CHAPTER VII:

CONCLUDING REMARKS:

In the present study, both uranium and boron are found to be present in plants as traces. A comparative discussion on the trace contents of these two elements in plants, and their possible relationship, if any, with the medicinal properties of plants is as follows.

7.1. COMPARISON OF THE TRACE CONTENTS OF URANIUM AND BORON IN THE PLANTS:

(a) The fission tracks in lexan (plate V) are found to be uniform with occasional clustering. The alpha-particle tracks as revealed in CN (Plate VI) are also uniform; and, in this case, no clustering is observed. This finding suggests that, perhaps the uranium,absorbed by the plants are irregularly (and likely preferentially too) distributed in the various parts of the plants. This may be co-incidental to the presence of various medicinal properties of the different parts of plants and a possible correlation between the two. In case of boron, no such possibility of correlation is observed; hence, the distribution of tracks may be uniform in this case.

(b) Out of the plants, studied here, uranium content is found to be highest in the leaves of the plant C.Gigantea(2.826ppm) and boron content, in the root of V.negundo (51.8 ppm). The

average uranium and boron contents of these plants as a whole, are found to vary from 0.356 ppm to 1.559 ppm and from 8 ppm to 40.7 ppm respectively (table 7.1). The average values of the two elements shown in table 7.1 are calculated for the plant part only (as flower, seed, latex etc. are not taken for all plants). The boron contents relative to uranium contents of the plants are shown in the last column of table 7.1 and also by the bar diagrams of figure 7.1. It is observed that boron contents of the plants are much higher - about ten to forty times generally, (except in the case of R.Communis plant, where it is about 110 times)-than uranium contents. This may be due to selective absorption of various micronutrients by plants, depending on their availability in the soil.

(c) Frequency distributions of the values of boron and uranium contents of the plants,shown in the second and third columns of table 7.1 are represented by the histograms of figure 7.2. Both distributions are rightwardly skewed, uranium contents have maximum number of values between 0.356 to 0.596 ppm, while boron contents have those between 7.2 to 10.2 ppm.

7.2. VARIATION OF URANIUM AND BORON CONTENTS WITH THE MEDICINAL PROPERTIES OF PLANTS:

As discussed in Chapter V, uranium contents in plants may have some correlation with certain medicinal properties in them. At least, the capacity of absorbing or retaining

