THE OCCURRENCE OF TETRODOTOXIN AND PARALYTIC SHELLFISH TOXINS IN MACROALGAE FROM THE BRAZILIAN COAST

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Previous pharmacological data obtained with extracts of various species of macroalgae from the Brazilian coast have shown the presence of neurotoxic activity (ref.1). The red algae Jania sp is assumed to be a primary source of the toxins in the poisonous crabs from the Japanese coastal area (ref. 2). A variety of seaweeds found in the stomach contents of toxic crabs from the Pacific and Atlantic coast showed neurotoxicity (ref.3-4). This paper deals with chemical and pharmacological analysis of the toxin of Arthrocardia gardneri (Rhodophyta, Nemalionales) and Jania rubens (Rhodophyta cryptonemiales).

These seaweeds were collected in Sao Sebastiao Channel, Sao Paulo, Brazil. The algae washed rapidly with distilled water were extracted with acetic acid acidic 80% ethanol (pH 4.0). After removal of ethanol by evaporation, the extracts were defatted by chloroform, evaporated to dryness (55°C_±5), weighed, and then dissolved in deionized water. The solutions thus obtained were submitted to pharmacological and chemical analyses. The mouse assay for toxicity was made by intraperitoneal injections (male mice of ddY strain, 17-22g), according to the standard method of A.O.A.C. (ref.5). Tetrodotoxin (TTX) was assayed by the method of Kawabata (ref.6).

Both seaweeds extracts showed paralytic effects on the mouse's phrenic nerve hemidiaphragm, toad's sciatic nerve preparations and similar toxicity to paralytic shellfish toxins (PSPs) or TTX in the mouse assays(data not shown). The neurotoxic guanidinium compounds were partially purified by ion exchange chromatography (ref.7) and analyzed by HPLC fluorometric analyses for TTX (ref.8) and PSPs (ref.9). The findings indicate the presence of tetrodonic acid (TA), TTX, 4-epiTTX, anhydroTTX, gonyautoxins (GTXs) 1,2,3, saxitoxin (STX) and neoSTX in A.gardneri and J.rubens (GTX 2 was not found in this species)(Fig.1). Although the macroalgae toxicity is low, these findings are important in terms of future toxin outbreaks in the Brazilian coast. For instance in this region, toxic strains of dinoflagellates so far have never

been reported. Finally, to the best of our knowledge it represents the first chemical identification of PSPs and TTX in the Brazilian coast and the occurrence of these toxins in a genus of macroalgae other than Jania.

Fig.1 Liquid Chromatographic fluorometric analysis.

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