



COLUMNAR BIOHERMAL STRUCTURES OF KRISHNANAGAR, RAIPUR GROUP, CHATTISGARH, INDIA

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ABSTRACT

The algal limestones near Krisnanagar of Raipur city show branched Columnar structure, Baicalia. the lime stones belongs to Raipur group of Chhattisgarh Super group. This type may be classified under (LLH-C) mode (Logan et al 1964). Rounded Oncolites occur as surface structures on the growing columnar structures. Rhombohedral dolomitic crystals constitute (40%) volume of the observed sections suggesting hypersaline magnesium rich Sabkha environment. The LLH-C mode suggest protected inter tidal mud-flat environments, where wave action is slight.

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INTRODUCTION

Stromatolite is a laminated structure having positive relief and discernible morphology inferred to have formed by microbial process. The lamination results from the trapping and binding of sediment by the mucilaginous filaments of algae which form mats growing on the sediment surface. The sediment precipitated by the algae themselves. The lamination is produced by variation in sediments supply, giving more or less organic rich layers. Stromatolites are certain sedimentary structures constructed in carbonate sediments by photosynthesizing cyanobacteria. They range in geologic age from early Archaean to the present and are among the early members of life on the earth. They exhibit heterotropism i.e. they grow vertically in response to the noon position of the sun (Sukumaran, 2003)

LITERATURE CITED

The Raipur Limestones of Chhattisgarh Supergroup were studied earlier by workers such as Dutt (1964), Moitra (1995), Jairaman and Banerjee (1988), Das et al (1992), Ramesh (2007).

Table 1 Stratigraphic succession of Chhattisgarh Basin (After Das et al., 1992 GSI)

Table with 2 columns: Stratigraphic Unit and Formation/Group. Units include C, H, A, T, I, S, G, A, R, H, S, U, P, E, R, G, R, O, U, P. Formations include Maniari (70m), Hirri (70m), Tarenga (180m), Chandi (670m), Gunderdehi, Charmuria (490m), and SINGHORA GROUP. Includes UNCONFORMITY lines and ARCHAEAN AND LOWER PROTEROZOIC BASEMENT.

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The Chhattisgarh Basin occupy vast tract of flatland in the central part of India occurs a prominent Late Proterozoic age

basin with sequences of stromatolitic limestones, shales and sandstones (orthoquartzites).

The Raipur Group of Chhattisgarh Supergroup is the youngest, overlying the Singhora and Chanderpur Groups of Proterozoic age (Table-1). This group is made up of formations such as the Charmuria, Gunderdehi, Chandi, Tarenga and Maniari formations as stated by Das *et al.* (1992).

Geological setting

The Raipur Group of Chhattisgarh Supergroup, M.P. is the youngest overlying Singhora and Chanderpur Groups of Late Proterozoic Age. This group is made up of formations from Charmuria to Maniari (Das *et al* 1992), Krishnanagaris located within the city of Raipur with algal structures within the carbonate rocks of Raipur Group.

Discription

- Phylum : Branched Columnar Structures
- Group : Cyanophyta (Blue-Green algae)
- Form : Baicalia aff B. rara Semikhatov
- Age : Low to Mid Riphean (1350-950 m yrs)

Morphology

The surface features show branched type growth factor with rugged variability, recumbent attitude and dendroidal branching style. Surface ornamentation is smooth with branched columnar structures and closely spaced laminae. The thickness of the laminate is less than 1mm and show branching property. The individual species, is 4cm with vertical thickness of 2 of the outcrop. The width of the lamination is 5-8 cm. amount of inclination of accretion vector is 35-40° from the base. The morphological description is based upon Hoffmans classification (1969a). (Fig.I)

Remarks

The present form Baicalica baicalica (krylov, 1964) may be correlated with SH-C mode of (Logan at al 1964).

Microtextures

The microsections studies of the samples show (20-30%) micrite with (60%) sparite carbonates. Pellets range from (5-20%) with Oolites (40%) within the carbonate matrix. Oolites (sand size particles of carbonates) also cover (60-65%) of the observed section. The matrix material also shows perfect development of Rhombohedral dolomitic crystals covering (65-70% volume of these sections. The irregularly shaped algal microlaminations occur as dark brown patches of size (400-600µm) covering (45-50%) volume of the observed carbonate matrix.

Chemical analysis

The change in the concentration of elements depends upon Eh, Ph condition of marine waters. Photosynthesis of marine blue green algae. Some of the elements occure as most abundant species of sea water (Table-II)

The variation in the concentration is related to the ability of the blue green algae to consume these elements for their growth in Precambrian waters in the tidal-flat zone.

Table II Chemical Analysis Data of Krishnanagar Limestones of Raipur City

S. No	Element	Sample 1	Sample 2
1	Sc	6.67	8.81
2	Zn	27.10	39.44
3	Nb	2.97	5.68
4	Pr	2.60	3.45
5	Dy	1.73	1.43
6	Hf	3.93	1.54
7	V	38.83	31.29
8	Ga	3.74	6.92
9	Nd	9.65	12.53
10	Ho	0.29	0.26

Significance

The occurrence of Baicalia baicalia (Krylov, 1973) and ellipsoidal Oncolites as surface structures, suggest deposition of Raipur sediments in stagant waters of shallow marine environments. The deposition of Raipur sediments and formation of algal structures occurred during the transitional period between lower to middle Riphean period (1350-950myrs) of Proterozoic Era. The branching mode of the vertically stacked hemispheroids is due to growth constraints caused by pebbles resting on the algal mats (Hoffman, 1969a).

CONCLUSIONS

The LLH-C mode (Logan *et al* 1964) suggests protected intertidal mud flats where wave action is slight.

The speroidal or ellipsoidal algal mats suggest agitated intertidal to subtidal zones of Proterzoic (Low-Mid Riphean) age for the deposition of algal species.

The vertically stacked hemispheroids suggest restricted protected arid areas with high tidal range Scaffin (1987).

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