



**EFFECT OF GIBBERELIC ACID ON SEED GERMINATION AND SEEDLING
GROWTH OF GREEN GRAM – *VIGNA RADIATA* (L.) WILCZEK**

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ABSTRACT

Mungbean (*Vigna radiata* L.) is a short-season summer growing grain legume grown as dry land crop in the center and northeast of Asia.^[1] Among the pulse crops, mungbean has a special importance of intensive crop production due to its short growth period^[2] Mungbean is a drought tolerant and crop and performance well under condition of low soil moisture. Gibberellic Acid (GA₃) is the most important growth regulator, which breaks seed dormancy, promotes germination, internodal length, hypocotyls growth and cell division in cambial zone and increases the size of leaves. The experiment was conducted at M.N College Visnagar, which is situated 23^o42 North latitude and 72^o33 East longitude. Major Economy of the taluka comes from agriculture sector. The study was conducted in the laboratory conditions, to determine the effects of Gibberellic acid on germination of green gram *Vigna radiata*. From the study it was found Gibberellic acid is effect on Fast seed germination and stem elongation.

KEYWORDS: Gibberellic acid, seed germination, stem elongation, *Vigna radiata*

INTRODUCTION

Mungbean (*Vigna radiata* L.) is a short-season summer growing grain legume grown as dry land crop in the center and northeast of Asia. Among the pulse crops, mungbean has a special importance of intensive crop production due to its short growth period. Mungbean is a drought tolerant and crop and performance well under condition of low soil moisture^[3] Germination is the process by which a plant grows from a seed. The most common example of germination is the sprouting of a seedling from a seed of an angiosperm or gymnosperm. In addition, the growth of a sporeling from a spore, such as the spores of hyphae from fungal spores, is also germination.

Many researchers have evolutad the processes involved in seed germination, and how they are affected by plant hormones in a range of plant family. The discovery of the plant hormone, gibberellins associated with a disease of rice called “bakane” (meaning foolish seedling).during the late 1800’s. Japanese farmers reported that rice plant affected with this disease were taller and paler and they did not bear seeds. At present about 60 gibberellic have been identified. They are abbreviated as GA₁,GA₂,GA₃,GA₄, and so on.^[4] The original gibberellic acid is GA₃. Physiological effects of gibberellic acid are stem elongation, seed germination, flower and sex determination.

Exogenous, gibberellins, promotes internodes elongation in genetically dwarf plant species. Gibberellins promotes internodes elongation by targeting the intercalary meristem and causes increase in both cell elongation and cell division. Gibberellic Acid (GA₃) is the most important growth regulator, which breaks seed dormancy, promotes germination, internodal length, hypocotyls growth and cell division in cambial zone and increases the size of leaves. GA stimulates hydrolytic enzymes that are needed for the degradation of the cells surrounding the radicle and thus speeds germination by promoting seedling elongation growth of cereal seeds.^[5]

Gibberellins causes seed germination by activity vegetative growth of the embryo and mobilizing stored food reserves of the endosperm by promoting the synthesis of a variety of hydrolytic enzymes that are evolved in the solubilization of endosperms reserves in most cases, emergence from dormancy correlates with an increased level of endogenous gibberellins in seeds and buds.

MATERIALS AND METHODS

Location of experiment: The experiment was conducted at M.N College Visnagar. Visnagar taluka situated in mehsana, district of Gujarat state. Earlier Visnagar was also known as “copper city”. which is situated 23^o42 North latitude and 72^o33 East longitude. Major economy of the taluka comes from agriculture sector.

Plant material: The experimental material selected for the present study is green gram. The seeds of *Vigna radiata* were purchased from the local market in Visnagar. Seed variety is EKTA 11. The study was conducted in the laboratory conditions, to determine the effects of Gibberellic acid on germination of green gram *Vigna Radiata*.

Experimental set-up

Preparation of solutions

1. **GA – 25ppm solution:** To make 25ppm gibberellic acid solution, 25mg GA powder was weighted, dissolved in a small amount of DW and then the volume was made up to 1000ml with DW.

2. **GA – 50ppm solution:** To make 50ppm gibberellic acid solution, 50mg GA powder was weighted, dissolved in a small amount of DW and then the volume was made up to 1000ml with DW.

3. **GA – 75ppm solution:** To make 75ppm gibberellic acid solution, 75mg GA powder was weighted, dissolved in a small amount of DW and then the volume was made up to 1000ml with DW.

4. **GA – 100ppm solution:** To make 100ppm gibberellic acid solution, 100mg GA powder was weighted, dissolved in a small amount of DW and then the volume was made up to 1000ml with DW.

