Research Abstract

The city of Cairo is considered one of the most air-polluted cities in the world, as it suffers from elevated particulate matter (PM_{10}) levels, that threatens the health of the city dwellers. Therefore, this research seeks to utilize urban vegetation to enhance the air quality in Cairo streets. The study concluded the most efficient local vegetation types, distribution, density that required to be applied in different street canyons.
The research comprises two phases.

The First phase: Basic information related to air pollution and the possibility of adopting vegetation to reduce it. The Second phase: Creating a model using the vegetation properties to evaluate the ability of local trees, shrubs and climbers in combating PM_{10} Results are expected to guide landscape architect through the process of designing vegetation in street canyons. Additionally, governments can benefit from reducing medical bills, as a result of the improved air quality.

Key Words

Air pollution – PM_{10} – Vegetation – Planting – Trees – Physical characteristics of leaves – Particle Pollution Removal – Street canyon – Micro Scale simulation – CFD models.

Summary of the Research

Air pollution is one of the most pressing problems affecting the quality of life in urban environments, its negative impact on individuals' health and the city economy compels experts and government to take action to reduce the negative influence. One approach tackling this dilemma is utilizing plant components to reduce air pollution. This research proposed a theoretical framework that illustrates the use of plants in the streets to reduce air pollution. In addition a computer model is formulated to assess the ability of local plants in combating pollutants generated from traffic.

The study is divided into two parts:

The theoretical part: Explains the principles, concepts of air pollution and its causes, in addition to an overview of the air pollution problem in the Egyptian cities, especially in Cairo. This section discusses interventions used to reduce air pollution and focuses on the use of plants. Several international case studies have been studied and analyzed to formulate a theoretical framework that aims to solve the research problem.

The empirical part: This part examines the efficiency of the planting scheme in (**El Mohandeseen district**), an initial software program (**Plants to air pollution (PAP)**) is created to classify local plants through their ability to reduce air pollution. Two case studies are selected (**Batal Ahmed Abdel-Aziz Street and Al-Ashgar Street**). The analysis included the current situation of the pollutant concentration in the streets and planting types, distribution, Spacing, location and density. Afterwards, the study proposed designs to enhance the air quality. After that researcher simulate the proposed and current cases using software (**ANSYS FLUENT**) to validate the result. Finally, the proposal has been altered to accommodate the existing plants and restrictions. The research concluded design and management recommendation seeking to integrate reducing air pollution into the planting design in the Cairo streets.