SHORT COMMUNICATIONS

RELATIVE INTENSITIES OF THE LOW ENERGY GAMMA TRANSITIONS IN THE DECAY OF Ba-133

A. S. V. SUBBA LAKSHMI,
S. VENKATARATNAM, S. BHULOKA REDDY
and K. VENKATA REDDY

Swami Jnanananda Laboratories for Nuclear Research, Andhra University, Visakhapatnam 530 003, India.

Ba-133 isotope which decays to Cs-133 by electron capture is a longlived radioactive isotope and is extensively used for the calibration of low energy Ge(Li) or Si(Li) x-ray detectors. There is a need for an accurate determination of the relative intensity data for the low energy transitions in Ba-133 decay. The gamma intensities of the low energy transitions were determined earlier[1-5] and the data are furnished in table 1. However, there are discrepancies in the intensity of the K x-rays[1,5]. Discrepancies also exist in other transitions. In the work of Gurfinkel *et al*[1], the 79.4 keV and 81 keV gamma rays are not resolved whereas in the work of Alexander *et al*[3], Bosch *et al*[2] and Schmidt-ott *et al*[5], the two gamma rays were partially resolved. In view of the above discrepancies, the present work aims to reinvestigate a more accurate relative intensity measurements in the decay of Ba-133.

In the present work, a low energy x-ray Si(Li) detector (6 mm dia × 3 mm thick) having FWHM of 180 eV at 5.9 keV line is used. The radioactive isotope Ba-133 is obtained from BARC, Bombay and a liquid source is prepared on a thin mylar film. The x-rays as well as the gamma ray spectra are recorded with the detector coupled to a ND 512 channel analyzer and this spectrum is shown in figure 1. The areas under the photopeaks are obtained by a computer program. The corresponding relative efficiencies are taken from the relative efficiency curve drawn using Am-241 and Hg-203 sources. The relative efficiency curve in the present work is checked by measuring the K/L ratio of the 662 keV M4 transition in the decay of Cs-137. Using the areas under the photopeaks and the corresponding efficiency values, the intensities are evaluated and tabulated in table 1 along with other previous values.

Since high resolution Si(Li) detector is used in the present work, the K'_{β_1} and K'_{β_2} lines are clearly resolved and their relative intensities can be determined separately resulting more accurate determination of their intensities. Paradellis *et al*[6] reported the existence of two new lines around 35 keV. The two peaks observed in the present spectrum at an energy of 35 keV and 35.8 keV are the $K'_{\beta 1}$ and $K'_{\beta 1}$ lines of the K x-rays of Cs-133. In all the previous measurements, the 79.4 keV and 81.0 keV photopeaks were not clearly resolved. In the present work these are completely resolved. This enables their intensity determination more accurately. The intensity of the K x-rays obtained in the present investigation shows disagreement with the value obtained by Schmidt-ott *et al*[5] whereas this is in good agreement with the value reported by Gurfinkel *et al*[1].

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1. Gurfinkel, Y. and Notea, A., *Nucl. Inst. Methods*, 1967, **57**, 173.

Table 1 *Relative intensities of the low energy gamma rays in the decay of Ba-133*

Energy keV	Gurfinkel *et al*[1]	Alexander *et al*[3]	Bosch *et al*[2]	Notea *et al*[4]	Schmidt-ott *et al*[5]	Present work
30.97 (K_α)	129 (9)	–	–	–	161.2(27)	126 8(40)
35.0 (K'_{β_1})	33.9(23)	–	–	–	37.4(5)	29 6(9)
35.8 (K'_{β_2})						5.74(16)
53.15	3.7(9)	3.3(5)	4.2(2)	3.78(9)	3 54(5)	2.96(9)
79.63	64.7(42)	11(4)	4.0(4)	64.7(72)	3.9(2)	4 67(14)
80 99		55(4)	58.2(15)		52.6(10)	55 3(16)

