

The spectral determination of chlorophylls A, B and total carotenoids using various solvents for tree species growing near sugar mill

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ABSTRACT - Sugar industry is one of the most important agro based industries in India and is highly responsible for creating significant impact on rural economy in particular and countries economy in general. Sugar industries rank second amongst major agro based industries in India. Sugar industry is seasonal in nature and operates only for 120 to 200 days in a year (early November to April). A significant large amount of waste is generated during the manufacture of sugar and contains a high amount of production load particularly in items of suspended solids, organic matters, press-mud, bagasses and air pollution. Air pollutants from sugar mill can directly affect plants *via* leaves or indirectly *via* soil acidification. When exposed to air pollutants, most plants experience physiological changes before exhibiting visible damage to leaves. In the present study, the extraction of chlorophyll a, chlorophyll b and carotenoid pigments were studied in the five tree species such as *Ficus benghalensis*, *Delonix regia*, *Ficus religiosa*, *Azadirachta indica* and *Pongamia pinnata*. Extraction was made by using solvents such as acetone (80% and 100%), ethanol and ethyl acetate. The spectrophotometric determination of chlorophyll a, chlorophyll b and carotenoid pigments were studied. The study area was polluted with organic pollutants which results in reduced pigment levels in the leaves. It was observed that Acetone (100%) showed higher significance during the extraction process when compared to ethanol, ethyl acetate and acetone (80%).

Key words - Air pollutants, Bagasse, Chlorophyll a and b, Carotenoid, Organic pollutants, Extraction process, Solvents

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Industrialization is an important tool for the development of any nation. Consequently, the industrial activity has expanded so much all over the world. Today, it has become a matter of major concern in the deterioration of the environment (Tiwari *et al.*, 1993). With the rapid growth of industries (sugar, paper, tannery, textile, sago, dye industries) in the country, pollution of natural water by industrial waste water has increased tremendously (Amathussalam *et al.*, 2002). Among them, sugar industry plays a major role in producing a higher amount of water pollution and soil pollution because they contain large quantities of chemical elements. They

contain higher amounts of total hardness, total dissolved solids, biological oxygen demand and chemical oxygen. The effluent not only affects the plant growth but also deteriorates the soil properties when used for irrigation (Maliwal *et al.*, 2004). In addition to that, some traceable amount of heavy metals such as zinc, copper and lead were also present in the effluent (Borale *et al.*, 2004). These effluents not only increase the nutrient level but also exceed tolerance limits and cause toxicity (Mishra *et al.*, 1999).

Sugar industry is one of the most important agro based industries in India and is highly responsible for creating