

# Will Biodegradable Superabsorbent Polymers help combat Drought in Agriculture?

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**Introduction**  
Drought is a natural phenomenon that occurs when there is a significant deficiency of water in the soil over an extended period. This can lead to crop failure and economic losses for farmers. One potential solution to this problem is the use of superabsorbent polymers (SAPs) in agriculture. SAPs are synthetic materials that can absorb and retain large amounts of water, up to 1000 times their own weight. When mixed with soil, they can help retain moisture, reducing the need for frequent irrigation. This can be particularly beneficial in arid and semi-arid regions where water is scarce. The use of SAPs can also help reduce the risk of soil erosion and improve soil health. However, there are some concerns about the use of SAPs, such as their potential to leach into the environment and their cost. Further research is needed to determine the long-term benefits and risks of using SAPs in agriculture.



**Methodology**  
The study was conducted in a laboratory setting. The SAPs were prepared by a chemical reaction between acrylic acid and crosslinking agents. The resulting SAPs were then mixed with soil and used to grow various crops. The amount of water absorbed by the SAPs was measured, and the growth of the crops was monitored. The results showed that the SAPs significantly increased the water retention capacity of the soil, leading to improved crop yields. The cost of the SAPs was also compared to the cost of traditional irrigation methods, and it was found that the use of SAPs was more cost-effective in the long run.



Plant Type	Water Retention (%)	Yield (kg/m <sup>2</sup> )
Tomato	85	12.5
Cucumber	78	10.2
Pepper	92	15.1
Bean	88	11.8
Carrot	75	9.5
Spinach	82	10.8
Onion	70	8.2
Garlic	72	8.8
Wheat	65	7.5
Rice	68	8.0



**Conclusion**  
The study has shown that the use of superabsorbent polymers in agriculture can significantly improve water retention in the soil, leading to increased crop yields. This is particularly important in areas where water is scarce. The use of SAPs is a promising technology that can help farmers combat drought and improve their livelihoods. Further research is needed to optimize the use of SAPs and to address the concerns about their cost and potential environmental impact.

**1ST PLACE**

