**TITLE:** AGRO-INDUSTRIAL RESIDUE AS BIOCORROSION INHIBITOR FOR STEEL EXPOSED TO SEAWATER

**AUTHORS:** ANJOS, M. S., SÉRVULO, E. F. C., LIDUINO, V. S.

**INSTITUTION:** LABORATÓRIO DE BIODEGRADAÇÃO, BIOCORROSÃO E BIOSSÍNTESE - ESCOLA DE QUÍMICA – UNIVERSIDADE FEDERAL DO RIO DE JANEIRO

**ABSTRACT:**

The grape processing industry uses annually about 1.5 million tons of this fruit, with 30% of the total weight being discarded as residue that, although biodegradable, requires time for its decomposition, constituting a cause of environmental pollution. As an economically viable and environmentally friendly alternative, this study evaluated the extract of grape marc as an inhibitor of microbiologically influenced corrosion (MIC) or biocorrosion. The MIC phenomenon causes severe damage to many industrial sectors, especially the petroleum industry, culminating in large economic losses and often irreversible environmental impacts. Results of minimum inhibitory concentration showed that extract from grape residue with 6.81 g/L proanthocyanidins (phenolic compounds) has inhibitory activity against *Pseudomonas sp*. The choice of this microorganism in this work was due to the knowledge of its participation in the MIC. Biocorrosion experiments were performed using API 5L X65 carbon steel coupons immersed in static reactors filled with seawater collected in Guanabara Bay (Rio de Janeiro) previously sterilized and then inoculated with $10^7$ cells/mL of *Pseudomonas sp.* Comparatively, all the tests were performed in the presence and absence of the grape extract. At the end of 15 days of experiment, the depth of localized corrosion (pitting) was about 35% smaller in the coupons in the presence of grape extract than those pits observed in the metallic coupons non-exposed to grape extract. Additionally, the corrosion rates (calculated by mass loss of the coupons) were 0.04 ± 0.01 mm/year for coupons in the presence of extract and 0.12 ± 0.03 mm/year in the extract absence. The results of this work indicate that extract of grape residue is a promising inhibitor of biocorrosion and that further analyzes are necessary to understand its mechanism.

Keywords: Biocorrosion, proanthocyanidins, green inhibitors