CHAPTER – 6

SUMMARY

The present investigation was analyse the study the effect of physical mutagen, gamma rays from 20 kR to 40 kR with an interval of 10 kR on the morphological, economical and biochemical characters of the plants and to induce new mutants of high yield in two parents Paiyur 1, CO 7 and their hybrid (Paiyur 1 x CO 7).

In M₁ generation, germination showed a dose dependent reduction in both parents and hybrid. The rate of reduction was higher in hybrid, than the parents Paiyur 1 and CO 7.

The reduction in survival rate of seedlings on 30th day showed a linear relationship with increase in dosage of gamma rays. Maximum reduction in survival rate was observed in CO 7 and the seedling height was increased in hybrid due to mutageneic treatments.

Different kinds of abnormalities affecting the shape of the leaves were observed in the present investigation. The occurrence of the gross morphological deviants like dwarfs, bushy type was increased with doses of mutagens.

The days to flowering was observed by the various mutageneic treatment of the mutagens. The maximum increasing of days to flowering was observed in CO 7.
The plant height increased in hybrid, while it was affected by the various mutageneic treatments at the gamma irradiation, most of the induced a significant reduction in plant height when compared to control.

The number of branches per plant showed a maximum of all the genotypes as the dose of gamma rays increased.

The number of pods per plant, increased in all the genotypes as the dosage of irradiation increased. The rate of reduction was less in hybrid as compared to parents Paiyur 1 and CO 7.

Generally gamma rays reduced the pod length more in Paiyur 1 than the CO 7 and hybrid. The maximum reduction of pod length was observed in CO 7 due to 40 kR gamma rays.

The number of seeds per pod showed an irregular trend in all the genotypes. The reduction of seeds per pod was greater in Paiyur 1 than the CO 7 and hybrid.

The seed yield per plant, increased gradually in all the genotypes with increased dose of gamma rays.

Gamma rays increased the protein content, carbohydrate content and phenol content of the mutated seeds in M₁ generation of Paiyur 1, CO 7 and hybrid.

Biochemical studies on seeds of the selected mutant revealed that, the hybrid showed higher protein content. The carbohydrate content was also
increase in hybrid. Among the phenol content highest amount in terms of mg/g was noted individually between the mutants and totally among the mutants.

In seedlings M₂ generation the chlorophyll mutation frequency increased up to 40 kR gamma rays and maximum increase was recorded in Paiyur 1 followed by hybrid and CO 7.

Among the three genotypes, the Paiyur 1 and CO 7 showed the same trend with regard in the type of chlorophyll mutants. The type chlorina was found to be maximum followed by albino, viridis, xantha and maculata. In hybrid xantha was found to be maximum followed by albino, chlorina, viridis and maculata.

Single and multiple mutants occurred in all genotypes. The effectiveness of gamma rays was found to be high in Paiyur 1, CO 7 and hybrid in 40 kR. The efficiency for chlorophyll mutations was high in Paiyur 1 based on lethality.

The effectiveness and efficiency were generally increased with increasing dose of gamma rays. A wide spectrum of viable mutation showed mixed relationship with the dosage of gamma rays. A number of viable macro-mutations involving changes in traits like plant habit, stem, leaves and seed size were identified.

The mean values of the yield components in all the three genotypes showed negative shift for M₁ generation, positive and negative shift for M₂ and M₃ generations. There was an irregular relationship between the dose of mutagen and genetic variability.
Gamma rays generated higher genetic variability for the traits like days to flowering, number of branches per plant, number of pods per plant, number of seeds per pod and seed yield per plant. The greater genetic variability and heritability along with higher genetic advance increased the scope for further selection.