

**SUPERABSORBENT POLYMERS TO RETAIN MOISTURE AND
NUTRIENTS IN AGRICULTURAL SOILS: A REVIEW**

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Superabsorbent polymers (SAPs) are a group of polymeric substances showing ability to retain massive amount of water and aqueous solutions. Later on SAP was used in agricultural practices conducting numerous research. SAP vary from each other by their monomer building block, particle size distribution, amount of water absorbed per gram of SAP material, reaction to salinity *etc.* There has been a growing trend of applying SAPs as soil amendment to retain soil moisture and plant nutrients. Generally, SAPs can absorb approximately 1000 times of water than its weight. This ultrahigh absorption capacity of SAPs is practically used in various fields including agriculture. Therefore, this review outlines historical background, preparation methods, types and chemical structures, physical, and chemical properties, and agricultural applications of SAP. Furthermore, agricultural usage of SAP for horticultural, vegetable, and field crops were also reviewed. It was reported that in the presence of SAP in soil there was an increase on height, girth, leaf circumferences, and number of leaves and finally yield improvement due to both moisture and nutrient retention in the soil. Moreover, application of SAPs to tomato and citrus, cultivated in field and greenhouse experiment were reviewed and noted improvement in quality of the fruits by increasing soluble solid content. Accordingly, SAPs create a favourable environment for plant growth and development through expanding pore size/number, rising soil nutrient reserves, and reduction in soil compaction, potential to progress soil physical properties such as water holding capacity, reducing soil erosion and nutrient loss, and improving runoff water quality *etc.* The results of literature showed that the addition of SAP to the soil delays water losses and evaporation, thus making water available to plants over a longer period of time with better nutrient retention for the crop improvement, fruit quality and yield.

Keywords: Nutrients retention, Superabsorbent polymers, Water holding capacity