



Food irradiation and fake research

Harm from rancid fats

In 1953 some researchers wondered what exactly caused the adverse effects from rancid fats is it either a toxic agent, or fats becoming less nutritious, or a destruction of nutrients, or a change in function and flora in the gut, or diminished food intake or a combination of them all?

As to nutrient destruction from rancidity, they reviewed research from the 1940s and made the following list: vitamin A and carotene, tocopherol (vitamin E), vitamin D, vitamin K, pantothenic acid (vitamin B5), pyridoxine (vitamin B6), biotin, ascorbic acid (vitamin C), and the essential fatty acids. These are linolenic, linoleic and arachidonic acid (1).

Furthermore they wondered if their experimental rats were supplied with massive doses of the very nutrients that are destroyed by rancidity plus rancid fat would there be still detrimental effects? So, they tested this (1).

The outcome was inconclusive. A need for more protein was noticed, but whether this was caused by either toxicity or a deficiency remained unclear, while this was the very thing they wanted to know.

Their overall conclusion was that a diet containing 1% rancid soybean oil supported almost normal growth in rats when all known essential nutrients were supplied in large amounts and protein constituted 30% of the diet.

The then unknown factors

At that stage it was unknown that massive doses of antioxidant vitamins halted lipid peroxidation (2). Equally unknown was that especially the breakdown products of peroxides were toxic. So, if you halted lipid peroxidation, you blocked the formation of the very substances you wanted to find. Finally it was unknown then that vitamin E deficiency by itself could trigger off lipid peroxidation. Some modern research has created lipid peroxidation in rats solely through a diet deficient in vitamin E or selenium, or both and by diets high in polyunsaturated fats (3).

Fake research

What was a failure in terms of genuine research (inconclusive result), became the success story of the food irradiation lobby.

An example is a 'research' on rats fed irradiated pork. The pork was gamma irradiated with spent fuel rods with doses of 8 and 56 kGy. Then the pork was incorporated in the diet for up to 35 days. This diet contained a complete vitamin mix plus liver extract. In addition twice a week fat-soluble vitamins (A, D and E) were force fed (4). In other trials the experimental animals got a weekly injection with vitamin E (5). In both researches no differences were found between experimental and control animals during and after the trial.

Crooked fakes

However, not all fake trials went well. A study on dogs for example, fed irradiated meat brought all kinds of thing to light (6). The comments on this result by the researchers is quite revealing.

'The existence of oxidizing conditions under the influence of irradiation has been demonstrated repeatedly. Polling et al. encountered a partial vitamin E deficiency in rats while feeding irradiated beef. Once these initial marginal deficiencies were corrected, no major differences existed between the control and experimental groups. The peroxide-vitamin E destruction might well have been the case in our beef experiment. Analysis of different meat samples indicated definite elevation in peroxide values of irradiated over control beef. It is also quite probable that peroxide values could have increased during storage periods... It is planned to repeat this experiment with a greater number of dogs and to give closed attention to the intake of the fat soluble vitamins. (6)

The good thing of this research report was that the reporting was honest. This in contrast to quite a number of feeding trials where the pretense was that everything was fine, while in actual fact the report revealed all kinds of adverse effects. Invariably it was concluded that this particular food was safe for consumption (7, 8, 9, 10).

NATURE

In 1968 Nature dedicated an editorial to the food irradiation issue. (11).

' The US Army, long the most fervent advocate of irradiation as a means of preserving food, will have to wait until the next Congress for news of a verdict by the Joint Committee on Atomic Energy on the future of the programme for preserving food...

In its letter of April 1, 1968, to the US Army, the Food and Drug Administration argued that the feeding of irradiated bacon and fruit to rats had been followed by marked reductions of the viability of the offspring of the animals. In one series of experiments with bacon and fruit irradiated to the kind of level contemplated in the (planned) Army experiments, the numbers of offspring born to experimental rats turned out to be 3 percent less than the numbers born to control animals. Similar but less striking tendencies were apparent in experiments with dogs, while there were also less significant signs of a reduction of body weight in another series of experiments.

The case against irradiated ham was also supported by evidence of reductions of red cell count and body weight and of an increase of mortality in mice and rats fed irradiated pork and other materials. The letter of April also quoted in a thoroughly tentative way a report of the incidence of pituitary cancer in a group of rats fed irradiated bacon. and...rats fed irradiated peaches were found to have an increased incidence of tumour formation, presumably as a result of the transformation of sugars into other chemicals.

What remains unclear is why the FDA did not pick up in the first place that the experimental design was invalid.

Politics

Underneath the first page of these reports on feeding experiments one reads ' This research was undertaken in cooperation with the Office of the Surgeon General, Department of the Army, under contract such and such. The editorial in NATURE identified the AEC or Atomic Energy Commission (US) as the source of the protocol.

Not long after the refusal of the FDA to go along with these poor research results, the Commissioner of the FDA was replaced with a more compliant chap and from then on the FDA became an active promoter of food irradiation.

Research protocol defended

At a symposium on food irradiation in 1966 a justification was given for the ongoing fake research. In a panel discussion the following was said (1)

N. Raica ' Since it is known that vitamins, among other nutrients, are destroyed by autooxidized and irradiated oils, it is difficult to separate nutritional effects and toxic product effects when such fats are incorporated in the diet. Supplementary vitamins and antioxidants should be given orally and, if possible, an active component or components isolated from the fats should also be given as separate supplements.

What remains unexplained is why at all you would want to separate nutritional deficiencies from toxic effects. The task of the promoters of food irradiation is to show that irradiated food is safe. So, all that is needed is checking for adverse effects, no matter their origin. The suggestion of the promoters of food irradiation that lack of **toxicity** means that the food is safe is nonsensical. Deficiencies can be just as harmful. Vitamin E deficiency leads also to lipid peroxidation.

Genuine research looking for adverse effects without smothering their experimental animals in antioxidant vitamins found plenty of them.

Conclusion

The case supporting the safety of irradiated food hinges on invalid research.

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