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CHEMICAL ANALYSIS OF RAIN WATER AT TEZPUR (ASSAM)

1. The chemical composition of rain water is of considerable importance in geochemistry, agriculture etc. However, data relating to the chemical composition of rain water in India is far from satisfactory. Handa (1968) had earlier reported the chemical analysis of rain water from the following locations—Dehradun, Sahasradhara, Haridwar, Laksar, Diamond Harbour, Calcutta, Bhasha, Sonarpur. His study did not include the North-Eastern India (Assam). A study of the water of Assam (Nair *et al.*, see Ref.) has shown that the subsoil water of Tezpur contains iron predominantly upto 22 ppm and the waters are acidic (pH 5.5-7.5). The composition of rain water was therefore of specific interest. In this note data on rain water collected at Tezpur (Darrang district in Assam) is reported.

2. The rain water samples were collected during the peak monsoon period (May-July) in polyethylene bottles, provided with large glass funnels in the exposure yard of Field Laboratory, Tezpur. Calcium and Magnesium ions were determined complexometrically with E.D.T.A. using Murexide and Eriochrome black T as indicator (Taylor 1958). Potassium content was determined in a Beckmann Flame Photometer at Defence Laboratory, Jodhpur and sodium content calculated by the method of difference. Iron content was examined colorimetrically, using potassium thiocyanate. Bicarbonate ions were determined by titration with standard acid using methyl orange indicator. For the estimation of Chloride ions the water samples were made alkaline by adding a aqueous sodium hydroxide solution, which were then completely neutralised with an equivalent amount of acid (Handa 1968). Chloride ions were then determined by titration with standard silver nitrate solution using chromate indicator. pH of

TABLE 1

Chemical composition of rain water samples from Tezpur (Assam) during May to July 1969

	pH	Constituents (ppm)					
		HCO ₃ ⁻	Cl ⁻	Ca ⁺⁺	Mg ⁺⁺	Na ⁺	K ⁺
16-5-1969	7.0	5.7	1.85	1.4	0.2	2.7	1.0
19-5-1969	7.0	3.66	2.5	1.0	0.2	1.5	Nil
20-5-1969	6.8	2.8	0.9	1.2	Nil	0.3	Nil
22-5-1969	7.0	4.02	1.5	1.5	Nil	0.3	1
23-5-1969	7.0	3.05	0.3	1.4	Nil	0.3	Nil
25-5-1969	6.7	5.0	2.6	0.5	0.5	2.1	Nil
27-5-1969	6.7	3.60	0.17	0.6	Nil	0.8	Nil
3-6-1969	6.8	3.60	2.46	1.0	Nil	0.6	2.0
4-6-1969	6.8	4.8	0.15	1.0	Nil	0.2	1.0
5-6-1969	6.8	5.2	0.56	1.4	Nil	0.2	1.0
6-6-1969	7.0	6.10	0.85	2.0	Nil	0.6	Nil
7-6-1969	7.0	3.66	0.56	1.4	Nil	0.2	Nil
9-6-1969	7.0	3.64	0.70	1.5	Nil	0.2	Nil
10-6-1969	7.0	8.54	0.45	3.0	Nil	0.1	Nil
11-6-1969	6.7	19.52	0.40	3.0	Nil	0.5	Nil
12-6-1969	6.9	8.68	0.52	2.0	0.3	0.7	Nil
14-6-1969	7.0	6.10	0.52	2.0	Nil	0.4	Nil
16-6-1969	7.0	9.5	0.78	2.0	0.8	0.3	Nil
24-6-1969	7.0	6.2	0.38	1.5	0.4	0.2	Nil
25-6-1969	6.8	8.64	0.39	1.4	0.6	0.8	Nil
1-7-1969	6.6	19.52	0.78	4.0	Nil	3.2	Nil
9-7-1969	7.0	18.30	1.0	2.0	1.0	3.4	Nil
10-7-1969	6.8	15.86	0.38	4.0	2.0	—	—
11-7-1969	6.9	17.08	0.56	2.6	1.5	1.0	Nil
13-7-1969	6.8	13.42	0.34	4.0	Nil	0.7	Nil
16-7-1969	6.7	21.96	0.90	4.0	2.0	1.3	Nil
17-7-1969	6.6	15.24	0.85	3.0	1.0	1.0	Nil
23-7-1969	6.8	14.64	0.74	2.5	1.0	0.3	Nil

water samples were determined in a mains operated pH meter.

3. The chemical data on rain water samples from Tezpur (Darrang district) Assam are given in Table 1.

By virtue of the dissolved salts, rain water acts as a mixture of electrolytes, besides absorbing atmospheric gases. According to Hutchinson (1957), the major constituents of rain water are Cl^- , HCO_3^- , SO_4^{--} , NO_3^- , Na^+ , K^+ , Ca^{++} and Mg^{++} . In the present investigation except NO_3^- and SO_4^{--} , other constituents have been detected and estimated.

4. *Bicarbonate ions* — In the work of Handa (1968) bicarbonate ions of various concentration (1.0 to 38.0 ppm) were reported in the rain waters collected at different places in North India. Our present findings on rain water of Assam corroborates the earlier findings of Handa that bicarbonate ions are more or less universally present in the rain waters of India, although in varied concentrations at Tezpur (2.8 to 21.96 ppm; Table 1).

Chloride ions — The chloride composition of rain water samples of Dehradun and other places, reported by Handa (*loc. cit*) ranges from 0.23 ppm to 3.95 ppm. The chloride content of rain waters

of Tezpur is less (0.15 to 0.60 ppm) comparatively.

Calcium and Magnesium ions — The calcium content of rain water of Tezpur is uniformly more than the magnesium content. The calcium content (max. 4 ppm) compared to magnesium content (max. 0.2 ppm), found in the rain waters of Tezpur, show that the calcium is of non-marine origin (Handa 1968).

Sodium ions — The sodium content reported from Dehradun and other places, varies from 0.03 to 1.41 ppm, whereas slightly higher values (0.07 to 3.4 ppm) are found in the rain water samples of Tezpur.

pH — In an exhaustive survey of waters of Darrang district in Assam (Nair *et al.*, see Ref.) the subsoil waters were invariably found to be acidic (pH ranges from 5.5 to 7.3). The nearly neutral pH (6.6 to 7.0) of the rain water samples clearly show that the acidity of sub-soil water is as a result of percolation of neutral rain water through the acidic soil (Mahanta and Neog 1968). Rain water by itself is neutral.

5. Results on chemical composition of rain water at Tezpur in Assam are in large conformity with the earlier findings on rain water in Northern India (Handa 1968). pH of the rain water is neutral compared to the acidic sub-soil water of Tezpur.

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