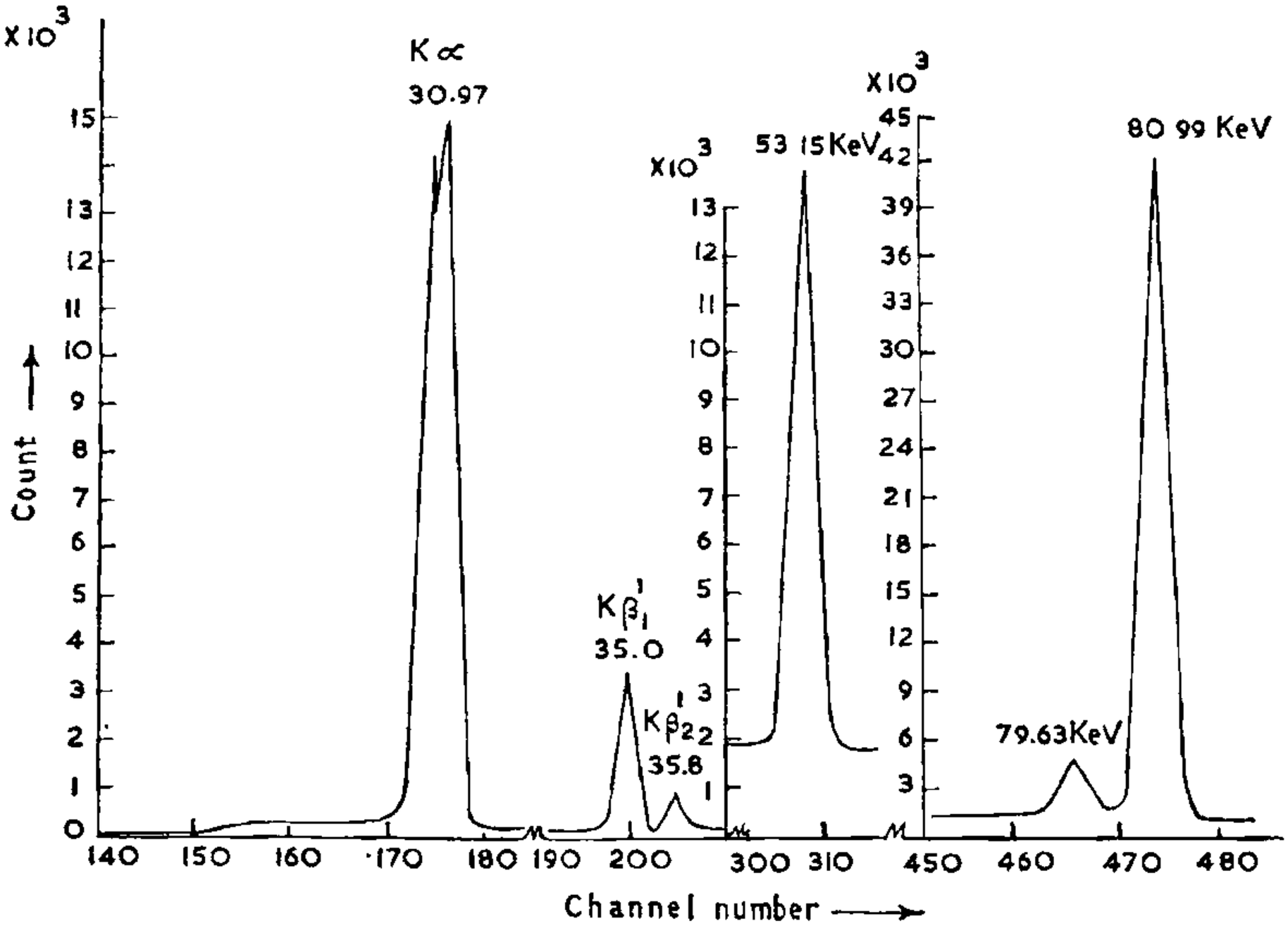

Figure 1. Low energy singles gamma ray spectrum in the decay of Ba-133 recorded with a Si(Li) x-ray detector.

2. Bosch, H. E., Haverfield, A. J., Szichman, E. and Abacasis, S. M., *Nucl. Phys.*, 1968, **A108,** 209.
3. Alexander, P. and Lau, J. P., *Nucl. Phys.*, 1968, **A121,** 612.
4. Notea, A. and Gurfinkel, Y., *Nucl. Phys.*, 1968, **A107,** 193.
5. Schmidt-ott, W. D. and Fink, R. W., *Z. Phys.*, 1972, **A249,** 286.
6. Paradellis, T., Hontzeas, S., Nazvi, S. I. H. and Wolfson, J. L., *Bull. Am. Phys. Soc.*, 1968, **13,** 69.

ALTERNARIA BLIGHT: A NEW DISEASE OF PATCHOULI

T. N. PARAMESWARAN,
N. S. RAVINDRA and M. SARWAR
Central Institute of Medicinal and Aromatic Plants, Regional Centre, Bangalore 560 037, India.

POGOSTEMON CABLIN Benth. (syn. *Pogostemon patchouli* var. suavis Hook.) is the source of well-known patchouli oil used extensively in perfumery. The oil is being imported to the tune of Rs. 50 lakhs every year. The cultivation of patchouli in India is in its early stages. Recently a severe leaf blight was observed causing defoliation and premature death of the plants.

The initial symptoms of the disease were observed as a brown discoloration at the tip of mature leaves mostly 30–50 days after transplanting. Brown discoloration advanced towards the leaf margin. Gradually the leaf lamina presented a blighted appearance. The disease was severe during the summer months. Isolations made from the infected leaves on potato dextrose agar (PDA) yielded a fungal pathogen. The fungus was identified as *Alternaria alternata* (Fr) Keissler. The pure culture was deposited with CMI who have also confirmed the identity of the fungus (IMI No. 260358).

Pathogenecity tests of the fungus were conducted by spraying spore suspension and mycelial fragments on 40-day-old potted plants. The experimental plants were provided with high humidity for 48 hr after inoculation. Control plants were sprayed with sterile water. Initial blight symptoms appeared 8 days after inoculation followed by shedding of leaves within 15–20 days. The fungus was reisolated from the infected test plants.

Seven fungicides viz Benomyl, Carbendazim, Captan, Cuprasol, Dithane M-45, Dithane Z-78 and