

MONITORING OF RADIOACTIVITY IN IMPORTED FOODSTUFFS  
EXPERIENCE GAINED AND RECOMMENDATIONS

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INTRODUCTION:

The Chernobyl reactor accident released large amounts of radioactivity that was carried by winds across international boundaries. Soils and surface waters as well as vegetation and grazing animals in neighbouring countries to the Soviet Union were subject to radioactive contamination in various degrees. Saudi Arabia imports much of its foodstuffs from European countries and about 75% of the imported foodstuffs come through western ports of the country. Hence the Government of Saudi Arabia took appropriate measures to ensure safety of imported foodstuffs.

King Abdulaziz University (KAU) was directed by the government at about mid-June 1986, to carry out radioactivity inspections of food items reaching Jeddah, Yanbu and Jizan seaports as well as food arrivals at King Abdulaziz International Airport at Jeddah. Parallel responsibilities were assigned to other universities and King Abdulaziz City for Science and Technology, for radioactivity inspections of imported foodstuffs reaching ports or inlets in their respective areas. In applying the measures and controls enacted by the government against importation of radioactively contaminated foodstuffs, much management experience was acquired and some of it is rather unique to Saudi Arabia.

RADIOACTIVITY INSPECTION MANAGEMENT:

1. Partition of the monitoring process into two parts was adopted. Gross radioactivity inspection was done at the inlets by the use of scintillation survey meters and qualitative and quantitative analysis for radionuclides was done at laboratories of the nuclear engineering department of King Abdulaziz University. Food samples that showed any increase of radioactivity above background raised sufficient concern that the parent shipment might have radioactive contamination resulting from Chernobyl reactor accident. The shipment was then held at the respective inlet, pending detailed analysis of representative samples at (KAU). Should that analysis show unacceptable levels of reactor fission products, the decision was then taken by the authorities to bar that shipment from entry into Saudi Arabia and its local agent was instructed to reship it to its port of origin.
2. The inspection team applied the temporary foodstuffs radioactivity limits adopted by the government of Saudi Arabia and

were similar to those practiced by the European Economic Council. These limits were a maximum of 600 Bq/Kg or liter for adult food and 370 Bq/Kg or liter for all infant food, for total Cs-137 and Cs-134. Recently however, the limits were officially set at 75 Bq/Kg or liter of total Cs-137 and Cs-134, for adult food, 30 Bq/Kg or liter for infant food and 10 Bq/liter for water, while animal feed limit was set at 300 Bq/Kg.

3. The assignment of radiological inspection of imported foodstuffs to the different scientific institutions was on a temporary basis, pending completion of training of the technical staff at the government quality control laboratories at the different ports. Hence an appropriate program of technical training for the quality control employees, in the western ports, on radioactivity gross inspection was embarked upon by (KAU). Lectures on the relevant principles of atomic and nuclear physics, radioisotopes, and foodstuffs' contamination by radioactivity were included. Furthermore experiments and laboratory demonstrations covering the different aspects and sources of error in gross radioactivity assay in foodstuffs were also included.

4. Acquisition of various radioactivity monitoring equipment from the various companies suffered much delay after Chernobyl accident. There was much demand for these equipment and the inventories were down. It is important to be prepared for such emergencies and back-up equipment should always be available at the various inspection sites.

5. There was a need for quick yet reliable sampling technique. In some situations, the sample heterogenities were not only in single shipments, but also inside individual containers noticeable variations in radioactivity were observed. One sample might be practically free from fission radionuclides side by side with samples containing unacceptable radioactivity levels. This could be due to packaging of food items from different sources in one shipment. An efficient and not time consuming sampling technique should be devised so as to permit truly representative sampling in emergency situations such as at pilgrimage times.

6. The quantity of imported foodstuff is greatly increased around the time of Muslim pilgrimage to Holy Mecca. A great influx of food items, live animals (mainly sheep and cows) and of course people takes place over a short period of time. In 1986, pilgrimage time was about the middle of August, i.e. after the time of Chernobyl accident, and food items and live animals were subjected to radioactivity inspection. The different ports to the country lacked animal whole body counters. When live animals are imported for religious sacrifice on a certain day, sampling meat from hundreds of animals becomes a problem. Inspection by survey meters is not enough and installation of animal whole body counters at all inlets to the country would facilitate the inspection process tremendously.

7. The Quality Control laboratories at the ports carry out several inspection processes on imported foodstuffs. Radioactivity inspection was a newcomer to the battery of tests usually

conducted and a position in the sequence of these tests has to be marked for radioactivity examination. The decision was taken by the Quality Control Department to conduct the radioactivity test at least concurrently with other tests, if not before, since presence of unacceptable levels would render other test unwarranted.

8. At the beginning of the inspection process, an unanticipated situation of great worry and concern evolved among seaport and airport workers handling foodstuffs found to be radioactively unacceptable, and ordered to be reshipped to its port of origin. This is not unusual anxiety on the part of these workers, who have no technical knowledge concerning radiation. However the problem was alleviated after oral communications with the workers and administrators in charge, and after distributing pamphlets written in nontechnical language explaining facts about radiations.

9. The inspection process for radioactivity levels in imported foodstuffs became widely known and had a tremendous impact on the public as well as on different governmental departments. As regards the public, this new awareness was definitely a positive outcome but it had also, in some cases, a negative aspect. Some members of the public became overly worried especially mothers of newborn babies and pregnant women. This matter was handled by having local experts in the field of radiation and health use the different news media to explain in simple language the relevant facts about radioactivity contamination of foodstuffs. This information campaign, so to speak, helped to ameliorate the unnecessary anxiety of some members of our public.

#### OBSERVATIONS AND RECOMMENDATIONS:

1. A lot of work needs to be done regarding setting internationally agreed upon maximum limits of radioactive contamination of adult and infant food items. The various situations of food mixes and eating habits should be taken in consideration.

2. Certificates accompanying food shipments from various countries declaring the food items to be "radioactively safe for human consumption" need to be issued by officially designated technical organization of the country shipping the foodstuffs.

3. The techniques used by the different countries for radioactive monitoring of food shipments should be standardized and agreed upon: Some certificates for example claimed that the accompanying food shipment was free from radioactivity as checked by Geiger survey meter. This of course is unacceptable technique at these very low radioactivity levels and was indeed found in error in several shipments.

4. Because another Chernobyl-like accident is not impossible, it would be extremely helpful to have publications written in the official languages of the United Nations and covering in simple non technical language the facts or rather the "true or false" about radioactive contamination of foodstuffs. Having such

publications distributed to member countries will be of great value in time of need.

5. The IAEA or WHO or some similar international organization may arrange a workshop or training program for administrators and public relation employees at seaports and airports covering simple facts about radiations and health and food contamination with radioactivity. Intelligent cooperation from these people is very important to the success of the inspection process.

6. The radioactivity inspection process has alerted several concerned scientific institutions in this country to the insufficiency of the present data on the radioactivity of our own natural environment and foodstuffs. This may actually be the situation with many other developing countries. Complete data on the radioactivity of locally grown food crops, meat from local cows and sheep as well as milk and milk products would have formed valuable baseline data for the food radioactivity inspection process.

7. In our management of the food inspection process, priority was given to perishable foodstuffs such as chilled meat and small live chicks...etc., But when these items show in the gross radioactivity check at the ports, increase in activity above background, the shipments will have to wait for the completion of the qualitative and quantitative tests. It is therefore advisable that the suppliers of these perishable foodstuffs be doubly sure that their shipment is free from radioactive contamination, so as to avoid possible financial losses.