

## PRODUCTION OF ENDOGENOUS ASCORBIC ACID FROM TISSUE CULTURES OF *FAGONIA CRETICA* LINN.

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The static culture of *Fagonia cretica* Linn. grown on MS medium were exploited for endogenous ascorbic acid at the growth ages of 2, 4 and 6 weeks. The potentialities of the tissues to produce ascorbic acid increases by incorporating D-glucose in the medium.

**Keywords :** D-glucose; Endogenous ascorbic acid; *Fagonia cretica* Linn; Growth Index.

Ascorbic acid, an important biological reductant and regulator of oxidation-reduction state of protoplasm, plays significant role in germination, growth, metabolism and flowering of plants. It is also well known for its property as an electron donor in photosynthetic phosphorylation<sup>1-5</sup>. Endogenous ascorbic acid and its exogenous effect have been studied in tissue cultures of some arid zone plant species<sup>6-8</sup>. D-glucose has also been observed on *in vitro* growth and ascorbic acid production.

The static cultures of *Fagonia cretica* were established from the seeds on MS medium supplemented with 5 ppm kinetin + 1 ppm 2,4-D and maintained for ten months under aseptic uniform conditions of temperature at  $26 \pm 1^\circ\text{C}$ , 55% relative humidity and diffused light. During study the tissues were harvested regularly at the age of 2, 4 and 6 weeks.

D-glucose (0.5%, 1%, 1.5%, 2%) were supplemented into the medium and the tissues were harvested. Growth indices were calculated and ascorbic acid contents were estimated by photoelectric colorimeter method<sup>9</sup> in each tissue sample. Five replicates of each sample were taken.

*Endogenous Ascorbic acid from Tissue Culture (Control)* : There is a linear increase in the growth index from two to six weeks, Maximum GI (15.66) was found in six week cultures and minimum (2.00) in two week old tissues. However, the ascorbic acid content was maximum (85.10 mg/100 gfw) in two week old tissues and minimum (68.30 mg/100 gfw) in six week old cultures (Table 1).

*Effect of D-glucose* : The maximum GI (16.50) was observed in six week old cultures grown on MS medium incorporated with 1.5% D-glucose. This GI is comparatively higher than the maximum GI (15.66) of control tissues. Maximum amount of ascorbic acid (100.50 mg/100 gfw) was found in two week old tissues fed with 1.5% D-glucose. However, minimum GI (4.00) in two week old cultures grown on MS medium supplemented with 1% D-glucose and ascorbic acid content (73.30 mg-100 gfw) was found in 0.5% D-glucose fed tissue at the growth age of four weeks (Table 1).

The present study supports that tissue cultures contain free endogenous acid have reported the maximum amount of free ascorbic acid in six week old callus of *Momordica charantia*<sup>10</sup> where as it has been found to be maximum in eight week old tissues of *Datura* spp.<sup>6</sup> and *Abutilon pannosum*<sup>8</sup>.

From the data presented, it can be concluded that the potentialities of the tissues to produce ascorbic acid even in ten month old tissues do not decrease. The incorporation of D-glucose into the medium increases the growth of tissues as well as the production of ascorbic acid significantly. D-glucose increases growth and ascorbic acid content of the tissues remarkably and acts as one of the precursors of ascorbic acid<sup>11-12</sup>.

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**Table 1.** Effect of D-glucose on growth and production of Ascorbic Acid Content (mg/100 gfw) in tissue cultures of *Fagonia cretica* Linn. grown on Murashige and Skoog's Medium (Five replicates of each  $\pm$  S. E.)

Age of tissue	MS		MS + 0.5% G		MS + 1% G		MS + 1.5% G		MS + 2% G	
	G.I.	A.A.	G.I.	A.A.	G.I.	A.A.	G.I.	A.A.	G.I.	A.A.
2 Week	2.00	85.10 $\pm$ 0.72	6.66	97.70 $\pm$ 0.66	4.00	95.30 $\pm$ 0.70	9.80	100.50 $\pm$ 0.82	7.20	97.70 $\pm$ 0.45
4 Week	5.66	80.90 $\pm$ 0.64	15.60	73.30 $\pm$ 0.68	11.00	74.30 $\pm$ 0.22	16.01	76.30 $\pm$ 0.38	11.80	73.90 $\pm$ 0.62
6 Week	15.66	68.30 $\pm$ 0.32	16.14	83.70 $\pm$ 0.47	13.28	81.30 $\pm$ 0.58	16.50	91.10 $\pm$ 0.56	12.60	90.70 $\pm$ 0.32

gfw = gram fresh weight; G. I. = Growth Index; A. A. = Ascorbic Acid.

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