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## Effects of hydrogel on growth and development of foliage plants

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**Abstract**

To study the influence of hydrogel incorporated growing media on floral characters of foliage plants based on completely randomized design (CRD) in three replications. The treatments were three concentrations of hydrogel 3g, 6g and 9g /pot and control without hydrogel. The results showed that different concentrations of hydrogels had influenced the growth characters of foliage plants. Potting media contains composition of vermicompost along with common potting mixture (Red earth+FYM+Sand). The results of this study showed that inclusion of hydrogels in potting media can improve the water availability and thereby improves the growth parameters of plants especially that are grown in pots.

**Keywords:** Hydrogel, foliage plants, CRD, potting media

**Introduction**

Hydrogel is a hydrophilic polymers used in oil recovery, medical grafting supplements, clarification of potable and waste waters, dewatering sludge, mining separations, food processing, personal care products, laboratory supplies, etc. Water insoluble hydrogels with a loosely cross-linked three-dimensional network structure, absorbing more than 80 g of water per gram of the xerogel (dry polymer), are termed superabsorbent hydrogels (SAPs).

Hydrogel is a semi-synthetic, cross linked, derivatized cellulose-graft-anionic polyacrylate superabsorbent polymer. It was designed specifically to perform in tropical and sub-tropical conditions of the country.

**Materials and Methods**

This study was carried in Department of Floriculture and Landscaping, Horticultural College and Research Institute, Coimbatore. The key characteristics of hydrogel are: Employs cellulosic (a natural polymer) backbone. Exhibits absorbency at high temperatures (40-50 °C), suitable for semi-arid and arid regions. Absorbs a minimum of 350 times of its dry weight in pure water and gradually releases it. Low rate of application (1-1.5 kg/acre). Less affected by the presence of salts in its immediate environment. Improves physical properties of soils and soil less media. Improves seed germination and the rate of seedling emergence. Improves root growth and density. The plant materials used are: Eranthemum, Syngonium, Pothos, Peperomia. Three concentrations of hydrogel 3g, 6g and 9g of hydrogel /pot and control without hydrogel.

**a. Took a mixture of sand, red soil, farm yard manure in a ratio of**

- Took 48 pots of equal size with weight of 3 kg approximately which can hold a potting mixture of 4 kg. Fill all those pots with sand and add potting mixture upto half of the pots. Add Hydrogel for water absorption of different weights. Plants which selected were planted in pots. Immediately after planting watering is done and the plants were kept under shade

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## Results and Discussion

At first we watered at the interval of eight days, then extended the watering interval to nine days, ten days, eleven days, and also twelve days, but the plant doesn't show any symptoms of wilting or drying. Then we increased the interval to thirteen days, at that time plants shows drying symptom. Therefore, it is better to water at twelve days interval while using hydrogel along with potting mixture. When we compared the treatments, 6g treatment shows good results.

Among the plants, Eranthemum had increased its height, number of leaves and plant spread. Syngonium showed higher soil moisture after 4 days of watering under 6g of hydrogel.

**Table 1:** Mean height of foliage plants under different concentration of hydrogel (cm)

Plants	At the time of planting				Two months after planting			
	Control	3g	6g	9g	Control	3g	6g	9g
Eranthemum	15.33	10.46	17.73	15.1	26.86	25.86	27	29
Pepromia	10.43	7.76	9.13	8.33	11.26	6.86	11.66	7.43
Syngonium	13.56	11.76	10.76	13.8	13.66	15.4	13.66	14.9
Pothos	8.56	7.66	6.16	9.66	10.66	9.76	11.4	9.5

**Table 2:** Mean number of leaves for foliage plants under different concentration of hydrogel (nos.)

Plants	At the time of planting				Two months after planting			
	Control	3g	6g	9g	Control	3g	6g	9g
Eranthemum	9	13	16	15	27.3	31.6	26	38.33
Pepromia	7	10	11	7	8	12	14	8
Syngonium	7	8	10	6	11.33	11	11.66	11
Pothos	5	5	6	3	7.66	6.66	7.33	5.33

**Table 3:** Mean plant spread of foliage plants under different concentration of hydrogel (cm)

Plants	At the time of planting				Two months after planting			
	Control	3g	6g	9g	Control	3g	6g	9g
Eranthemum	255	143	300	273	323.70	168.75	304.71	396
Pepromia	110	117	168	120	95.29	172.62	189.01	108.
Syngonium	285	240	208	272	498.18	498.18	350.53	380
Pothos	192	195	156	104	124.61	172.62	168.42	228.62

## Wet soil moisture in percentage

**Table 4:** Mean soil moisture measured using tentimeter (%) of foliage plants under different concentration of hydrogel

Plants	On day of watering				4 <sup>th</sup> day after watering			
	control	3g	6g	9g	control	3g	6g	9g
Eranthemum	7.3	8.4	8.8	8.4	5.4	6.2	6.7	7.9
Pepromia	6.9	10.0	10.6	8.8	5.6	5.8	8.8	8.3
Syngonium	10.3	8.8	10.2	8.7	7.6	7.4	9.2	8.1
Pothos	8.6	8.5	9.4	8.5	6.3	6.8	7.6	7.8

Incorporation of hydrogel in the potting media exhibited significant increase in the plant growth as follows, Eranthemum shows good sign of growth in the treatment of 9g, Syngonium, pothos, pepromia shows significant increase in growth in the treatment of 6g

Generally, foliage plants are watered once in two days. Hydrogel increase the water use efficiency of the plants. It absorbs the water and slowly releases the water required by the plants. Therefore incorporating hydrogel to the potting media we can increase the watering interval upto ten days. Plant getting dried up during longer period of water stress can be prevented by incorporating hydrogel to the pot plants. Hydrogel performs well in high temperature and low humidity because plants loss water very rapidly. When water is sprayed

on the foliage, because of high humidity the plant becomes susceptible to diseases, but in hydrogel incorporated plants watering is done at the soil level, the risk of plants getting affected by disease can be avoided.

## Conclusion

Moisture retention capacity of hydrogel is good and it gradually releases the water required by the plants. From the above table, 6g plants were showing good response on application of hydrogel.

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