

# **The Use of Earthenware Material for Passive Evaporative Cooling**

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In hot climatic zones the temperature conditions have negative effects on human thermal comfort, consequently leading to more energy consumption for indoor air conditioning. In order to reduce energy consumption and create suitable thermal conditions, passive cooling systems are increasingly envisaged and used in bioclimatic eco-design.

In the past, traditional solutions such as wind-catcher were used in Iranian, Egyptian and Indian architecture in order to reduce the temperature and reach thermal comfort inside of the buildings. In this system outside air guided by the wind-catcher passes over water filled earthenware pots and is significantly cooled by evaporation. The drop of temperature allows the cold air to flow downward in the interior space. This traditional technique has been in use for several centuries in hot climatic zones as a passive evaporative cooling process.

Another method to decrease indoor air temperature is to use natural materials on the facade of the building. Facade elements such as earthenware plant containers and clay pot irrigation system can protect the building against solar gain. Additionally, this type of vertical gardens create highly effective evaporative cooling affecting the building itself and its surroundings.

Both solution are relatively easy to implement and should be more taken in consideration in architectural design. The aim of this work is to estimate the suitability of those low-tech solutions which could be an valuable alternative to meet the growing cooling demand.

**Key words:** Bioclimatic eco-design, passive evaporative cooling, earthenware units, low-tech solutions, sustainability.