Effect of mutagens on qualitative and quantitative analysis of *Plantago ovata* seed husk

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Abstract: Seed husk of Isabgol is used ethno-medicinally in no. of ways in present study qualitative and quantitative analysis due to treatment with mutagens was done in respect to husk and swelling factor. Experiment was carried out by Gamma Radiation, EMS and combining both. Husk obtained for 0.5% EMS and 3hr was maximum, for gamma rays husk is maximum at 10krad and combining both husk is maximum at 20krad+0.5%. Swelling factor was also observed.

Key words: EMS, Gamma radiation, husk, swelling factor

Introduction
Seed husk of Isabgol is used ethno-medicinally in no. of ways each seed encased in thin white translucent membrane known as husk it is rosy white and light. the plant is indigenous to Mediterranean region and west Asia, extending up to Sutlej, Sind and west Pakistan (Singh and Virmani, 1982) in India its husk and seed is popular remedy in chronic dysentery and intestinal fluxes, husk are demulcents and mildly astringents, mucilage act as a soothing lubricant and absorbs toxins in the digestive tract. Mucilage describes a group of clear colour less gelling agent the milled seed mucilage is white, fibrous material that is hydrophilic. mucilaginous gel was formed after absorbing water and increase in volume by 10 folds or more. Husk is preferred to whole seed in acute cases or for treating children, mucilage is some time employed as substitute for agar-agar it may serve as a stabilizer in ice cream, CDRI Lucknow developed Isaptent sticks from Isabgol husk for medical termination of pregnancy.

Materials and Methods
During present Investigations, for the quantitative estimation of husk, the husk obtained per one thousands seeds was weighed and computed. data has been presented in Table-1.

On the other hand, to analyse the swelling factor, one gram of husk from control and each treated sets was gently agitated occasionally in a graduated, stoppered cylinder filled to 100ml mark with water for 4hr in such a manner to ensure the even distribution of mucilage. the mixture was allowed to settle for 24hr at 5°C and the volume occupied by the husk was recorded. To make comparison realistic, husk from the seeds of different mutagenic progenies was tested under strictly similar conditions. Doses of treatment for EMS are 0.5% for 3hr,5hr,7hr and for gamma rays 20krad,40krad,60krad,80krad, for combined treatment it was 20krad+0.5%,40krad+0.5%,60krad+0.5%,80krad+0.5%.

Results
In the present study it was observed that for husk EMS treatment gradual decrease along with increasing dose of treatment. It was recorded as 470 mg,325mg,295mg at 3hr,5hr,7hr treatment duration, respectively as compared to 650mg in control.

In case of irradiation husk was recorded as 600mg (20krad), 560mg (40krad), 400mg (60krad) and 340mg (80krad). In combined treatment husk showed an increase at lower dose in respect of control whereas at higher doses exhibited gradual decrease. It was recorded as 690mg (20krad+0.5%), 810mg (40krad+0.5%), 560mg (60krad+0.5%), and 540mg (80krad + 0.5%) as compared to 650mg in control.

As far as swelling factor was concerned it was recorded as 13ml in control,22ml,18ml and 12ml at 3,5 and 7hr treatment duration of 0.5% EMS respectively, in irradiated sets the maximum swelling factor was recorded at 40krad dose and minimum at 80krad dose like 29ml(20krad),37ml(40krad),30ml(60krad) and 15ml(80krad). In combined treatment trend was like radiation recorded as 23ml (20krad+0.5%), 26ml (40krad+0.5%), 24ml (60krad+0.5%) and 18 ml (80krad+0.5%).

Discussion
Present investigation reveals that mutagens induce significant variations with regard to husk as well as mucilage content (swelling factor). It is clearly observed that dose dependent decrease as compared to control in EMS treatments as well as gamma
radiation. Whereas combined treatments showed positive response at lower doses, however further increase in dose causes reduction in husk yield, the variation in husk yield may be attributed to the variation in the size of seeds due to the effect of mutagens.

On the other hand swelling factor of seeds showed an increase at lower doses duration of EMS treatment as compared to control. However at highest dose (7hr), it showed a sharp decline. A linear decreasing trend was established among treated sets, in case of gamma radiation as well as combined treatment the swelling factor increase at all the doses in comparison to control but there was a lack of any regular trend (Mital et al., 1975). These observations correlate the reports regarding effectiveness of mutagens in inducing changes in qualitative and quantitative traits (Ramanna and Natrajan 1965). The result of present study revealed that both chemical and physical mutagens singly or in combination are capable of inducing significant variation with regard to the quality of husk. It can therefore be concluded that mutagenesis can be profitably utilized for improving the quality of seeds.

References