quantified in the supernatant of body homogenates: (a) CYP450, assessed by a fluorometric protocol using 7-ethoxycumarine (7-EC) as substrate (ECOD); (b) glutathione S-transferases, with 1-chloro-2,4-dinitrobenzene (CDNB) and GSH as substrates; and (c) catalases (CAT), determined by recording the decomposition of H_2O_2. GSH content was measured using the Ellman reagent (5,5′-dithiobis(2 nitrobenzoic acid-DTNB). Protein concentration was quantified using Lowry assays.

Results: In untreated adults, ECOD activity was significantly lower in LSS than in FP ($P < 0.05$). In adult exposed to acetamiprid, ECOD activity was significantly higher in the FP at 50 and 100 ppm respectively. None of the concentrations applied modified the ECOD activity in the LSS respect to untreated ones. GST activity in FP adults exposed to 25 ppm of acetamiprid was significantly higher than untreated adults ($P < 0.05$). LSS individuals were not affected by any of the concentrations of acetamiprid tested. CAT activity from adults of both LSS and FP were unaffected by the concentrations of acetamiprid evaluated. The GSH content from FP adults was significantly higher at 25 ppm and 100 ppm respect to the control group ($P < 0.05$). LSS adults showed a significant increase of GSH content at 100 ppm compared to the control group ($P < 0.05$).

Conclusion: CYP450 activity increased in a concentration-dependent manner (6.25–100 ppm) in FP. A similar profile was observed for the GSH content in both FP and LSS. These results suggest that the increase of GSH content is a response to the oxidative stress generated by CYP450 or acetamiprid.

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PP5.4
Evaluation of phytoremediated sugarcane vinasse toxicity by micronucleus test in tilapia (*Oreochromis niloticus*)

T.A. Guedes [1], J.E. Correa [1], A.C.C. Marcato [1], M.C.F. Santos [2], C. Moreira-de-Sousa [1], C.S. Fontanetti [1]

[1] *UNESP, São Paulo State University, Rio Claro, São Paulo, Brazil*
[2] *UNIARARAS, Hermínio Ometto Foundation, Araras, São Paulo, Brazil*

Introduction: Brazil is considered one of the largest producers of sugarcane in the world; it has approximately 350 operant plants, with capacity to produce 16 billion liters of ethanol/year. This shows that this great production certainly generates a lot of waste and puts the country in worrying situation on the disposal of waste that production entails. The vinasse main waste generated by sugar industry is generated in a proportion fifteen times greater than ethanol; due to its high organic load and toxicity it was necessary to create alternative use of the same, as previously considerable amounts were released into water resources causing serious pollution problems. However, the indiscriminate spraying of this waste as fertilizer in the sugarcane crop still worries researchers for the possible effects that it can provide in organisms. In this sense it is necessary pretreatment of vinasse to reduce their toxicity. The use of biomarkers linked to micronucleus test has been an important tool in studies of toxicity of different residues and contaminants.

Objective: The objective of this study was to evaluate the toxicity of phytorremediated vinasse by water hyacinth (*Eichhornia crassipes*) through the micronucleus test and nuclear abnormalities in tilapia.

Materials and methods: Fifteen specimens of *O. niloticus* were used which they were exposed to the control group and phytorremediated vinasse for 7 and 15 days diluted to 5% for 96 h. The collected blood was subjected to the standard procedure for micronucleus test. Data normality was tested by the Shapiro–Wilk test and the significance between the groups was obtained by the nonparametric Kruskal–Wallis and Dunn's post hoc with significance $p < 0.05$.

Results: After analysis and quantification of the micronucleus and nuclear abnormalities slides it was observed low values of micronuclei and nuclear abnormalities for the phytorremetiated vinasse for 7 days similar to the control values. After 15 days of phytoremediation was observed a statistically significant further decrease of nuclear abnormalities, this value was lower than those observed in control.

Conclusion: Taking into account the high toxicity that the vinasse in natura presents the results obtained in this study indicate that the phytoremediation of vinasse by water hyacinth was effective in reducing its toxicity, being more effective after 15 days of treatment.

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PP5.5
Reduction of BOD values of sugarcane vinasse through bioremediation by water hyacinth (*Eichhornia crassipes*)

A.C.C. Marcato, C.P. Souza, C.S. Fontanetti

UNESP, Department of Biology, São Paulo State University, Av. 24A, 1515, Bela Vista, Rio Claro, São Paulo, Brazil

Introduction: The vinasse is a major waste of transformation of sugarcane into ethanol. It is usually acidic and with high content of dissolved organic carbon. The polluting power of this residual liquid derives from its richness in organic matter, low pH, high power of corrosion and high levels of biochemical oxygen demand (BOD), and high temperature in output of distillers. Thus, the vinasse is considered highly harmful to fauna, flora, microfauna and microflora of water resources. Due to the large amount of vinasse produced by the ethanol industry several alternatives for its reuse and reduced toxicity have been tested. The activity of some micro-organisms and plant species are useful in the recovery of polluted environments and are the basis of the concept of bioremediation. Considering the two processes, bioremediation may be defined as the process by which living organisms degrade or transform and detoxify hazardous organic and inorganic contaminants or residues in natural conditions into innocuous compounds, such as carbon dioxide and water, or less toxic forms. These transformations of environmental pollutants occur by the reactions that are part of their metabolic processes.

Objective: Thereby, the present study aimed at evaluating the effectiveness of using bioremediation with water hyacinth (*Eichhornia crassipes*) in the treatment of sugarcane vinasse.

Materials and methods: The vinasse was submitted to a period of decantation, after this period was filtered and submitted to phytoremediation with water hyacinth.

Results: Through physicochemical analysis was possible to monitor the progress of changes related to bioremediation. The most evident change was the reduction in the value of BOD. All samples had higher than 90% reduction. The possible factor responsible for the decrease in BOD is the oxidation of organic matter which provides energy for microbial metabolic processes and can be synthesized and incorporated into the cell mass. The organic matter present in the wastewater provides a substrate for the aero-