6	33.6
Maize	28.0	28.6	30.6
Sunflower	28.6	29.3	29.2
	T1 – Magnet water	T2 –T1 + Polymer	T3 - Control

SPAD Values at Vegetative stage (45 DAS)

Crops	T1 Magnet water	T2 Magnetic water + Polymer	T3 Control
Beet root	45.8	42.6	38.5
Radish	38.6	38.2	28.7
Bhendi	45.4	43.4	29.4
Cowpea	48.4	48.8	36.0
Soybean	52.7	52.6	42.5
Chillies	45.4	43.5	42.7
Sugarbeet	62.4	60.8	68.6
Maize	57.8	56.8	44.2
Sunflower	39.6	38.7	24.8

Influence of magnetic water in Pest and Disease

Crop	Pest and Disease
Bhendi	Less hopper damage compared to control Powdery mildew nil upto harvest.
Sunflower	Less mealy bug in magnetic water Mealy bug attack appears on 45 th DAS upto harvest
Sugarbeet	More damage by leaf feeding caterpillar
Beet root	Leaf spot less than control
Chillies	Less chilli mite and thrips damage than control
Conclusion	Sucking Pest & Diseases- Positive Leaf feeders – Negative Need Plant protection

Percentage of yield increased over control

Crops	T1	T2
Radish	58.2	48.4
Bhendi	28.2	14.7
Cowpea	19.6	45.5
Soyabean	1.8	1.8
Chillies	29.9	10.4
Maize	41.4	45.7

Constarints in yield observation

Sunflower	Birds damage
Beet root	Germination percentage was very poor in control due to water stagnation

Maize



Chillies



Maize grain



Cowpea





USE OF MAGNETIC WATER (GMX) AND POLYMER (RAIN DROPS) IN AGRICULTURE

DOS : 19 - 07 - 2009

CROPS :

1. BEET ROOT
2. RADISH
3. BHENDI
4. COWPEA
5. SOYBEAN

6. CHILLIES
7. SUGARBEET
8. MAIZE
9. SUNFLOWER

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Bhendi Control\Manetic water





MAIZE



CHILLIES



SOYABEAN



COWPEA



BHENDI



RADISH



BEETROOT



VCs VISIT





Thank You