3. RESULT AND DISCUSSION

Analysis of variance showed that the effect of gibberellin on Plant height was significant. The maximum of Plant height of treatments 100ppm gibberellin was obtained. Gibberellins increases growth at most plant species especially rosette plants.^[6]

Root length: Compared to the control, radicle lengths of mung seedlings was noticed to be more. This trend of enhanced radicle growth was noticed till 4th day, after which the best results were found in case of control and the radicle lengths were found to be decreasing along the graduals GA concentration.^[7]

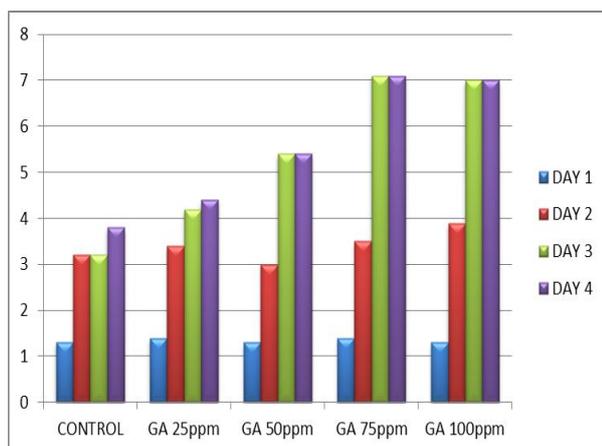


Table 1: shows root growth under different concentrations of GA.

Shoot length: It was found that as compared to the control the GA showed promotion in shoot length over the period of study. Among the various concentration of GA tried, 50ppm was found to be more effective.

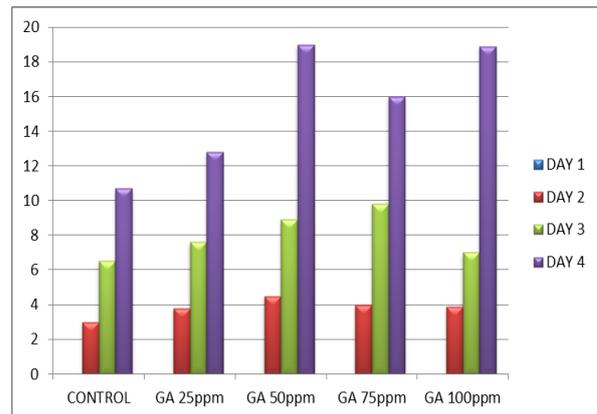


Table 2: Shows shoot length under different concentrations of GA.

Fresh Weight: It was found that among the various concentration of GA tried 25 ppm was found to be better. The fresh weight was found to be enhance in 25 ppm. However, 50 ppm concentration showed decrease in fresh weight.

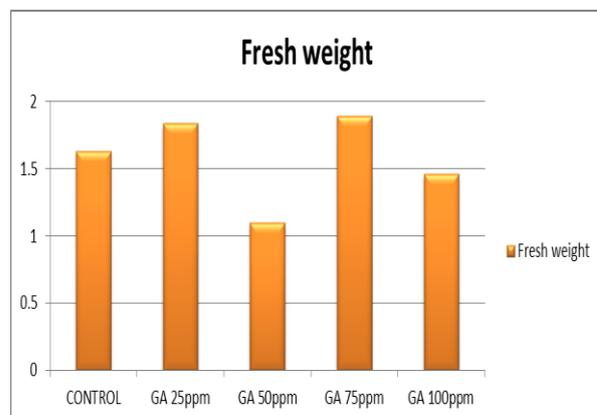
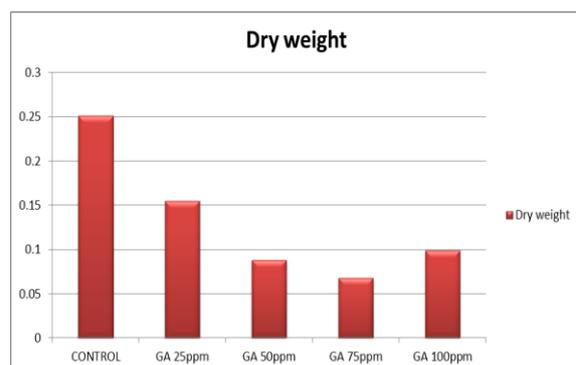


Table 3: shows fresh weight under different concentration of GA.

Dry weight: In present study maximum weight control seed 0.251 gm and minimum weight 0.068 gm.



CONCLUSION

From this study it can be concluded that The hormone plant like gibberellic acid have the important role in growth of plant in general stem enlargement in all plants that was treated by external GA₃ hormone. This has positive consequence on management of this crop at planting and germination stage. If priming of mung seed with high concentration of gibberellic acid (100ppm) is done. GA₃ did not increase fruit weight and production, but 100 ppm GA₃ decreased inflorescence and increased wet forage yield in merak species. GA increased bud flower in 3 variety of strawberry (Seascape, Laguna, Camarosa) especially in Seascape species.^[8] Gibberellic acid importance and could be recommended to farmers to achieve higher germination and also for stem elongation.

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