

EXTENDED ABSTRACT

Photodynamic therapy (PDT) is a light-oxygen dependent modality developed for the treatment of various types of cancers and benign diseases. PDT requires simultaneous presence of its three basic elements, photosensitizer, light and oxygen. Infections due to microorganisms are the leading cause of death worldwide. It is expected that 10-20% population worldwide may be affected due to these infections, which range from small skin infections to rapidly systemic diseases. The cause of concern is the global increased resistance of various microorganisms against traditional antibiotic chemicals mainly in case of HIV-infected or immunosuppressed patients. Efficiency of PDT action directly depends on local concentration of photosensitizer and light energy.

Sporothrix schenckii is a dimorphic fungus, which can be found world-wide in soil as well as in living and decomposing plant materials. It is a causative agent of Sporotrichosis and infectious for both human and animals. Dermatophytes are main causative agents of skin fungal infections throughout the world. *Microsporum fulvum* is a dermatophytic species with some reports related to human fungal infections. The increasing incidence of fungal infections and their strain resistance to existing antifungal agents are indicating towards the urgent need for an alternative therapeutic option. Various chemical dyes are used as a photosensitizer in PDT, some of them have shown unwanted toxic and hazardous effect during and after the treatment. These chemical photosensitizers are too costly and not available easily. To overcome these difficulties researchers are investigating the natural products as new natural photosensitizer. In order to search, the efficacy of some natural products like *Beta vulgaris*, *Nigella sativa* seeds, pomegranate, Cinnamon, Roselle, Carob, *Alternanthera maritima* have been studied. *Lawsonia inermis* L. (henna) is now a subject of intense scientific research because of its multifunctional uses ranging from cosmetic dye to an anti-cancer agent. The extract and some of its isolates perform like a multifunctional agent. Its potential as antibacterial, antifungal, antioxidant and immunomodulatory, antipyretic, anti-inflammatory and cytotoxic agent has been shown. Lawsone, an aromatic compound, is the main constituent of henna and Other groups like quinones, phenylpropanoid, flavanoids, terpanoids, and naphthaquinones are also present. The products like quinones have extended π -electron systems which show phototoxic activities.

In present study, *Lawsonia inermis* L. has been used as a natural photosensitizer against two different and very harmful fungal species causing skin diseases. The effect of laser radiation (473 nm) at different powers (25 & 50 mW) and exposure time (5, 10, & 15 min) associated with *Lawsonia inermis* L. natural photosensitizer on the viability of *Sporothrix schenckii* and *Microsporum fulvum*. Although inhibition was observed in all the cases, a maximum inhibition of 83% in case of *Sporothrix schenckii* and 82.49% in case of *Microsporum fulvum* was achieved when they were exposed for 10 and 15 min respectively with laser (473 nm) power 50 mW. This study is important to optimize different parameters to design a low-cost, compact, non-invasive and portable device for the treatment of superficial and cutaneous skin diseases.