Guzmán, J., De la Rosa, E., Félix, R. and Olvera, O. National Institute of Nuclear Energy, Mexico City, Mexico. Preliminary results on the radioprotective effect of butylated hydroxytoluene on D. melanogaster.

During irradiation with high energy radiation, free radicals are produced which are generally considered responsible for the induction of biological damage. Irradiation of organisms with ionizing radiation causes mutations, some of which can be identified as recessive lethals, as well as chromosome losses due to breakage. There is evidence although indirect, that changes produced by irradiation and those which arise spontaneously in the cell, have free radicals as a common source. These arise respectively, by the dissociation of water and by the interaction of oxidative enzymes with O_2 and H_2O_2 (Harman, 1956). Radiation-induced free radicals are found along pathways randomly distributed throughout the entire cell. Therefore, they are more likely to reach and to react with cellular materials, such as the DNA of the nucleus, than the same number of endogenously originated radicals which act in circumscribed regions (Harman, 1962).

This difference in the distribution of radicals would account for the longer period of time generally required to produce a given effect by radicals of metabolic origin in comparison with the ones formed by irradiation. The damage produced by free radical reactions would be expected to be proportionately greater as the length of the chain reactions increases (Nesrobian and Tobolsky, 1961; Swern, 1961). Lipid peroxidation is cited as a cause of biological damage in various pathological states. In vitro peroxidation of lipid in vitamin E deficiency in numerous animal tissues has been reported; however, there is a paucity of definitive in vivo studies. The reaction of ozone with carbon-carbon double bonds of unsaturated fatty acids has been known for many years (Goldstein and Buckley, 1970).

When one considers that 2-mercaptoethylamine is an efficient free radical scavenger and has therefore a radioprotective action (Harman, 1969), it is reasonable to assume that BHT (2,6-di-tert-butyl-p-cresol), being another active free radical scavenger, might show radioprotection when administered as a food additive to fruit flies. It has been shown previously, that BHT prolonges the life span of mice (Harman, 1968) and Drosophila melanogaster (Félix et al., 1970).

Male flies from a strain "Oster male" containing a marked sc^8 Y chromosome and the closed X^{c2} with the mutations yellow (y) and Bar (B) in the males, were mated after being aged during 3 days to isolated virgin "Oster females", with markers in the X, II and III chromosomes (y sc^{S1} In49 sc^8;bw;st p^P). Each female was aged during 3 days before mated to 2 or 3 males in each vial, in order to identify clusters of XO individuals originated in pre-meiotic events.

The F_1 flies were separated to determine the frequency of exceptional males which appeared yellow in contrast to the normal class of males expected. The latter had non-yellow bodies, since they carried the normal dominant allelomorph (y^+) of yellow in the sc^8 insertion of their chromosome. The yellow males represent cases of loss of the whole or part of the X- or Y-chromosome. The use of the markers Bar and yellow to identify the treated sex chromosome of the males, makes the detection of sex linked recessive lethals fairly easy. F_1 males and females were allowed to mate with each other for at least two days before being separated into vials. The F_1 fertilized females were tested for lethals by examination of the F_2 offspring for the absence of Bar males, which would indicate that a lethal was induced in the paternal chromosome. BHT (Egon Meyer) was added to the culture medium at a concentration of 0.2g/100 ml. As BHT is sparingly soluble in water, it was dissolved in propionic acid, which is a normal component of the medium.

The Oster male flies received the following treatments: while a control group was kept on normal medium, a second group was irradiated when 3 days old with 2,500 r and mated immediately in vials to virgin Oster females. A third group was fed before and after irradiation with 2,500 r, with BHT added. A Co^{60} source Gamma-Cell 200 model was employed for the irradiation treatment.

Table 1. Percentage of X-chromosome loss (Def. 1. Trout, H., 1964)

Control	2,500 r	BHT+ 2,500 r
0.39 (5/1275) ± 0.17	0.88 (7/792) ±0.33	0.55 (3/539) ± 0.32

The chi square and P values for the obtained deviations are as follows:

a. (2,500 r)-(control), $\chi^2 = 4.742$, $P < 0.05$
b. (2,500 r)-(BHT + 2,500 r), $\chi^2 = 0.632$, $P > 0.30$
c. (BHT + 2,500 r)-(control), $\chi^2 = 0.368$, $P > 0.50$

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Godbole, N.N. and V.G. Vaidya. University of Poona, India. Drosophilid survey of Mahabaleshwar.

