CHAPTER IV

DISCUSSION

Results of gross beta activity of the samples of marine fish and shellfish (59), meat (6), cereal (22) and milk (2) as presenting in Table 6 to 16 varied in a wide range but the activity concentration of Sr-90 in each category of samples was rather constant except in some samples indicated very high value and suspected radiocontamination. This evidence could easily be seen in the case of Sardine (Table 10.. sample no. 5, 6; Table 16.. sample no.7), Salmon (Table 11.. sample no.5), Herring (Table 7.. sample no.4), Oyster (Table 8.. sample no.9); Table 10.. sample no.1), Corned beef (Table 7.. sample no.2; Table 9.. sample no.7; Table 12.. sample no.1) which the value of Sr-90 concentration in pCi/g.-ash was higher than the average (mean) of the result of each group. Since the baseline level of activity concentration of Sr-90 in those food was not yet known in Thailand at present and the data obtained from this study was inadequate, the indication of radiocontamination could not possibly be drawn for the time being. In addition, the origin of the source of the samples which was very important to learn the background of the nature of that sources could not also definitely indicate except the places where that products were manufactured. Consequently, the useful necessary informations cited by the other scientists were unable to be used

in evaluation of the radiocontamination in those samples.

There were no relationships between the activity concentration of gross β and Sr-90 in every category of samples. Regarding the concentration of Sr-90, it was found that the value was higher in crops than in milk, meat and fish respectively which agreed quite well with the reports of Kamath et.al,(1966) and Booth, et.al (1968).

The concentration range of Sr/Ca ratio in various samples as indicated in Table 17 was remarkable. Since the calcium content of shellfish and corned-beef was rather low, the Sr/Ca ratio of those samples was notably high accordingly. Although the Sr/Ca ratio was rather large but these food items were occasionally consumed. Besides they were eaten along with other normal diet which enriched in calcium therefore the radiation harzard was less significant.

Gamma spectrum searching showed that only Cs-137 and K-40 were the major component of gamma activity. Figure 8 and Figure 9 illustrated the spectrum of 0.66 MeV, Cs-137 and 1.46 MeV, K-40 of one sample and a background radiation respectively. The spectrum of the background showed peak of Cs-137 due to the contamination of the crystal detector and the container itself. After substraction of the background the sample were shown to present the activity of Cs-137. There were 3 samples of fish (Sardine) from Southafrica, Japan and Thailand(Sardine were imported and packed in Thailand) that contained high value of Cs-137, that was

