Subcellular Processes in Plants and Animal Cells

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The cell makers in tolerant plant to air pollutants in Rain Forest, Brazil

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Tibouchina pulchra (Cham.) Cogn., a pioneer tree species commonly found in coastal mountains, in the Cubatão city – southeast Brazil, has been used as a biomonitor due to its high tolerance to air pollutants. This region which the plants were exposed is contaminated by air pollutants, mainly sulphur dioxide, oxides of nitrogen, ozone and particulate matter, from a petrochemical industry. Biochemical and physiological responses on this species has been found in the literature, indicating the ability to environmental change [1, 2]. However, ultrastructural analyses are of major importance to understanding of cellular mechanisms which this plant is subject. In the literature are cited ultrastructural markers that identify changes caused by oxidative stress used in active (young plants) and passive (adult plants) biomonitoring [3]. Therefore, this study aimed to verify that these markers are found in plants of *T. pulchra* and which distinguish among the different types of biomonitoring.

Samples of the material were fixed in Karnovsky's solution [4] for 24h, washed in phosphate buffer and post-fixed in 1% osmium tetroxide for 2h, and kept on uranyl acetate overnight. The fixed material was washed and then dehydrated using a graded ethanol series, infiltrated and embedded in Spurr or LR White resin. TEM sections was being cut at about 90nm using a glass knife and a Leica EMUC6 ultramicrotome. Sections were stained with uranyl acetate and lead citrate. The permanent slide was also taken for interpretation. Preliminary results showed: thickening, collapse and strand protrusion of cell walls and degradation of lamella media. The chloroplasts presented starch grains, numerous plastoglobuli with different intensities of the electron density, but thylacoids membranes were healthy and organized. Mitochondria showed slight swelling in their cristae. Additionally, it was observed the condensation of chromatin and nucleus degeneration. There was the production and accumulation of phenolic compounds on vacuole in adult when compared to young plants (Figure 1). Thus, *T. pulchra* showed the cell markers and these indicate that adult plants tend to have higher production of antioxidants and consequently a higher level of tolerance to oxidative stress.

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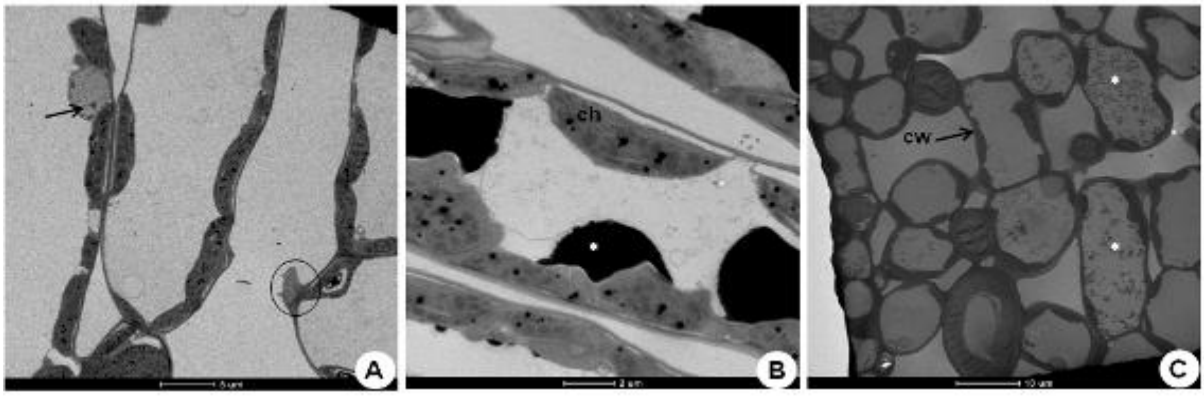

Figure 1. Ultrastructural features of *Tibouchina pulchra*. (A) Mesophyll cells, arrows indicate nucleus degeneration and ellipse indicate strand protrusion; (B) palisade mesophyll with chloroplast (ch) and asterisks indicate phenolic compounds; (C) thickening cell wall (cw) in spongy mesophyll and asterisks indicate phenolic compounds.