

would slow down considerably the development and prevent damage by most of the stored product insects.

In temperate climates the use of refrigerated air for the preservation of slightly moist barley was shown to be effective. However in humid tropical and subtropical climates this method needs to be investigated.

Another aspect discussed was the reverse cycle moisture migration, in which moistening of grain pockets are observed at the bottom of the bins with cold grain during summer. Experimental data to evaluate the extent of this problem is not available.

In conclusion, aeration is simply the process of using air as the transport medium for moisture and heat. The psychrometric principles are simple and easily understood. The problem lies in engineering difficulties involved in applying of this principle to the solution of particular problems.

ROUNDTABLE VII. PROSPECTS FOR THE USE OF IONIZING AND MICROWAVE RADIATION FOR INSECT CONTROL

Discussion moderator: F.M. Wiendl, Brazil.

Topics discussed were:

1. The labeling of irradiated food items (pros and cons).
2. Problems of shortening irradiation exposure times.
3. The use of pre irradiation and post irradiation heat treatments to increase effectiveness.
4. Advantages of gamma irradiation in treatment of packed food: the possibility of irradiating food within the package.
5. Simplicity of gamma irradiation technique.
6. Minimal maintenance costs over initial 10 year period.
7. Advantage of clean handling of food.
8. Advantage that treated food is free from toxic residues.
9. Extremely suitable for developing countries such as Brazil which do not have sophisticated disinfestation equipment installed.
10. The use of irradiation for exported commodities.
11. Multiple use of irradiation (but through another line)
12. Uniformity in quality of irradiated foods,- a requirement necessary to achieve optimal results.
13. The ready availability of Cobalt 60.
14. The need for legislation in some countries.
15. The problem of high initial cost.
16. The problem of resistance by nature conservation movements (Greenpeace) to irradiation.
17. The experience by Japan with irradiation of potatoes and other items.
18. The experience of South Africa on irradiation, mainly with fruits.
19. The experience of Holland on irradiation of diverse items of food.
20. A project: The combination of irradiation with PH3 for controlling adult insects.

21. A project: Combination with inert gases during irradiation.
22. The fact that since 1980(WHO) there is no need for more wholesomeness studies - 1 Mrad.
23. Irradiation was proposed as being a very suitable method for expensive food items.

Conclusions were as follows:

1. Food irradiation no longer requires studies on wholesomeness, whereas economic studies on irradiation are still needed.
2. The experience obtained by Japan, Holland, and South Africa will facilitate adoption of irradiation procedures in other countries, particularly in the light of increasing restrictions in the use of insecticides throughout the world.
3. Some further research has to be done to improve the effect of radiation such as the influence of heat before or after irradiation, the use of oxygen or other inert gases, or even toxic fumigants, to increase the radiation effects. Also the integration of irradiation with other methods of food conservation was recommended.
4. A major problem in the introduction of irradiation is the hostility by many people to anything "atomic" as demonstrated mainly in Germany and by the "Greenpeace" movement. So it seems that politics pose the main barrier to the commercial use of food irradiation throughout the world.

ROUNDTABLE VIII. ADVANCES IN THE FLUIDIZED BED HEATING OF GRAIN

Discussion Moderator: D. Evans, Australia.

The history of heat disinfestation using fluid beds and more recently spouted beds and pneumatic conveyors was outlined. Heat disinfestation is basically a simple process but can be adapted to both "high tech" and "low tech" circumstances. Research to date has shown that once the "tolerance - envelopes" of commodities to be disinfested are known, a suitable temperature X time combination can be identified and exploited. In general, heating to 60°C for 20-30 seconds or 65°C for 2-3 seconds appears fatal even to pests within the grain. The pros and cons of heat disinfestation vis-a-vis irradiation were considered and the applicability of heat disinfestation systems to grain drying and cleaning was noted.

ROUNDTABLE IX. PROMISING NOVEL COMPOUNDS OF LOW MAMMALIAN TOXICITY FOR USE IN STORED PRODUCT PROTECTION

Roundtable Moderator: A. Perry, Israel

The moderator presented an overview of the subject of what constitutes low mammalian toxicity, hazards from pesticides and the need to establish more realistic residue levels in stored grains of the developing countries.