## INDUSTRIAL APPLICATIONS OF IONIZING RADIATION

The applied research in the field of ionizing radiation, directed towards the modification of properties of plastic and textile materials, was continued under the sponsorship of industry. The main radiation facilities employed were a 550 keV electron accelerator and $^{60}Co$ sources.

1. IMPROVEMENT OF THERMAL PROPERTIES OF PLASTIC TUBING
(J. Wallach, M. Katz, Y. Yagur and G. Waldner)

The effort was continued with particular stress on evaluation of mechanical properties of the radiation-crosslinked plastics. An instrument was designed and built for creep testing under conditions which permit extrapolating creep properties over an extended period of time.

2. MODIFICATION OF PERMEABILITY PROPERTIES OF PLASTIC SHEETS
(Y. Haruvi, A.G. Katz, L.A. Rajbenbach and G. Waldner)

Permeability studies were continued with particular stress on modification of the water transport properties of several commercially available plastic sheets.

3. APPLICATION OF RADIATION TECHNOLOGY TO TEXTILES
(D. Behar, G. Waldner, Y. Carmeli and L.A. Rajbenbach)

Radiation grafting of monomers, from both aqueous and organic solutions, to improve the physical properties of textiles was continued. Effort was concentrated on reduction of overall energy consumption in the radiation-curing process.

## STERILIZATION OF SURGICAL SUTURES BY GAMMA RADIATION

M. Lapidot, E. Eisenberg and I. Ross

Surveys performed in 1967 in several local hospitals established the need for the introduction of disposable medical devices. The local manufacture of such items required a commercial irradiation facility for sterilization. The local AEC and a large international concern jointly organized the Sor-Van service irradiation facility. In order to create a market, processes had to be developed locally for the production of radiation sterilizable products. The R & D effort was usually undertaken jointly by Soreq Nuclear Research Centre and the corresponding industry. Among the first and rather simple products developed were hypodermic syringes and petri dishes.

More recently effort was aimed at developing surgical suture packs which are radiation-sterilized, since know-how in this area could not be purchased. This is a more sophisticated product as it is defined in the pharmacopeia and hence is considered more a drug than a device. It was necessary to use raw material having qualities required by the pharmacopeia, and to locate suppliers of such raw materials (braided suture, eyeless needles), as well as to determine the effect of gamma radiation on the properties of these materials. The results were positive and the radiation-sterilized product was found compatible with the U.S. and British pharmacopeia. It was necessary to develop the technological process for preparing suture and suture-needle packs, using equipment that is suitable for a small production scale and locally obtainable packaging materials, which withstand radiation, and are compatible with the pharmacopeia.

The project was undertaken jointly with a local pharmaceutical firm, which had first performed an economic feasibility study. A production line was begun in 1976, and already includes a large variety of products, which have encountered excellent customer acceptance.

## STERILIZATION OF BACTERIOLOGICAL CULTURE MEDIA BY IONIZING RADIATION*(1)

E. Eisenberg, M. Lapidot, G. Altman ** and B. Bogokowsky**

Culture media used in bacteriological work are usually sterilized by heat and then poured aseptically into plastic petri dishes or tubes. Gamma radiation offers an economical alternative means of sterilizing the final product, thereby eliminating costly aseptic filling and losses due to contamination. However, the use of ionizing radiation for the sterilization of bacteriological culture media has generally been found to produce deleterious effects in the irradiated material, such as the production of toxic substances and the destruction of nutrients and the structure of building polymers(2,3).

Work has been done to investigate the possibility of applying gamma sterilization to several widely used clinical bacteriological media. A series of culture media, including triple sugar iron, Mueller-Hinton medium, tryptose agar and brain-heart infusion, were checked. The culture media were sterilized by 1.5 Mrad gamma radiation, tested for physical and chemical changes and evaluated for bacteriological work during storage of up to 1.5 months at 4°C and room temperature. It was found that by making slight changes in the formulas

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