ABSTRACT

The present research focused on the plant growth, anatomy, and physiology of *Cassia fistula* L. to different levels of air pollutants. The experiment was conducted in Botanic Garden GCU Lahore having the facility of an Open-top Chamber system having three chambers i.e. Ambient Air chamber (AA), Filtered Air chamber (FA), and Unfiltered Air chamber (UFA). The ambient air pollutants (SO_2, O_3, CO, NO_2) have been monitored from October 2022- August 2022 while this time plant growth was also monitored. The plant growth, anatomy, and physiology were compared in these chambers. The FA chamber plants exhibited maximum growth i.e. initial plant height was 37cm and reached 178cm in FA, 33cm to 142cm in UFA, and 38cm to 103cm in AA. Initially, the average number of leaves were 41, 32, and 39, reaching 141, 200, and 190 in the AA, FA, and UFA chamber respectively in August 2022. The anatomical traits showed non-significant difference in the three chambers while the physiological traits showed significant difference i.e. stomatal conductance (*gs*), was lesser in the AA chamber (0.063) than in FA chamber (0.103) and UFA chamber (0.105), the transpiration rate was higher in FA (0.87) than in AA (0.527) and UFA chamber (0.527), rate of photosynthesis (*A*) was higher (110.8) in FA than in AA (88.03) and UFA chambers (61.68). Chlorophyll content was higher in FA (42.33) than in AA (35.30) and UFA (34.50) showed non-significant difference. Total biomass reduced in AA Chamber (0.177) as related to FA (0.254) and UFA (0.236) chamber, showed non-significant difference. During winter, SO_2 concentration was recorded higher in AA (0.08ppm) and UFA (0.113ppm) than FA chamber (0.033ppm) and NO_2 concentration was higher in AA (0.108ppm) and UFA (0.124ppm) than in FA (0.04ppm). During spring, NO_2 concentration was higher in AA (0.084 ppm) and UFA (0.094ppm) chamber. During summer, NO_2 Concentration was higher in AA (0.165ppm) and UFA (0.161 ppm) than in FA chamber (0.057 ppm) and FA chamber (0.021 ppm) had a lesser O_3 concentration than AA (0.037 ppm) and UFA (0.053 ppm). This study concludes the higher growth, improved anatomy, and physiology in FA chamber as compared to the plants grown in AA and UFA Chambers.