

An economic Study to Save Some Food Using Radiation Technology

The dried foods as rice, corn, wheat, broad bean, lentil, chick-peas, lupine peanut, sesame, dry dates, spices.....etc. Considered as of nutritional importance to man most of these foods are imported to Egypt by foreign currency. Dried foods, in Egypt, suffering from different problems related to insect infestation and their residual toxins. The traditional method to resist such insect infestation is the process, fumigation by chemical insecticides. Although the low costs of these chemical insecticides and the ease of fumigation the hazardous effect on the human health is of great concern to the consumer. In addition, the fumigation by chemical insecticides effect the superficial incident only and do not penetrate to the deep insect eggs, which lately hatched and causing insect invasion even under good packing conditions. The necessity to a new technology to avoid the hazardous effects of toxic chemical and extend the storability of the dried foods, in the same time, became of great importance. Gamma irradiation technology to control insect infestation of grains is a recent technology. It appears since four adopted by three international organizations namely FAO (Food and Agriculture Organization), WHO (World Health Organization) and IAEA (International Atomic Energy Agency). The application of irradiation technology is cleared and accepted by about 50 countries. The main object of this investigation is to reduce qualitative and quantitative losses in grains by using irradiation technology, on the local scale, to avoid all hazards in health, ecology and economy upon using chemical insecticides. The economic feasibility of establishing gamma irradiation facility for grains in its proposed site in "El-Obour" market for gross marketing in Egypt. The present study was classified into four sections: The first chapter: contains the loss in grains during the storage period and their causes of physical and biological contamination. Also the adopted methods to control these losses in grains market in Egypt. The obtained data have revealed the dangerous continuity of the present status of the Egyptian markets under chemical insecticides fumigation processes. require The second chapter: contains the technical facilities insect required for establishing of a "gamma irradiation project" devoted for disinfestation of dried foods and all international and experience in radiation disinfestation of dried foods and local the optimal dose for each food item. The third chapter: Particularly for marketing study which divided into two parts: Part 1: contains the periodical arrangement of the "full capacity" of the irradiator along the year by or exploiting knowledge the harvest time of each crop, capacity of the irradiator (dose rate), the amount of each crop per ton [the proposed amount of grains equals 15000 tons per month, from cobalt 60 equals 513115 Curies] the activity radiation source Part 2: contains public investigation about the consumer acceptance for the irradiated food. To achieve this part a completely randomized sample involved 150 consumers in "Cairo" city was taken the declaration sheet involved different questions declaring the consumer ability to buy and consume irradiated grains and the effect of different parameters as age, educational status, sex and location. The fourth chapter which considers the backbone of this investigation and focused upon the financial analysis of establishing of a food irradiation processing unit taking the main objective of evaluation of benefits on the private investor commercial scale. The financial analysis was done according to cash flow system of the International Bank for development taking into account that the project will be carried out as a private sector. The financial analysis contained the initial investment costs of 22.88 millions Egyptian pound (LE) and annual labour costs of 0.6 millions LE, annual operation expenditures by 1.72 millions LE,

pre-operation — costs by 0.650 millions LE, annual depreciation provision by 0.86 millions LE. The annual radiation processing costs including profitability, annual processing costs and annual depreciation provision was evaluated by 6.01 millions LE annually. The determination of irradiation costs per hour and per ton during different capacities of 100, 90 and 80% was also taken into consideration this irradiation costs was also dependant upon the irradiation dose which 0.5 KGy for grains and 1.0 k.Gy for dry dates and 10.0 k.Gy for spices. The commercial profitability of the project was determined according to cash flow tables, Internal rate of return (I.R.R) and Pay back period (P.B.P). The sensitivity of the project was also analyzed under the conditions of revenue decrease and expenditures increase. The study have also revealed that the commercial profitability of the project was acceptable for both evaluation systems of Internal Rate of Return (IRR=17%) and Pay Back period (P.B.P= 5.9 years). Contained the added value to the national income upon the establishment of irradiation facility of dried foods. In this section, attention was focused chiefly upon wholesomeness of the community and ecology, improvement of marketing ability and keeping quality of foods and the added value to our national income. The added value to the national income was 43.064 millions LE annually which reflects positive health, ecologic, marketing and financial returns.