SUMMARY & CONCLUSION

The aim of this work was to study the possibility of using different safe doses of γ-rays (up to 1000 K. rad) for destroying or minimizing trypsin inhibitors for soybean seeds and detect their effect on the main constituents of seeds. Attention was focussed on changes occured in physicochemical properties, fatty acids composition and unsaponifiable matter components of soybean oil due to both gamma irradiation and storage treatments. In addition, the changes in the main constituents of soybean meals were also studied .

The results can be summaried as follows :
Soybean seeds were subjected to -rays doses from Cobal-60 source at safe doses of 100, 250, 500 and 1000 K.rad and compared to non-iradiated seeds.
It was found that:

1. Trypsin inhibitory activity (T.I.A.) had a very limited change when soybean seeds were exposed to low doses (100 and 250 K. rad), while higher doses particularly 1000 K. rad induced a noticeable decrease in T.I.A. Besides, T.I.A. showed no changes either when samples were extracted by water or by buffer solution (p^H 7.6).

2. Soybean meal contained 10.62% moisture, 36.82% protein, 7.64% total crude fiber and 8.67% ash. Moreover, ash

contained 3.64% K, 0.086% Na, 0.003% Cu, 0.02% Fe, and 0.001% Pb.

Gamma irradiation treatments had no effect on the above mentioned chemical constituents of soybean meal.

3. Gamma rays doses under taken caused no changes on the refractive index, acid value, saponification value and unsaponifiable matter percentage of soybean oil. Meanwhile higher doses induced a slight change in both peroxide value and iodine number of soybean oils .

4. The storage of oil samples under investigation had a very limited effect on refractive index, saponification value and unsaponifiable matter percentage of soybean oils .However, both acid value and peroxide value showed a gradual increase with increase in the time of storage. In addition, iodine number decreased only after oil samples were stored for three months and this decrease was more pronounced in control and samples exposed to lower doses (100 and 250 K. rad).

5. Gas liquid chromotographic analysis indicated that crude soybean oil contained 19.55% saturated fatty acids (S.F.A.) and palmatic acid predominated among

there acids. However, unsaturated fatty acids (USFA) amounted to 80.44% and linoleic acid representd the major unsaturated fatty acids followed by oleic acid On the other hand, other acids were present in minor concentrations.

The application of gamma irradiation induced a marked decrease in total saturated fatty acids and the same picture was also observed in palmatic acid. Meanwhile, total unsaturated fatty acids behaved in a reverse manner occured in total saturated fatty acids. Furthermore, linoleic acid showed a pronounced increase while oleic acid decreased upon exposing soybean seeds to gamma irradiation.

6. The storage of oil samples under investigation for three months led to a noticeable increase in total saturated fatty acids and its major acid (palmitic), but the rate of increase was more pronounced in oils of irradiated seeds. Meanwhile total unsaturated fatty acids showed an opposite tend occured in total saturated fatty acids due to storage treatments. The same treatment had a very limited effect on both. linoleic and oleic acids of non-irradiated sample, while former acid showed a noticeable increase and the latter one showed a pronounced decrease in oils

of irradiated samples. On the other hand, linolenic acid showed a flauctionation trend as a result of s storage treatments.

7. The fractionation of unsaponifiable matter of crude soybean oil by column chromatography indicate that unsaponifiable matter of crude soybean oil contained 28.08% non-polar fraction, 71.91% polar fraction and 2.22% unsaturated hydrocarbon..

Gamm rays doses 100, 250 and 1000 K. rad decreased non-polar fraction, while 500 K. rad increased it. The reverse trend was occurred in polar fractions due to the previous doses. Besides, unsaturated hydrocarbon of non-polar fraction showed a remarkable increase as a result of gamma - irradiation

8. Gas chromatographic analysis illustrate that unsaponifiable matter of crude soybean oil contained 43.61% total hydrocarbons and C_{27} predominated amound hydrocarbons followed by squslene compound). On the other hand, unsaponifiable matter contained 53.11% sterols and B-sitosterol was present as a major sterol followed campesterol and stigmasterol in desending order.

The exposing of soybean seeds to 100, 250 and 1000 K. rad induced a remarkable decrease in total hydrocarbon, while 500 K. rad increased it. Upon fractionation, lower hydrocarbons namely; C_{20}, C_{21} and C_{22} were only identified due to gamma irradiation. Moreover, the major one (C_{27}) showed an acute drop, while C_{23} showed a marked increase due to gamma irradiation. Higher doses (500 and 1000 K. rad) decreased squalene compound.

Total sterols and its major compound (B-sitosterol) behaved in a reverse manner occurred in total hydrocarbons. Doses up to 1000 K. rad decreased campesterol, while other sterols showed a minute dranges due to gamma - irradiation

9. The storage of oil samples undertaken caused a remarkable decrease in total hydrocarbon of unsaponifiable matter of soybean oil. C_{27} showed a drastic drop in oil of non-irradiated sample, while it showed a noticeable increase in oils of samples irradiated with doses higher than 100 K. rad when these oil samples stored for three months. Furthermore, saualene of all irradiated samples increased due storage treatment. On the other hand, total sterols and its major compounds (B-sitosterol) showed a reverse trend occ-

ured in total hydrocarbons in all samples undertaken upon exposing them to storage treatment. Besides this treatment increased also stigmasterol in all samples, while cholesterol appeared in oils of irradiated samples when these samples stored for three months. In addition, other hydrocarbon and sterol compounds showed a very little changes as a result of sterol treatment.