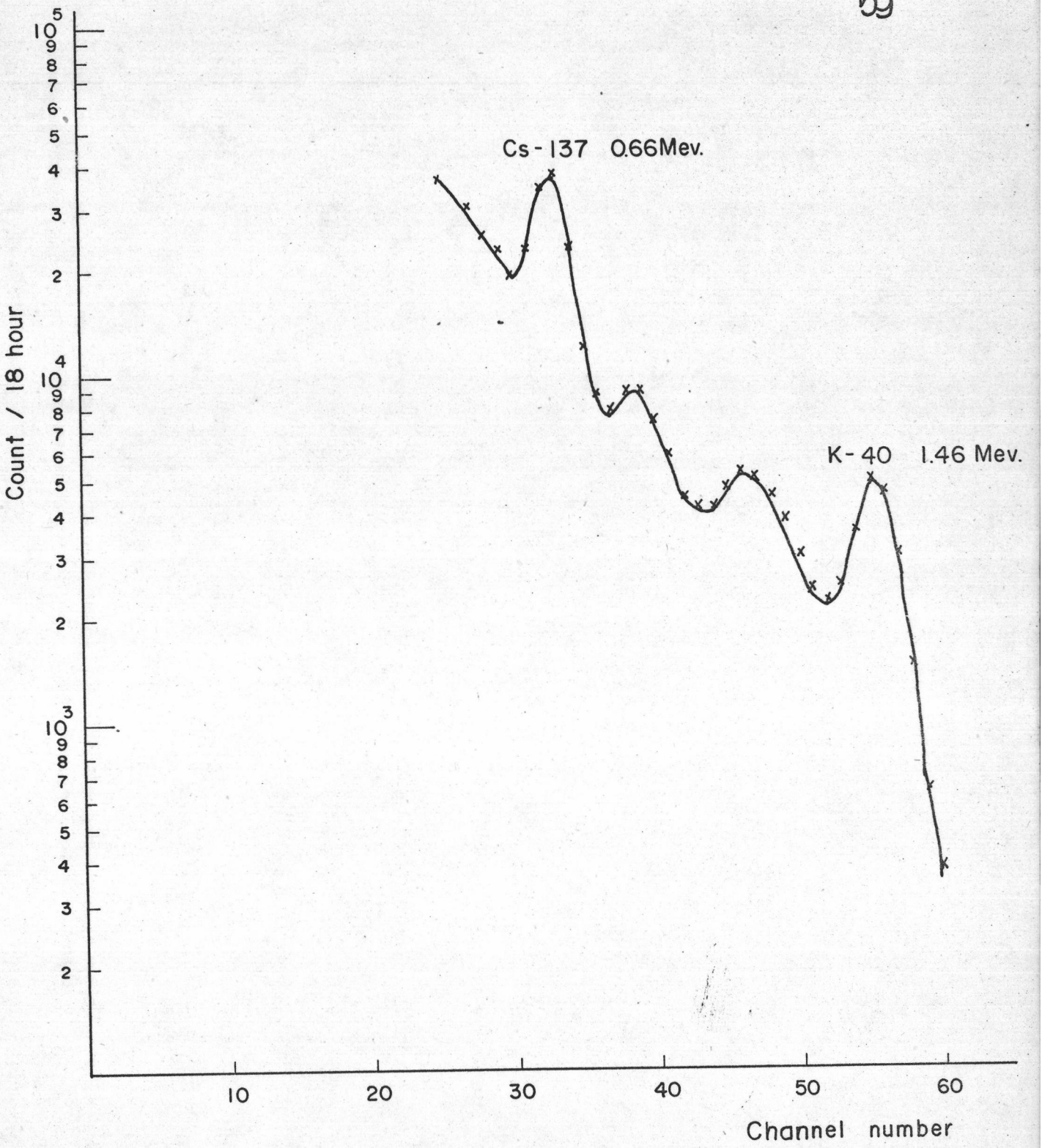

FIG. 8 GAMMA SPECTRUM OF BACKGROUND FROM 128-CHANNEL ANALYZER CONNECTED WITH 3" x 3" NaI(T DETECTOR.

