

The Blue Amazon

Four millions and a half square kilometers of the Brazilian territory, an area almost as big as the legal Amazon, are under the Atlantic Ocean. Such huge territory has started being consistently explored less than 40 years ago, though. Nowadays, the scientific research on the Brazilian sea is undergoing an unprecedented expansion, as a consequence of the increasing importance of the marine resources for the national economy. This expansion has demanded the development of more and more comprehensive funding and capacity building tools, resulting in the multiplication of under-graduate and graduate programs dedicated to the marine sciences.¹

The scientific contribution of chemistry to the marine sciences in Brazil is very recent. Up to the 80's, the chemical research profile in Brazil did not include, among its main application sectors,² the chemistry of the sea and its living and non-living resources. However, in the following decade, the Brazilian Chemical Society (SBQ), aware of the country's priorities, dedicated a special issue of *Química Nova* to a comprehensive discussion on its involvement with the environmental area, including the marine sciences. Among other important information in that issue, it is worth noting the high percentage of papers on the hydrosphere (17.1% out of 241) presented during the scientific meetings promoted by SBQ environmental division.³ In the last 10 years, the contribution of chemistry to the marine sciences in Brazil has been outstanding, with about 400 papers published in indexed periodicals, of which almost 80 in *Química Nova* and in the *Journal of the Brazilian Chemical Society*.⁴

In spite of the increasing and significant participation in the knowledge generation, it is remarkable the virtual absence of chemists in the planning of efforts in Science and Technology in marine sciences in Brazil. For example, a broad effort for the graduation system expansion in marine science put in practice by the Brazilian Federal Agency for Support and Evaluation of Graduate Education (Marine Science Public Notice 2009) has approved 26 projects involving almost 30 institutions and about 30 million dollars. Among these, only two dealt with the sea chemistry and just one is based in a chemistry institute.

The timid participation of the chemistry area in important national programs such as the Sea Resource Sector Plan, coordinated by the Interministerial Commission for the Sea Resources and the Brazilian Panel on Climate Change, coordinated by the Ministries of Science and Technology and of the Environment and other instruments that define the strategic Sci & Tech development scenarios in Brazil results in a minor participation of chemistry in the sector development strategy building.

Even in typical chemical areas, such as natural products, pharmaceuticals in general, biofuels and biotechnology, the participation fraction resultant from studies on the marine biodiversity does not even reach 1% of the total production in

these sub areas, which are still strongly based on the terrestrial biodiversity.

In a recent diagnosis published in *Química Nova* (vol 32, nº 3), among 24 articles on natural resource exploration and the innovation perspectives, only one deals with the prospect of marine biodiversity originated pharmaceuticals. In a world level, from the 18,500 substances derived from marine organisms isolated in the last four decades, less than 3% has been studied.

The Brazilian contribution towards such effort is feeble.⁵ Although the natural marine product market, not only for food but also for pharmacological and biotechnological use, currently generates about five billion dollars on a world scale, the Brazilian participation in it is irrelevant, in spite of Brazil's immense marine area in comparison with that market leading countries.

Paradoxically, when one considers the sea chemistry knowledge itself, though the Brazilian participation in the generation of original knowledge still lags behind its overall participation in the other different science fields, the quality of the work that has been done has taken Brazil to different levels of participation in international programs.

Even more recently, under the National Institutes of Science and Technology, an initial integration between chemistry excellence groups and groups traditionally dedicated to marine researches has been noticed.

The above briefly-described situation makes clear the need of an effort by the chemistry community and particularly by SBQ, aiming at a more relevant and general participation in the different levels of decision taking concerning the pro-research policies and human resource formation for the sea science area.

For the enhancement of the knowledge on the Brazilian sea, the chemistry experience in the technology, product and input generation is an urgent demand, which can be very useful for the creation of a patent-oriented mind, still very restricted in the scope of the sea sciences and allow to keep in the country the benefits from the exploration of the chemical resources of the Blue Amazon.

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