

## ABSTRACT

In this study, the growth and physiology of *Syzygium cumini* were observed at three levels of air pollution using Open Top Chamber Systems (OTC). The three levels were ambient air chamber (AA), filtered air chamber (FA), and unfiltered air chamber (UF). The anatomical, physiological, and morphological features of the plant were observed from September 2021 to August 2022, along with the monitoring of air pollutants in the spring, winter, and summer months. For each treatment of air pollution, 15 replicate plants were used, grown in 14-inch diameter earthen pots. The plant growth parameters such as plant stem height, number of leaves and branches, stomata (number, length, width), xylem vessels (number, length, width), rate of photosynthesis, transpiration rate, and chlorophyll content were measured. It was found that the plant growth was maximum in an unfiltered air chamber. The plant height was 8cm at the start and reached 85cm in UF, 62cm, and 65cm in FA and AA respectively. The number of leaves was 68, 59, and 72 for AA, FA and UF respectively. The number of branches was 10, 13, and 13 for AA, FA and UF respectively. The anatomical traits showed that AA, FA and UF had a non-significant difference. The physiological traits had significant difference for stomatal conductance ( $g_s$ ), it was 0.59, 0.12 and 0.2 for AA, FA and UF respectively. The transpiration rate ( $E$ ) was also significant i.e 0.55, 0.1 and 0.2 for AA, FA and UF respectively. The rate of photosynthesis ( $A$ ) was significantly difference for the plants for all chambers. It was 142, 62 and 99 for AA, FA and UF respectively. The chlorophyll content was 42, 38 and 45 for AA, FA and UF respectively. The pollutants concentration was 0.16ppm, 0.07ppm and 0.19ppm in summer; 0.09ppm, 0.08ppm and 0.11ppm in winter and 0.11ppm, 0.6ppm and 0.13ppm in spring. After plant harvest it was found that the plant biomass was 0.13g, 0.07g and 0.09g for AA, FA and UF respectively. As in most parameters the maximum results were obtained for UF even though it had the highest level of pollution. Therefore, this study concludes that the plant is tolerant to these pollutants and can be grown as road side plant.