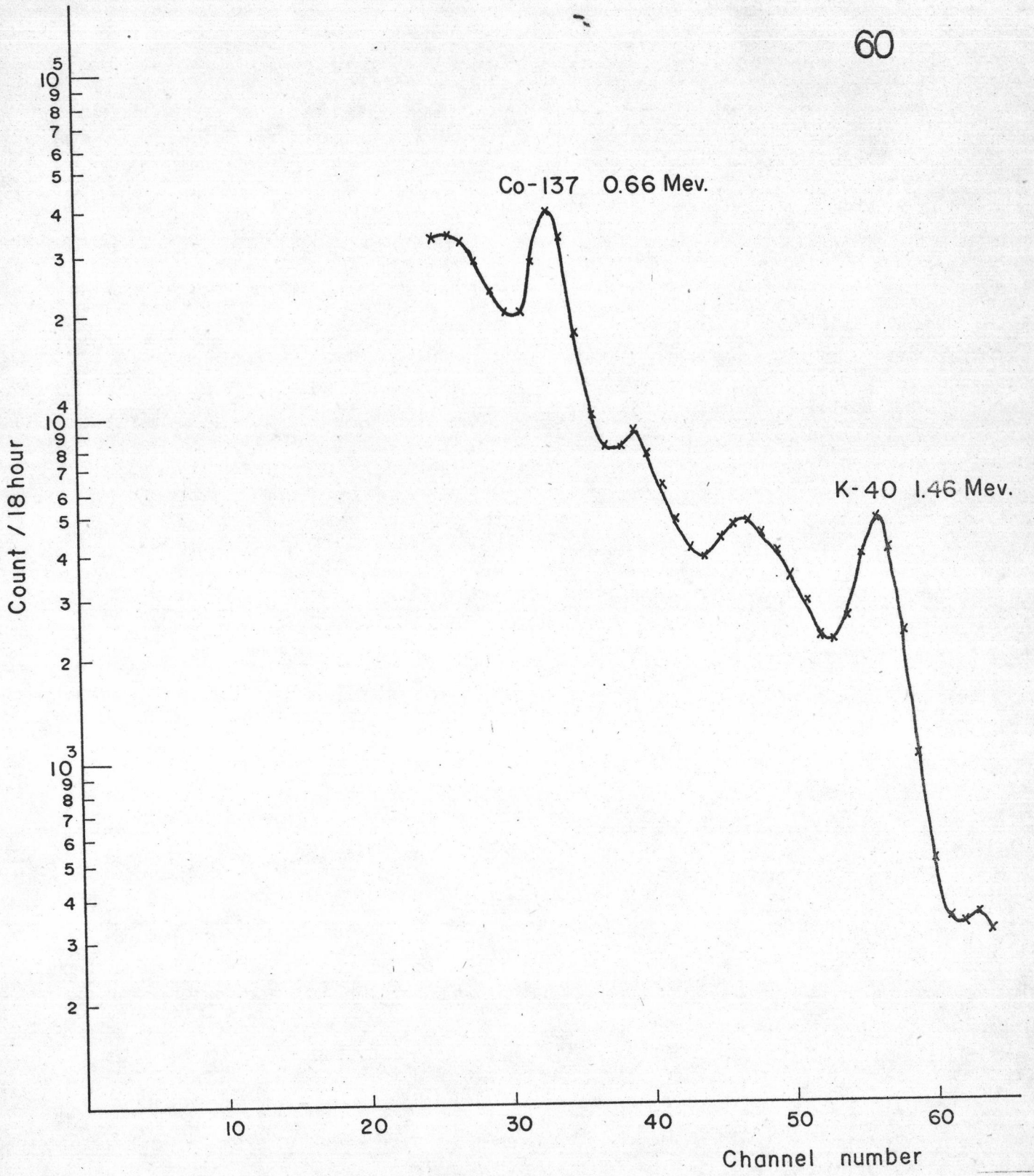

FIG. 9 GAMMA SPECTRUM OF ON SAMPLE FROM 128 — CHANNEL ANALYZER CONNECTED WITH 3" x 3" NaI (T DETECTOR.

5.69, 5.46 and 5.08 pCi/g wet weight respectively.

The limit of detection under the conditions used as calculated for K-40 and Cs-137 was 0.04 and 0.03 pCi/gm wet weight respectively. Consequently, the activity concentration of K-40 and Cs-137 in samples which the counting rates were below the detection limits would be reported as under 0.04 and 0.03 pCi/g wet weight respectively as appeared in Table 6-16.

It can be seen in Table 7 and 9 that the activity concentration of K-40 and Cs-137 has not yet reported. The determination of such parameters must stop due to the 128 channel pulse height analyzer does not function properly and it was found out later that the failure is from the high voltage supply. Gamma counting with the other multichannel analyzer has been attempted but it was not successful according to the full load of such analyzers.

The method used for the determination of Sr-90 in this study was selective and sensitive. The reliability was excellent as shown in Table 3 and 4. There are still some advantages regarding this extraction procedure, that is:- Firstly Y-90, the daughter product of Sr-90, is purely separated into the organic phase. Secondly, the chemical yield of its oxalate precipitation can be corrected to 100 percent with the known amount of added yttrium carrier therefore no losses of Y-90 activity is occurred. This is very important since the activity of Y-90 will be used for

calculation of Sr-90. Thirdly the extraction yield of the procedure can also be corrected to 100 percent yield with the known activity of Sr-85 tracer added. In addition the remain Sr-85 activity in the Y-90 fraction will not interfere with the Y-90 activity measurement since Sr-85 is the pure gamma-emitter. Finally, after storing the aqueous phase of Sr-90 for about two weeks allowing the growth of Y-90 to be reached equilibrium, Sr-90 activity can be again measured and calculated. This means that in a single extraction a duplicate result can be obtained. Anyhow in checking the extraction yield of this procedure, with Sr-85 tracer, it was found that the average chemical yield was over 95 %.

Since the procedure for Sr-90 determination was sensitive and the cost of TBP was rather high, the analysis was done in single measurement. However the standard solution was run together with a set of analysis and the suspeeted value was then re-confirmed. For calcium value, at least three determinations for each result were performed.

The samples used in this study were selected to cover the wide categories of imported food and food products which were prefered by the native consumers such as Sardine, Salmon, oyster, cornbeef etc. Samples of milk powder, milk product and cereals were also chosen since they are essential to infant. Therefore, this group of population are likely to receive and contain higher exposure than the others.