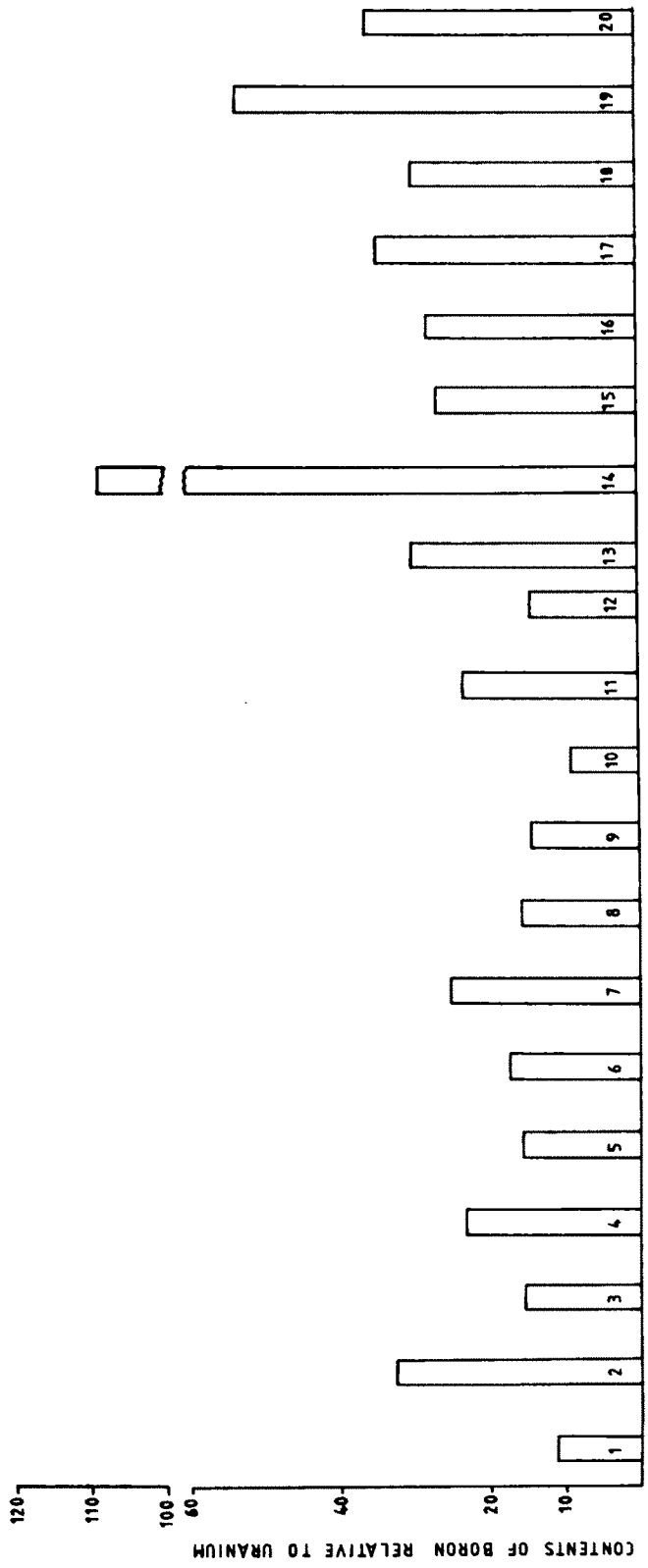
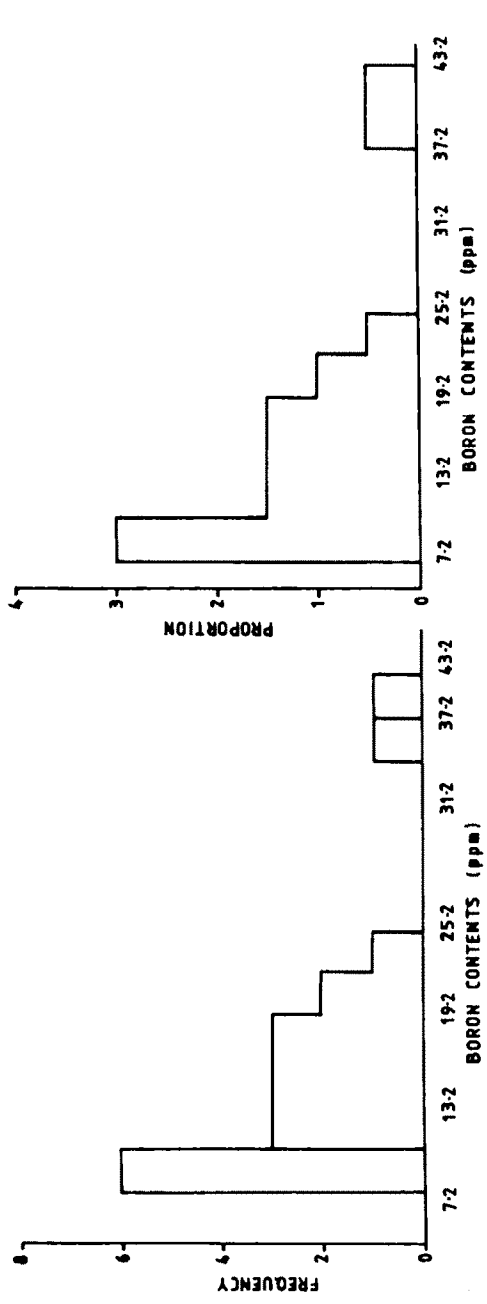


FIG. 7·1 BAR DIAGRAMS SHOWING THE BORON CONTENTS OF EACH PLANT IN TERMS OF ITS URANIUM CONTENTS TAKEN AS UNITY. [THE NUMBERS DENOTE THE CORRESPONDING PLANTS IN TABLE 7·1]



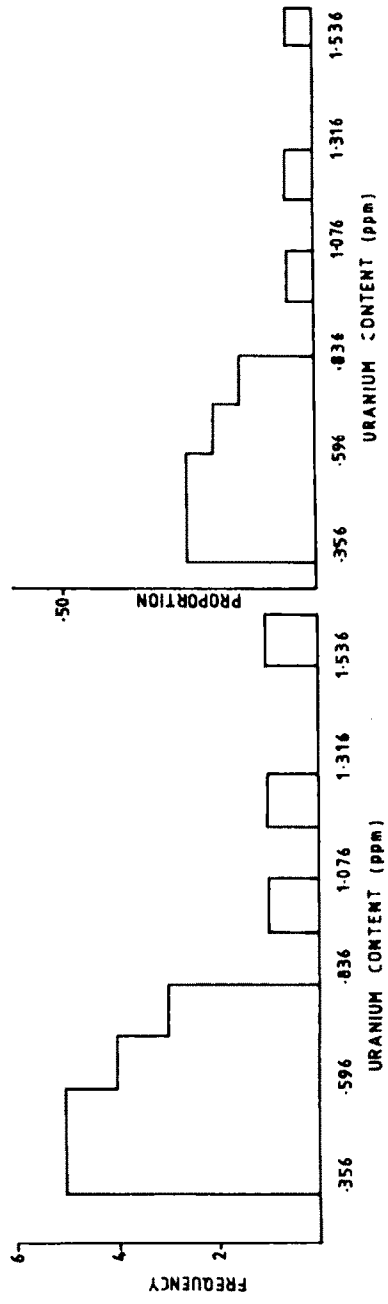


FIG. 7.2 FREQUENCY DISTRIBUTIONS OF AVERAGE URANIUM AND BORON CONTENTS OF THE PLANT SAMPLES.

