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Microbial organic matter in the micrite of the vermetid association from the Upper Miocene (Salento Peninsula, Italy): evidence of synsedimentary cementation.

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Small and low relief carbonate bodies, made up of a characteristic micrite-vermetid association, have been recognized in the Salento Peninsula (Southern Italy) at the base of the early Messinian reef complex of the Novaglie Formation. The micrite represents the most abundant component and its characterization allowed the understanding of its origin and role in the micrite/skeletal metazoan association. The study has been carried out through microfacies analyses, epifluorescence observations, and organic matter investigations.

Three different types of micrite have been recognized: (a) non/low fluorescent detritic micrite with a few fine bioclastic grains; (b) fluorescent mudstones/wackestone rich in fine bioclastic grains; (c) fluorescent thrombolitic peloidal micrite. The first type of micrite is mainly associated to the basal layer of the community, which is characterized by vermetids still in life position. The overlying deposits, with horizontally leaning vermetid shells (isooriented vermetid facies), can be interpreted as the product of redeposition of the original assemblage. These sediments are constituted mainly by type (b) and type (c) micrites.

The high fluorescence of the (b) and (c) microfacies has been related to the occurrence of two different types of organic matter. The former, which derives from decaying metazoan and planktonic organisms, accumulated during the sedimentation process. The latter is linked to microbial metabolic activity that induced thrombolite biomineralization.

The FT-IR analyses confirm the two source of organic matter in the type (b) and (c) micrites. The type (c) micrite has been deposited *in situ* and syndepositionally cemented. This mineralization type is indicated by the presence of bacterial derived biomarkers. Actually GC-MS analyses revealed the presence of straight chain saturated (C_{14}, C_{l6}), monounsaturated (C_{16}, C_{18}) and diunsaturated (C_{l8}) acids that are known to occur ubiquitously in carbonatogenetic bacteria. The thrombolitic micrites also contains the 17α,21β(H)-isomer that is indicative of cyanobacterial or heterotrophic prokaryotic marker found in microbial mats generated in carbonate environments.

The syndepositional cementation of the automicrite, which should have happened after the death of the vermetid community, prevented the fragmentation of the fragile vermetid feeding tubes.

Microbial communities seem to have played a prominent role in the early Messinian reef complex of the Novaglie Formation both as micrite production and stabilizing factor. The absence of any kind of primary constructors permit to consider the microbialite as “primary framework” of these small and low relief carbonate bodies.