

**BIOLOGICAL MONITORING OF SULFUR DIOXIDE IN
AMBIENT AIR USING BRYOPHYTES.**

A PROJECT REPORT PRESENTED BY

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ABSTRACT

Air pollution has become a very serious global problem in the present millennium. Sulfur dioxide is an air pollutant that releases to the atmosphere heavily due to anthropogenic activities and creates many social and environmental problems. This brings the necessity of knowing the existing environmental conditions. Standard air pollution monitoring techniques although dependable, measure the pollution only for the instance where the sample is collected. They are expensive and thus limit their applications in poor countries. Therefore, an attempt was taken to develop a low cost, environment friendly, biological monitoring method using Bryophyte plants to detect atmospheric sulfur dioxide and also to select a suitable bryophyte species for sulfur accumulation.

To achieve this, two main experiments were carried out. Firstly, a chemical analysis was done to obtain the total sulfur in Bryophytes at three study sites in Kandy District namely, Kadugannawa, Bowalawatta and Hantana. The three sampling sites differ from each other mainly by their pollution levels but are generally similar in climatic, geographical conditions.

Secondly, atmospheric SO₂ concentration was measured continuously at each site using the West and Gaeke method. The fluctuations of atmospheric SO₂ level with the climatic conditions were clearly observed. Because of the high solubility of sulfur dioxide gas in water, lower values of SO₂ concentrations were shown in an area during the rainy days than in dry days. To get an average value for a particular area, measurements were taken throughout a three months time that included both wet and dry seasons.

Results revealed that atmospheric sulfur dioxide pollution at Kadugannawa road side was the highest while at Hantana mountain area was the lowest. Similarly, the total sulfur content in plant materials of *Fissidens ceylonensis* was also the highest in samples collected from Kadugannawa and the lowest in samples collected from Hantana.

A positive correlation was observed between total sulfur content in plant materials of *Fissidens ceylonensis* and mean sulfur dioxide concentration in ambient air.

The results also revealed that, *Bryum argenteum* accumulates more sulfur amount at low pollution levels and hence a better bio-indicator than *Fissidens ceylonensis* and can be used in biological monitoring.

Total Sulfur content in Bryophyte plants of a particular area can be used as a tool of monitoring atmospheric SO₂ level of that particular area.