12. C60 FULLERENE/BENZOL SOLUTION AS AN AGENT OF PARTIAL DEGRADATION OF BOTRYOCOCCUS BRAUNII KÜTZ. COLONIES FROM HUNGARIAN ALGINITE

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Short communication

The pecularities in the biopolymer organization of the wall of the *Botryococcus braunii* colonies and the most important establishments were briefly discussed in the previous contribution of this number (KEDVES, SASHALMI and SZÉCSÉNYI, 2002). From the point of view of our new experiments, the presence of the biopolymer structures, which may be modelled with fullerenes, is important. The opportunities in the partial degradation of the fullerene/benzol solution were recognized previously (KEDVES, 1996). Our first experiments are as follows: 10 mg fullerene was soluted in 100 ml benzol, and pure *Botryococcus braunii* KÜTZ. colonies from the Alginite of Várpalota (Transdanubia, Hungary) were the experimental material. 2 mg dried material + 5 ml fullerene/benzol solution, temperature: 30°C, length of time 24 hours, washing with pure benzol, and the dissoluted colonies were dried. Experiment No.: T-12-109. – the dried colonies after experimentation were embedded in Araldite. Experiment No.: T-12-110. – the dried colonies were postfixed in OsO_4 aq. dil. and embedded in Araldite. Experiment No.: T-12-111. – 2 ml merkaptoethanol were added to the dried colonies, and after washing the newly dried material was embedded in Araldite without OsO_4 postfixation. Results. – Experiment T-12-109. (Plate 12.1., figs. 1,2). Dark and light globular units were discovered. The small dark points are of 5-30 Å, the larger light units (holes) 10-70 Å. Sometimes large electron dense globular units are arranged in a regular pentagon. Experiment No.: T-12-110. Different kinds of degradation of the cups were observed (Plate 12.1., fig. 3). In the substance of the cups sometimes linear electron dense structures were observed. In highly magnified pictures there are globular units. Experiment No.: T-12-111. (Plate 12.1., figs. 4,5). Electron dense globular units of 5-60 Å in diameter, and light globular holes of 10-40 Å in diameter appeared after this experiment also. In one part of the partially degraded wall the light holes are arranged in more or less regular pentagon, and hexagons. Two pentagon and two hexagon were observed (Plate 12.1., fig. 5 and schemas A and B). Concerning the hexagons similar electron dense structures were published by MORBELLI and ROWLEY (1996) by confocal study of *Selaginella* megaspore wall. HEMSLEY et al. (1994, 1998) and HEMSLEY (1998) simulated the colloidal sporopollenin in *Selaginella* megaspores by polystyrene latex, cyclohexane and water and nonlinear pattern were demonstrated, between them hexagonal structures also.

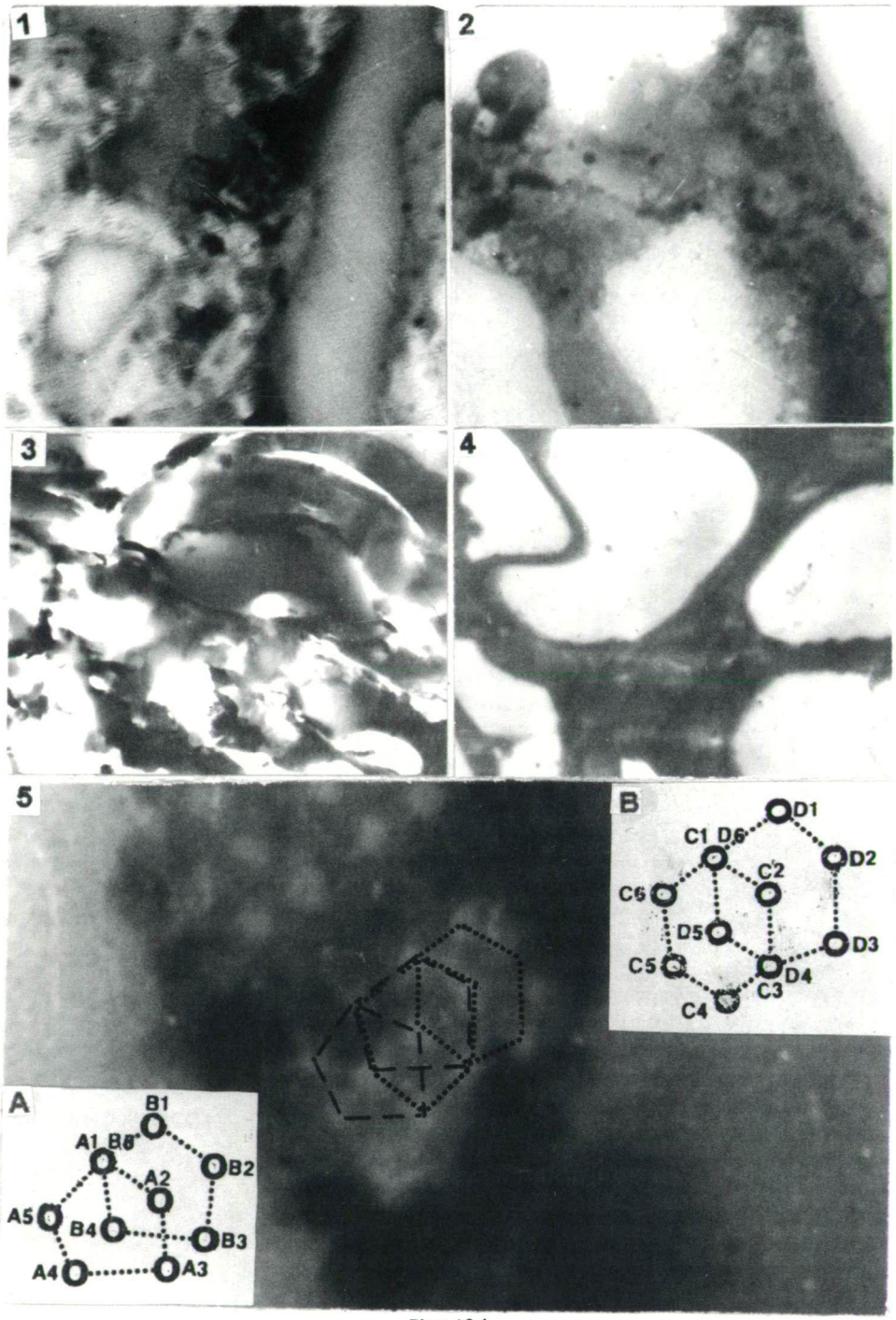
1
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Plate 12.1.

Plate 12.1

1-5. *Botryococcus braunii* KÜTZ. TEM pictures of the experimentally degraded colonies.
1,2. Experiment No.: T-12-109., 1. Negative No.: 8426, 100.000, 2. Negative No.: 8427, 100.000x.
3. Experiment No.: T-12-110., Negative No.: 8479, 5.000x.
4,5. Experiment No.: T-12-111., 4. Negative No.: 8441, 5.000x, 5. Negative No.: 8434, 250.000x.
A: Schema of the light globular holes forming two pentagons.
B: Schema of two hexagons which are formed by light globular holes.

Finally, we can emphasize, that the basic method seems to be resolved further partial degradation with the fullerene/benzol solution. Based on the first results the highly organized biopolymer network (quasi-crystalloid and quasi-equivalent) may be degraded with this method. But a detailed methodical investigations are necessary for the systematic application of this method.

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