# WHY ABSORBENTS BASED ON NATURAL POLYMERS IN AGRICULTURE

**Water insoluble hydrogels with loosely crosslinked three dimensional network structure, absorbing more than 200g of water per gram of the xerogel (dry polymer).**

**The majority of the superabsorbents manufactured are synthetic polymers (essentially acrylics) due to their superior price-to efficiency balance.**

**In view of environment concerns, all over the world the importance of replacing the synthetics by "greener" options is being felt. One of most popular approaches explored for the purpose is introduction of polysaccharides/ carbohydrates through a suitable mechanism.**

## ENVIRONMENTAL SAFETY ASPECTS:

**Major issue : Inherent toxicity of the unreacted monomer *a*crylamide, acrylic acid, acrylate etc. present in the finished products.**

**Synthetic absorbent materials slowly degrade to toxic material and get leached into ground water and have adverse effect on soil microbial population.**

**Worldwide research has shown natural polymer based absorbent material have no consistent adverse effect on soil microbial populations.**

## Desirable characteristics for applications in agriculture

1. high absorption capacity in saline and hard water conditions optimized absorbency under load (AUL)
2. lowest soluble content and residual monomer
   low price high durability and stability in the swelling environment and during storage gradual
3. biodegradability without formation of toxic species
4. pH-neutrality after swelling in water

photostability

5. Re-wetting capability

**Unlike Superabsorbent polymers of synthetic type absorbents based on natural polymer have capability to release water whenever required by plant.**

Natural polymer backbone based
Exhibits maximum absorbency @ temperatures (40- 50$^0$C) characteristic of semi-arid and arid soils

Absorbs water 400 times its dry weight and gradually releases the same
Stable in soil for a minimum period of one year
Less affected by salts

Low rates of soil application – 1-2 kg / ha for nursery horticultural
crops; 2.5-5 kg/ ha for field crops

Reduces leaching of herbicides and fertilizers
Improves physical properties of soils and soilless media

Improves seed germination and seedling emergence rate
improves root growth and density
Helps plants withstand prolonged moisture stress
Reduces nursery establishment period
Reduces irrigation and fertigation requirements of crops
Promotes early and dense flowering and fruiting/ tillering.
Delays onset of permanent wilting point