Mahabaleshwar, a well-known hill station in the State of Maharashtra, India (Lat. 17°51' N, Long. 73°30' E), is situated at an altitude of about 1570 m above mean sea level. The township and the surrounding hilly area of about 130 sq km was chosen for the survey. Most of this area is covered by dense forest and underlying bushy vegetation. The temperature ranges between 18°C and 23°C. The average annual rainfall is about 625 cm. The wet season extends from July to October.

The survey of Drosophilidae was undertaken for a period of four years beginning in August 1969, during which frequent collections were made covering all the seasons of the year. The following localities were visited, which represented many different types of ecological habitats: 1) Bazar area, 2) Chinaman's Waterfall, 3) Bombay Point, 4) Lodwick Point, 5) Dhobi Waterfall Ride, 6) Arthur Seat, 7) Old Mahabaleshwar, 8) Venna Lake, 9) Wilson Point, 10) Babington Point and 11) Tigerpath Ride.

The collections were made mainly by sweeping with net and by placing banana baits. The flies were found on garbage, around decaying leaves, on exuding sap of trees, etc. and were abundant during the months of November to June. During the months of July to October, a period of heavy rainfall, very small numbers of flies could be collected. Most of the species collected except two (shown with asterisks) could be reared in the laboratory on the standard cornmeal-agar medium.

The following twelve species were collected which include two new species and a new report from India. Three genera, Drosophila, Leuphenga and Stegana, are represented.

1 Drosophila (Sophophora) biarmipes
2 Drosophila (Sophophora) melanogaster
3 Drosophila (Sophophora) ananassae
4 Drosophila (Sophophora) malerkotliana
5 Drosophila (Sophophora) jambulina
6 Species of Sophophora (new species)
7 Drosophila (Drosophila) nasuta
8 Drosophila (Drosophila) repleta
9 Drosophila (Scaptodrosophila) latifshahi
10 Leuphenga (Leucophenga) guttiventris
*11 Leuphenga (Leuphenga) subpollinosa (new report from India)
*12 Stegana (a new species of Steganina subgroup allied to S. excavata)

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As there is not a significant difference in groups b and c, the results for XO chromosome loss are not conclusive.

Table 2. Percentage of X-chromosome recessive lethals

Control	2,500 r	BHT+ 2,500 r
0.37 (1/274) ± 0.37	3.06 (18/589) ± 0.71	0.70 (2/287) ± 0.49

The chi square and P values for the obtained deviations are as follows:
a. (2,500 r)-(control), $X^2 = 14.651$, $P < 0.001$
b. (2,500 r)-(BHT + 2,500 r), $X^2 = 11.223$, $P < 0.001$
c. (BHT + 2,500 r)-(control), $X^2 = 1.006$, $P > 0.020$

These data indicate that BHT added to the food medium of D. melanogaster is an effective radioprotector when the percentage of sex-linked recessive lethals is estimated.

References: Félix, R., J. Ramírez, V.M. Salceda and A. de Garay 1970, DIS 45:121-123; Goldstein, B.D. and R.D. Buckley 1970, Science 169:605-606; Harman, D. 1956, J. Geront. 11: 298-300; Harman, D. 1962, Radiat. Res. 16:753-763; Harman, D. 1968, The Gerontologist 8: 13; Harman, D. 1969, J. Am. Geriat. Soc. 27:721-735; Nesrobian, R.B. and A.B. Tobolsky 1961, Autooxidation of hydrocarbons accelerated by metals, light and other agents. Lundberg Interscience, N.Y., Vol. 1:107-131; Traut, H. 1964, Mutation Res. 1:157-162; Swern, D. 1961, Autooxidation and antioxidants. Lundberg Interscience, N.Y. 1-54.