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ABSTRACT: In this paper, a robust and simple biogenic route has been developed to synthesize self-assembled ZnO superstructures in short interval of time using naturally available aloe vera plant gel and zinc nitrate as starting materials. The stabilization of zinc ions with polysaccharides wrapped chains along with the support of proteins, lipids and phyosterols of aloe vera gel followed by combustion derives the ZnO superstructures. The obtained ZnO superstructures shows hexagonal crystal phase and exhibit semiconducting behaviour with the energy band gap varies from 2.92 – 3.08 eV. The aloe vera gel derived ZnO superstructures exhibit unique and strong orange-red emission centered at 600 nm. The better structural, morphological and photoluminescence results are obtained for ZnO prepared with 16.6 % W/V of zinc nitrate with aloe vera content compared to other concentrations of aloe vera. The prepared compounds are tested for antimalassezial activity against *Malassezia furfur* - dermatologically prevalent yeast and were found to have Minimum Inhibitory Concentration (MIC) values ranging from 8 µg/ml to 125 µg/ml. Fluorescence microscopic analysis revealed that yeast cells treated with ZnO superstructures have the chromatin as orange instead of green show casing the cell aggregation suggests that ZnO superstructures have an immense potential as antifungal agent. Hence, the explored method of preparation shows high efficient ZnO superstructures derived from the aloe vera plant gel have potential applications in medicine, biomedical and cosmetic industries.