

EFFECT OF BRASSINOSTEROIDS ON CERTAIN BIOCHEMICAL PARAMETERS IN GROUNDNUT (*ARACHIS HYPOGAEA* L.)

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An investigation was carried out to study the effect of brassinosteroids on certain biochemical parameters of groundnut. Field experiments were conducted with foliar spraying of brassinosteroids at different concentrations (0.25, 0.50 and 1.00 mg l⁻¹) on 25, 30, 35 and 50 DAS. Observations on biochemical parameters like chlorophyll, soluble protein, sugars and nitrogenase activity were recorded. From the results, it was found that application of brassinosteroids @ 1.00 mg l⁻¹ on 25 and 35 DAS was the best among the treatments when compared to control.

Key words : Brassinosteroids, chlorophyll, groundnut, nitrogenase activity, soluble protein, sugars.

Brassinosteroids have unique growth promoting activity, when applied exogenously at sub micromolar concentrations, it elicit several physiological and biochemical responses in various test systems ranging from single cells to whole plants (Mandava *et al.* 1981, Yopp *et al.* 1981, Mandava 1988, Cutler *et al.* 1991). Brassinosteroids induced plant growth was reported to be associated with increased metabolic processes like photosynthesis (Sairam, 1994) and protein synthesis (Kalinch *et al.* 1985). Among the various brassinosteroids tested, Brassinolide (BR1) and its epimer 24-epibrassinolides (EPR) and 28-homobrassinolide (HBR) were found to be more effective than other compounds in short term bioassays generally involving excised plant parts (Takematsu *et al.* 1983 a, b). In this study, the effect of commercial preparation of brassinosteroids on certain biochemical parameters in groundnut was investigated.

Present investigation was conducted to study the influence of brassinosteroid on biochemical parameters like chlorophyll, soluble protein, sugars and nitrogenase activity of groundnut cv. VRI-2. The study was conducted at TANCOF (Tamil Nadu Oilseed Growers Cooperative Federation Ltd.) Farm at Neyveli, Tamil Nadu during 2000 and 2001. Brassinosteroid was purchased from

Godrej Agrovet Ltd., Mumbai (in the form of Godrej Double). Seeds were obtained from Regional Research Station (TNAU), Vriddhachalam, Tamil Nadu. Groundnut plants were raised in the field and sprayed with brassinosteroids as per the following treatments.

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|----------------|---|---|
| T ₁ | - | Control (Water spray) |
| T ₂ | - | BR 0.25 mg l ⁻¹ on 25 and 35 DAS |
| T ₃ | - | BR 0.50 mg l ⁻¹ on 25 and 35 DAS |
| T ₄ | - | BR 1.00 mg l ⁻¹ on 25 and 35 DAS |
| T ₅ | - | BR 0.25 mg l ⁻¹ on 30 and 50 DAS |
| T ₆ | - | BR 0.50 mg l ⁻¹ on 50 DAS |

The experiment was laid out in randomised block design with three replications. Observations were recorded by selecting ten plants at random from all the treatments of each replication. Chlorophyll content was estimated by the method of Yoshida *et al.* (1971). Sugars were estimated by the method of Somogyi (1952). Soluble protein was estimated by the method of Lowry *et al.* (1951). Nitrogenase activity was analysed by acetylene reduction assay as per Hardy *et al.* (1968). The data was subjected to statistical analysis and results are discussed.

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The experimental results are given in Table 1. When compared to control, brassinosteroid treated plants recorded higher values for all parameters studied. Among the treatments, plants sprayed with brassinosteroid twice @ 1.00 mg l⁻¹ on 25 and 35 DAS recorded maximum values, followed by plants sprayed with 0.25 mg l⁻¹ on 30 and 50 DAS. Maximum chlorophyll content (1.893 mg g⁻¹) and soluble protein (8.11 mg g⁻¹) was observed in plants sprayed with brassinosteroid @ 1.00 mg l⁻¹ twice on 25 and 35 DAS. A similar report of increased soluble protein with brassinosteroid treatment was given by

Vardhini and Rao (1988). Similarly maximum total sugars (111.85 mg g⁻¹) and nitrogenase activity (7.68 µmol per g root weight per hour) were also observed in plants sprayed with brassinosteroid @ 1.00 mg l⁻¹ on 25 and 35 DAS, whereas in control these were only 99.47 (mg g⁻¹) and 5.61 (µmol per g root weight per hour) for total sugars and nitrogenase activity respectively. Vardhini and Rao (1999) also reported brassinosteroid induced increase in nitrogenase activity. The present results confirm the influence of brassinosteroid on certain biochemical parameters, which might be helpful in further studies.

Table 1. Effect of Brassinosteroids on certain biochemical parameters in groundnut

Treatments	Chlorophyll a (mg/g fw)	Chlorophyll b (mg/g fw)	Total Chlorophyll (mg/g fw)	Soluble Protein (mg/g fw)	Reducing Sugars (mg/g fw)	Non Reducing Sugars (mg/g fw)	Total Sugars (mg/g fw)	Nitrogenase activity (µmol per g root weight per hour)
T ₁	1.084	0.513	1.597	6.71	53.31	46.16	99.47	5.61
T ₂	1.124	0.537	1.661	7.39	54.34	47.71	102.05	5.93
T ₃	1.232	0.551	1.783	7.90	57.36	49.14	106.50	7.32
T ₄	1.326	0.567	1.893	8.11	50.52	51.33	111.85	7.68
T ₅	1.279	0.535	1.814	8.02	58.14	50.69	108.83	7.50
T ₆	1.238	0.527	1.765	7.31	54.31	50.11	94.42	7.51
C.D. (0.05)	0.058	0.037	0.073	0.063	1.314	2.042	2.369	0.336

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EFFECT OF BRASSINOSTEROIDS ON GROUNDNUT

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