**ABSTRACT**

**Title of the thesis/Dissertation** : “Study on Growth Retardants for Ameliorating the Effect of Drought Stress in Mustard (*Brassica juncea* L.)”

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Detailed systemic studies were conducted on the study of growth retardants for ameliorating the effect of drought stress in mustard (*Brassica juncea* L.).RH-30, RSPR-01 and Pusa bold varieties were taken as an experimental material. The foliar spray of growth regulators Paclobutrazol (PBZ) and Chlormequat chloride (CCC) were given at vegetative stage. PBZ and CCCwere applied at different concentration (100 ppm, 150 ppm, 200 ppm and 250 ppm) and (500 ppm, 800 ppm, 1100 ppm and 1400 ppm) respectively. PBZ and CCCwere used as biochemical hormone to reduce the amount of water requirements and increase crop water use efficiency and to study their effect on lodging and pod shattering inmustard crop. The results revealed that PBZ and CCC application induced themorphological, physiological and biochemical responses that minimized the effect of drought stress in *Brassica juncea* genotypes grown under rainfed condition. In relation to morphological responses, a significant reduction in plant height was recorded inCCC treated plants @ 1100 ppm (77.4 cm, 70.6 and 66.4 cm) followed by PBZ @ 200 ppm (80.4, 75.7 and 70.4 cm) in comparison to control (134.6 cm,125.4 cm and 112.8 cm) in varieties RH-30, RSPR-01 and Pusa bold respectively. Highestrelativewater content was recorded in plants treated with CCC @ 1100 ppm (92.31, 84.44 and 79.33 %) followed by PBZ @ 200 ppm (89.38, 79.83 and 77.12 %) and lowest was observed in control (74.29, 65.42 and 60.23 %) in varieties RH-30, RSPR-01 and Pusa bold respectively.Maximum relative stress injury was observed in control plants in comparison to treated plants. Maximum photosynthetic rate (μmol CO2 /m2 /s) was observed in CCC treated plants @ 1100 ppm and PBZ @ 200 ppm in comparison to control. Highest yield/plant (g) was observed in CCC treated plants @ 1100 ppm (23.2 g) followed by PBZ @ 200 ppm (20.9) in comparison to control (9.2 g).A marked increase in cellulose and lignin content (g) were recorded in CCC treated plants @ 1100 ppm and PBZ @ 200 ppm in comparison to control. Results of all morphological, physiological and biochemical responses indicated that CCC @1100 ppm and PBZ @200 ppm causing reduced height and increased stem diameter thus leading to smaller plants with relatively better performances under water limiting condition. It also plays a significant role in tolerance tolodging and pod shattering in mustard crops.

**Keywords:** *DROUGHT STRESS;MUSTARD; PACLOBUTRAZOL;CHLORMEQUAT CHLORIDE;CELLULOSE;LODGING; POD SHATTERING*

**Signature of the Major Advisor Signature of the Student**