ASSESSMENT OF MICROCLIMATE VARIABILITY IN URBAN INDOOR, COMPOUND, AND BALCONY SPACES AND ITS IMPACT ON SELECTED MEDICINAL PLANTS

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Urbanization alters local microclimatic conditions, yet the effects of indoor, balcony, and compound environments on medicinal plant growth remain poorly documented in tropical contexts. This study evaluated light intensity (LI), air temperature (AT), and relative air humidity (RH) across these three urban spaces at the University of Sri Jayewardenepura, Sri Lanka, and assessed their impact on *Azadirachta indica*, *Lantana camara*, and *Morus alba* over six months under a Randomized Complete Block Design (RCBD) with 6 replicates. Two-way ANOVA was performed for all nine parameters ($p \leq 0.05$). Regression models explained 89–91% of PH variation from week 5 onward, with stem diameter as the most consistent predictor. The compound space recorded intermediate to high LI (3,547–5,225 lux) and moderate AT (25.9–29.9°C); the balcony space showed the highest and most variable LI (4,177–12,027 lux) with the lowest RH (45.8–59.0%); and the indoor space had the lowest LI (152–189 lux), lowest AT (24.0–26.7°C), and highest RH (61.5–65.0%). Nine parameters; plant height (PH), stem diameter (SDM), internode length (INL), number of leaves (NL), petiole length (PL), leaf length (LL), leaf width (LW), number of branches (NB), and chlorophyll content (CC) were monitored at four evaluation intervals (weeks 1, 5, 9, and 13; W1–W13). Growth consistently followed the gradient compound ≥ balcony > indoor across species, with PH, LL, LW, and INL highest in compound-grown *M. alba* and lowest indoors; SDM and PL greatest in balcony-grown *A. indica* and lowest indoors; and NL and NB greatest in compound-grown *L. camara*; CC was likewise highest in balcony-grown *A. indica* and lowest indoors across all species. These findings demonstrate that urban microclimatic variation significantly influences medicinal plant growth and physiology, with compound environments providing the most favorable conditions for overall development.

Keywords: balcony gardening, indoor cultivation, light intensity, medicinal plants, plant growth, urban microclimate