

Taxonomical and Ecological Distribution of Allelochemical Production in Benthic Mediterranean Organisms

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The chemical activity of benthic organisms has traditionally been related to different aspects of their biology, ecology, systematics, geographical distribution and evolution.

Allelopathy as an ecological phenomenon has been comparatively much less studied in the Mediterranean Sea (Amade et al., 1987) than in tropical and temperate Atlantic zones.

In this study we looked for the taxonomical and ecological distribution of the following activities - Antibacterial (BACT), Antifungal (FUNG), Antiviral (VIR), Cytotoxic (CYT) and Antimitotic (MIT) - in Western Mediterranean benthos.

800 samples were taken by SCUBA diving in October 1988 during a survey aboard the "B/O García del Cid". The zone prospected includes the Balearic Archipelago and the Columbretes Islands (Western Mediterranean). The different communities found in the 27 sampling stations, were sampled. These samples yielded a total of 225 species of benthic algae and invertebrates distributed in ten groups of communities: Communities of photophilic algae (PA), Communities of sciaphilic algae (SA), Precoralligenous (PC), Coralligenous blocks, lower side (CBL), Coralligenous blocks, upper side (CBU), Semi-obscure caves (SOC), Habitats under blocks (UB), *Posidonia oceanica* meadows (PM), Detritic bottoms (DB) and Euryhaline and eurytherm lagoons (EEL).

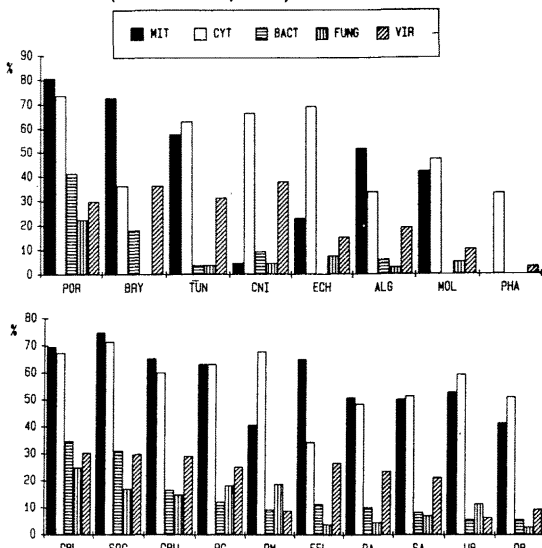
The antimicrobial activity of the crude organic extracts was tested by the diffusion method on cultures of two strains of bacteria and two of fungi. Antimitotic tests were performed on leucemic cells of mice. For antiviral and cytotoxic activities the tests were performed on Herpes simplex viruses and on vesicular stomatitis viruses.

Cytotoxic and antimitotic activities are the most abundant, and are widespread in almost all the taxonomic groups studied (Fig. 1). Porifera and Bryozoa are, generally speaking, the most active taxa, except for the cytotoxic activity which is better represented in Tunicates than in Bryozoa. Antimitotic activity is the most remarkable feature in Porifera and Bryozoa, whereas cytotoxic activity is noteworthy in Porifera, Tunicata and Cnidaria. Antibacterial and antifungal activities are well widespread only in sponges. Antiviral activity is, on the contrary, quite uniformly distributed among the taxonomic groups with a slightly higher incidence in Bryozoa, Porifera, Tunicata and Cnidaria.

Most of the resulting activities exhibit clear relationships with some structural and dynamic characteristics of the benthic communities (Fig. 2). Active species are in general much more abundant in sciaphilic/cryptic habitats (CBL and SOC) where filter-feeder, surface-dependent invertebrates dominate from either a qualitative or a quantitative point of view (Ros et al., 1985). Almost double the percentage of active species has been found in these communities in comparison with those from more photophilic environments (PA, SA, EEL, PM). This percentage reaches its lowest values in detritic communities (DB). The differences found among the photophilic communities are in general slight and they vary according to the type of activity. On the other hand, the *Posidonia* meadows exhibit relatively high percentages of antimitotic and cytotoxic activities, which could be influenced by the fauna associated with the rhizome of the plant which is a rather sciaphilic one (Ros et al., 1985). The results of activities on samples from euryhalyn and eurytherm lagoons are difficult to interpret. These zones constitute a complex of different habitats that are poorly represented in our samples and require more complete studies.

On the whole, cytotoxic and antimitotic activities are the most abundant (38.6% and 39.8% of active species respectively), and are widespread in all the communities explored.

There are clear relationships between activities and taxonomic groups. Porifera, Bryozoa and Tunicata are on the whole the most active taxa. They have an important specific weight in the sciaphilic/cryptic communities and are therefore responsible for the high activity rates found there. The same taxa have demonstrated high levels of activity in other latitudes (Munro et al., 1989).



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