CHAPTER VI
SUMMARY AND CONCLUSION

The present experiment entitled under “Effect of GA3 and different containers on seed germination and seedling growth of papaya (Carica papaya L.) cv. Madhubindu” conducted at Fruit Research Station, Lalbaug, Junagadh Agricultural University, Junagadh during March to May 2017.

The experiment was assigned with factorial concept in Completely Randomized Design (FCRD) with twelve treatment combinations arising from three levels of GA3 (G1 - GA3 100 ppm, G2 - GA3 200 ppm and G3 - GA3 300 ppm) and four levels of containers (C1 - Paper cup, C2 - Plastic cup C3 - Polybag and C4 - Root trainer) with three replications. The results discussed in preceding chapters are summarized as follows.

6.1 EFFECT OF GA3

6.1.1 Seed parameters
The seed parameters were significantly influenced by the GA3. The GA3 300 ppm executed significantly maximum germination percentage (85%), seed vigour index length (2938.33 cm), seed vigour index mass (56.10 g) and significantly minimum days to germination (12.54), mortality of seedling (2.50) and mortality percentage (10%), as compare to GA3 200 ppm and GA3 100 ppm concentrations.

6.1.2 Growth parameters
Growth parameters were found to have significant influence by the GA3. Significantly maximum shoot length (12.18 cm and 20.65 cm) root length (8.90 cm and 13.27 cm) and seedling length (20.88 and 33.83 cm) was recorded in GA3 300 ppm at 30 and 45 DAS, respectively. Similarly significantly maximum collar diameter (5.86 mm) at 45 DAS, maximum number of leaves (8.35 and 11.36) and maximum number of nodes (8.42 and 12.32) was recorded in GA3 300 ppm at 30 and 45 DAS, respectively. Like wise significantly higher seedling fresh weight (2.69 g and 4.62 g), higher fresh weight of shoot (1.49 g and 2.45 g) and significantly maximum root fresh weight (1.20 g and 2.18 g) was recorded in GA3 300 ppm at 30 and 45 DAS, respectively. Maximum dry weight of seedling (0.42 g and 0.65 g), significantly maximum dry weight of shoot (0.24 g and 0.38 g) and maximum dry weight of root (0.19 g and 0.27 g) was recorded in GA3 300 ppm at 30 and 45 DAS, respectively.
Further more significantly higher leaf area (16.26 cm$^2$ and 25.34 cm$^2$) was recorded in GA$_3$ 300 ppm at 30 and 45 DAS, respectively and significantly the highest percentage of survival (90%) was observed in GA$_3$ 300 ppm in comparision to GA$_3$ 200 ppm and GA$_3$ 100 ppm concentrations.

6.2 EFFECT OF CONTAINERS

6.2.1 Seed parameters

The seed parameters were significantly influenced by the containers. The polybag executed significantly higher germination percentage (86.67%), seed vigour index length (3577.11 cm), seed vigour index mass (62.20 g) and significantly minimum days to germinate (13.42), mortality of seedling (2.0) and mortality percentage (8%), as compare to other containers.

6.2.2 Growth parameters

Growth parameters were found to have significant influence by the containers. significantly maximum shoot length (13.06 cm and 26.51 cm) root length (11.39 cm and 15.13 cm) and seedling length (24.33 cm and 41.00 cm) was recorded in polybag at 30 and 45 DAS, respectively. Significantly maximum collar diameter (6.70 mm) at 45 DAS was recorded in polybag. Significantly maximum number of leaves (8.87 and 12.46) and maximum number of nodes (8.92 and 12.89) was recorded in polybag at 30 and 45 DAS, respectively. Similarly significantly maximum fresh weight of seedling (3.59 g and 5.53 g), maximum fresh weight of shoot (1.49 g and 2.92 g) and significantly higher root fresh weight (1.65 g and 2.64 g) was recorded in polybag at 30 and 45 DAS, respectively. Like wise significantly maximum dry weight of seedling (0.47 g and 0.71 g), maximum dry weight of shoot (0.26 g and 0.42 g) and significantly higher root dry weight (0.20 g and 0.29 g) was recorded in polybag at 30 and 45 DAS, respectively. Further more significantly higher leaf area (19.97 cm$^2$ and 32.37 cm$^2$) were observed at 30 and 45 DAS, respectively and percentage of survival (92.00%) were observed in polybag as compare to other containers.

6.3 INTERACTION EFFECT OF GA$_3$ AND DIFFERENT CONTAINERS

6.3.1 Seed parameters

Interaction of GA$_3$ and different containers significantly influenced mortality of seedling, and seed vigour index. Treatment G$_3$C$_3$ (GA$_3$ 300 ppm and polybag) recorded significantly minimum seedling mortality (1.0), significantly minimum mortality percentage (4%), maximum significant vigour index (4320.00 cm) and
maximum significant vigour index (76.16 g) as compared to other treatment combinations.

6.3.2 Growth parameters

Interaction effect was found significant on different growth parameters. Maximum shoot length (14.67 cm and 29.27 cm) was recorded in GA$_3$ 300 ppm and polybag at 30 and 45 DAS, respectively. Maximum root length (12.33 cm) was recorded in GA$_3$ 300 ppm and polybag at 30 DAS and 15.83 cm was recorded in GA$_3$ 200 ppm and polybag at 45 DAS. Maximum seedling length (26.67 cm and 45.00 cm) was recorded in GA$_3$ 300 ppm and polybag at 30 and 45 DAS, respectively. Maximum collar diameter (6.97 mm) was recorded in GA$_3$ 300 ppm and polybag. Like vise maximum number of leaves (9.10) were recorded in GA$_3$ 300 ppm and polybag at 30 DAS and (12.77) were recorded at 45 DAS. Maximum number of nodes (9.17) were recorded in GA$_3$ 300 ppm and polybag at 30 DAS and (13.50) were recorded at 45 DAS. Furthermore maximum fresh weight of seedling (3.86 g and 5.77 g), maximum fresh weight of shoot (2.05 g and 3.03 g) and significantly maximum fresh weight of root (1.81 g and 2.73 g) was recorded in GA$_3$ 300 ppm and polybag at 30 and 45 DAS, respectively. Similarly significantly maximum dry weight of shoot (0.28 g and 0.49 g) was recorded in GA$_3$ 300 ppm and polybag at 30 and 45 DAS, respectively. In the same way significantly maximum leaf area (21.68 cm$^2$ and 36.43 cm$^2$) was recorded in GA$_3$ 300 ppm and polybag at 30 and 45 DAS, respectively. Significantly the highest percentage of survival (96.00%) was observed in GA$_3$ 300 ppm and polybag as compared to other treatment combinations.

CONCLUSIONS

On the basis of experiment it can be concluded that among the different concentrations of gibberellic acid, GA$_3$ 300 ppm was found to be the most effective for better germination of papaya seeds as well as growth, vigour and survival of papaya seedlings. Similarly among the different containers used, polybag showed better in seed parameters and growth parameters. Hence, it can be concluded that for the preparation of papaya seedlings in the nursery, the papaya (cv. Madhubindu) seeds are advised to saw in polybag after soaking in GA$_3$ 300 ppm for 24 hours attained the early germination, maximum germination percentage and survival percentage with the highest seedling growth parameters.