the steady-state concentrations of its sulphonic acid intermediates. The pathway appears to serve for degradation and not for synthesis of the sulpholipid.

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Biochemistry of the Sex Attractants of Marine Plants

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The chemotactic sperm attractants of the female gametes of lower plants may be generically termed 'sirenins' (Köhler, 1967). Apparently the sirenins form a family of remarkable cyclic molecules with and without functional groups. Their chemistry and biochemistry will be discussed.

The first chemical elucidation of such a molecule was achieved in the case of the *Allomyces* sirenin by Machlis and co-workers (Nutting *et al.*, 1968). In the meantime Müller (1968) had isolated the sirenin from the brown alga *Ectocarpus siliculosus*. It is a volatile hydrocarbon, C₁₁H₁₆, with an aromatic terpenoid odour, formed only during a short period of the generation cycle between maturation and fertilization of the female gametes. A 100g wet wt. batch of sexual algal thalli produces about 6mg of the near-homogeneous compound, which was separated by condensing the gas phase above the plants and purified by g.l.c. By means of chemical degradations, mass spectroscopy, i.r. spectroscopy and n.m.r. spectroscopy, its structure was found to be all-*cis*-1-(cyclohepta-2',5'-dienyl)but-1-ene (Müller *et al.*, 1971).

The compound is optically active by virtue of the centre of asymmetry at the branching carbon atom C-1: $[\alpha]_D^{25}$ is 71.75°. Its absolute configuration was established by chemical means and comparison with authentic compounds as *S*, which is in accordance with the globular conformation of the volatile molecule. The formula was established by partial transformations of the natural compound and comparison with synthetic derivatives (Akintobi, 1970), and finally by the total synthesis of the cyclic hydrocarbon from divinylcyclopropanes and appropriate unsaturated halogeno hydrocarbons, followed by Cope rearrangement (Jaenicke *et al.*, 1971). By way of this versatile synthesis it is possible to prepare various homologues and steric relatives of the *Ectocarpus*

sirenin. In a semi-quantitative assay system most of them proved to be biologically inactive. From the structure of the *Ectocarpus* sirenin it may be inferred that it is biosynthetically derived from the hydrocarbon end of highly unsaturated fatty acids such as linolenate, with their penta-2,4-dienyl sequence preserved. It has been established that the native compound possesses the cycloheptadiene structure.

On the other hand there is great similarity to the dictyopterenes, isolated from *Dictyopteris plagiogramma* and studied extensively by Moore *et al.* (1968). They are mostly divinylcyclopropane derivatives, which can be transformed artificially into cycloheptadienes of similar structure (see Pettus & Moore, 1971). In the genus *Fucus* was found a cluster of volatile compounds and sex attractants that seem to be closely related to the sirenin from *Ectocarpus*. Their structure has not yet been determined unequivocally.

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Oxidation of Catechol in Plants

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A wide range of structurally diverse natural products found in higher plants and micro-organisms (lignins, tannins, antibiotics, alkaloids, melanins, pigments) are recognized to be derived from hydroxy aromatic compounds by oxidative coupling involving C-C and C-O linkages (Brown, 1967; Scott, 1967). We decided to test whether such oxidation products were formed from catechol in the leaves of *Tecoma stans*. It had already been demonstrated in our laboratory that anthranilate was converted into catechol in *Tecoma* leaves (Nair & Vaidyanathan, 1964). In the present study we have observed that leaf extracts of *T. stans* can carry out the oxidation of catechol to yield biphenylene dioxide 2,3-quinone and 3,4,3',4'-tetrahydroxybiphenyl (Kandaswami *et al.*, 1969). The occurrence of two distinct enzymes, one involved in the conversion of catechol into biphenylene dioxide 2,3-quinone and the other