Effect of gamma irradiation and some nutrient elements on growth yield and storage ability of broccoli

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Effect of gamma irradiation doses and phosphorus application levels :This experiments was performed during the seasons 1999/2000 and 2000/2001 in order to study the effect of gamma rays; 0, 2, 3, 4 Gy within 4-levels of phosphorus fertilization 0, 30, 60 and 90 kg P205/fed., supplied as calcium superphosphate (15.5% P205).This experiment included 16 treatments arranged as split plot design where 4-gamma rays assigned in main plots and 4 P-levels in subplots with 4 replicates. Plot area was 35 m2 (one raw 50 m long, 70 cm between raws and 30 cm between plants) and included 166 plants, irrigated by using the drip irrigation system. Super phosphate fertilizer was added as broadcasting in the soil at two equal portions, 45 and 65 days after transplanting. The obtained results : The most preferable degree of germination and chancing of maturity is 3, 4 and 2 gray and at last the control group (without radiation).As for the interaction between phosphorus levels and radiation, the level of 90 kg P205 / feddan gave good results regarding the vegetable growth, increasing in the volume of the spear and stem thickness, so a very fasting flowering and very fasting regeneration because broccoli in its nature is a very fast flowering plant and is continuing to flower even after harvest.112 Summary and ConclusionAlso, the best level of 60 kg P2O5 / feddan improved the vegetable growth, it increased the cord of the spear, the total crow but not the flowering volume. Second experiment : ”Effect of gamma irradiation within foliar application with some essential nutrients; Zn, B, S and S+K”This experiment was carried out under field conditions during the winter seasons of 1999/2000 and 2000/2001 at the Experimental Farm of the Nuclear Research Center, Atomic Energy Authority, Inshas, Egypt. This experiment included 20 treatments which are the combinations of 4 doses of gamma radiation, 0, 2, 3 and 4 Gy within foliar application of 5 nutrients, Zn, B, S, S+K and control (without any foliar nutrients application). The experimental design was split plot whereas the four gamma rays assigned in the main plots and nutrients foliar application served in sub plots with 4-replicates. Plot area was 35 m2 included one raw 50 m long and 70 cm between raws and 30 cm between plants. Each plot included 166 plants irrigated using the drip irrigation system. The nutrients added as foliar spray at two times, 45 and 65 days after transplanting. The obtained results : The most preferable element is Boron which is interacting with radiation, 3 gray with boron, 4 gray with boron for center of the spear, the fresh weight of the spear, the dry weight and at last total crow. After Boron, Zinc gave good results with 3, 4 gray for goodness, the general shape of the plant, its color and the increasing of the weight.For sulphur, it lead to increasing the diameter of the spear and its weight by increasing the percent of the juice and water in the plant especially the spear as it gives a very soft and fresh plant with a very big and thick spear and it becomes more soft which lead to fast regeneration and unable to be stored after that because it is worm and becomes very soft for the increased quantity of juice and water and it is affected with algae when stored and many diseases. This occurs also with sulphur (S), potassium (K), when mixed as solution used for spraying the plant. Third experiment : ”Storage ability of spears”Harvested spears of plants supplied with Zn, B, S, S+K and control during two winter seasons of 1999/2000 and 2000/2001 were used two evaluate the storage ability of spears under bags and temperature treatments stripped of remaining leaves were transported to the labor

within 2 hours of harvest. Marketable and uniform spears were randomly distributed in two divisions, first, packed in carton box (5 kg size) and the second packed in poly ethylene bags each sample contained 30 spears (about 5 kg) storage treatments were replicated 4 times. Samples were stored at room temperature (20 °C and 80-85 % relative humidity) or at 4 °C and 95 % R.H. The obtained results :Broccoli is very sensitive to storage because it is continued to flowering even after harvest.The most preferable results obtained are : Storage in carton package with tables containing zinc element (in the refrigerator) at 2 - 4 °C and humidity 90 - 95 %.After that becomes the carton package containing tables of boron element in a refrigerator at 2 - 4 °C and humidity 90 - 95%.At last becomes the control stored with tables containing S+K and added S to carton package in the refrigerator.The weight loss and percent of regeneration increased with increasing of storage duration.The percent of decreasing was gradually in carbohydrates, the self solid materials T.S.S., chlorophyll, vitamin C, the nitrogen, phosphorus were very little in the carton package stored in the refrigerator but it increased with increasing of the storing duration compared with the carton package in the natural temperature at 20 °C and humidity 80 - 85 %.where stored in polyethylene package in refrigerator, the lost in weight, and percent of regeneration and with duration of storage period, the decrease in carbohydrates, chlorophyll, vitamin C and TSS are more notable.The worst storing treatment is the polyethylene with the room temperature degree 20 °C and humidity 80 - 85 %.The lost in weight, increasing of regeneration percent age, increased smell of ethylene, flowering and yellowing of spear, also the decrease in T.S.S. percent age, carbohydrate, vitamin C, chlorophyll, nitrogen and phosphorus percent even in the first or second season were existed.Conclusion :from the economic view, the present results clearly indicate that P2O5 at 60 kg/fedd. combined with irradiation ether at 3 or 4 gray gave vigorous vegetative and flowering growth and the spears characteristics as well. Also, it is obvious that treatments of Boron follow by zinc, potassium and sulphur (in descending order) combined with irradiation at 3 or 4 gray were of economic value regarding the growth and fresh spears yield but not the storageability.So, for storage ability the best treatment was of zinc and carton box at low temperature (4 °C) followed by Boron at the same conditions. Since, these treatments kept most of physical and chemical characteristics of stored spears in high economic value. Therefore, present study strongly admit the use of such treatment in combination with irradiation treatment at 3 or 4 gray for yield increases and improving characteristics of yielded spears and risingtheir storage ability as well.