TABLE 7.1

Uranium and boron contents of the plants compared

Sl. No.	Names of plant	Average U-content ppm	Average b-content ppm	Ratio U.content: b.content
1.	Acorus calamus, Linn	0.707	7.2	1:10.1
2.	Adhatoda vasica, Nees	0.529	17.2	1:32.4
3.	Alstonia scholaris, R.Br.	1.214	18.9	1:15.6
4.	Asparagus racemosus, Willd	0.577	11.7	1:20.3
5.	Azadirachta indica, A.Juss	0.549	9.9	1:16.9
6.	Butea monosperma, Lam	0.543	9.2	1:17.0
7.	Caesalpinia crista, Linn	0.758	15.5	1:20.5
8.	Calotropis gigantea, R.Br	1.559	24.2	1:15.5
9.	Datura metal, Linn	0.613	8.7	1:14.2
10.	Euphorbia neriifolia, Linn	0.596	8.0	1:9.2
11.	Mallotus phillippinensis, Muell, Arg.	0.395	9.13	1:23.1
12.	Moringa oleifera, Lam	0.968	13.6	1:14.0
13.	Pongamiaglabra, Vent	0.405	12.1	1:30.0
14.	Ricinus communis, Linn	0.356	38.7	1:108.6
15.	Saraca indica, Linn	0.787	20.4	1:25.9
16.	Tamarindus indica, Linn	0.657	18.3	1:27.9
17.	Terminelia arjuna, W.& A.	0.512	21.3	1:41.6
18.	Thevetia neriifolia, Juss	0.472	14.3	1:30.3
19.	Vitex negundo, Linn	0.758	40.7	1:53.7
20.	Vitis quadrangularis, Wall	0.363	13.1	1:36.2

different amounts of uranium by various parts of a plant may be a deciding factor in determining some actions of the medicinal plants.

Boron contents, on the other hand, are not found to be related to medicinal properties of plant (Chapter VI). As already mentioned in Chapter I, no effect of this element in animal nutrition has so far been observed. The result in this work, is therefore, in conformity with this fact.

Uranium is also chemically toxic. Natural uranium, in its tetravalent form is unstable. It is oxidised to the more toxic hexavalent form, which can block normal metabolic process[1]. The toxicity of uranium compounds varies widely. Some compounds of this element is practically nontoxic, while some others are toxic in moderate doses, still some others like UO_2F_2 is toxic in small doses[2]. Uranium affects the kidney and bone first and then the liver and spleen, and accumulates there in order of preference[3-4]. It can even induce leukemia. The lethel dose varies for various compounds of it; e.g. in case of uranyl nitrate hexahydrate, it is 1 to 2 mg/day and for uranyl nitrate it is about 50 mg/day[4]. In general the maximum permissible intake of this element is 40 mg/day[5].

But radioactivity of uranium may be a major factor as regards its relation to the medicinal properties of plants. Because the alpha, beta and gamma rays, emitted by it can produce deleterious products, injurious to various organs. Uranium, that enters the body in the form of medicines derived

from plants is only in traces, well below the permissible dose. But the correlations discussed here is noticeable. Another point to be noted is that the element boron, which is not radioactive and is present abundantly, in plants, compared to uranium, may not have such effects on medicinal properties of plants. Hence it may not be related to medicinal properties as observed in the present investigation.

Thus radioactivity may be an additional agent in deciding the actions of medicinal properties of plants.

7.3. FUTURE PERSPECTIVE:

The experimental results presented in this work brings a significant factor to light that awaits extensive study. A detailed and channelised investigation in this line can help to achieve decisive results as to the actions of medicinal properties of plants. Controlled experiments in collaboration with clinical studies can help to find out the significance of presence of uranium for better understanding of the medicinal actions of plants. It may even be possible to identify the genuine parts of plants having a particular medicinal property.

Estimations of some other trace elements like pb, Hg, Ni, Zn, Ba etc. and a similar study are desirable.

Thus a study of trace elements like uranium, boron with some other ones like lead, mercury etc. in some medicinal plants may furnish some information on the role played by them, and in future, the information may enrich our knowledge as regards the better use of medicinal plants.

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