DBT/NIPER-Guwahati

A new technique to manage dry eye syndrome

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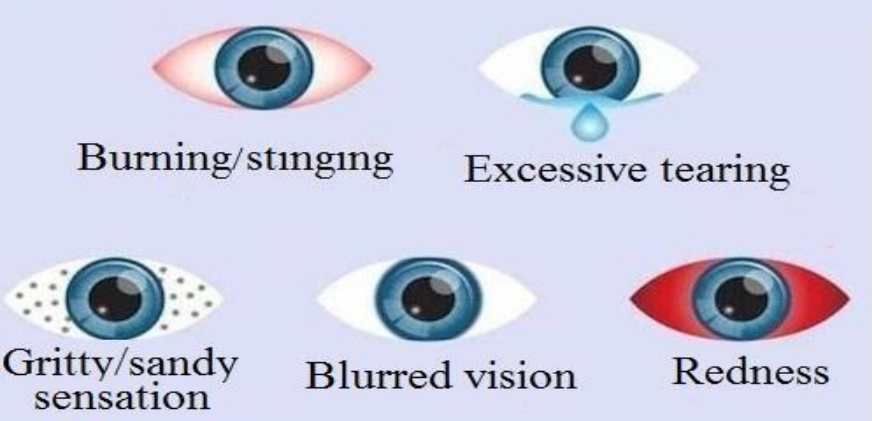
New Delhi, April 07: The prolonged use of computers, mobile phones and other such electronic gadgets causes an ocular disease condition termed as Dry Eye Syndrome (DES) or kerotoconjunctivitis sicca (KCS). In general, the people suffering from dry eyes will feel a "gritty sandy" sensation in their eyes and even seemingly paradoxical watering eyes. Conventional tear substitutes require frequent instillation into eyes to correct or treat it. Oily eye drops are not acceptable to patient due to visual disturbance following instillation of oily drops into eyes.

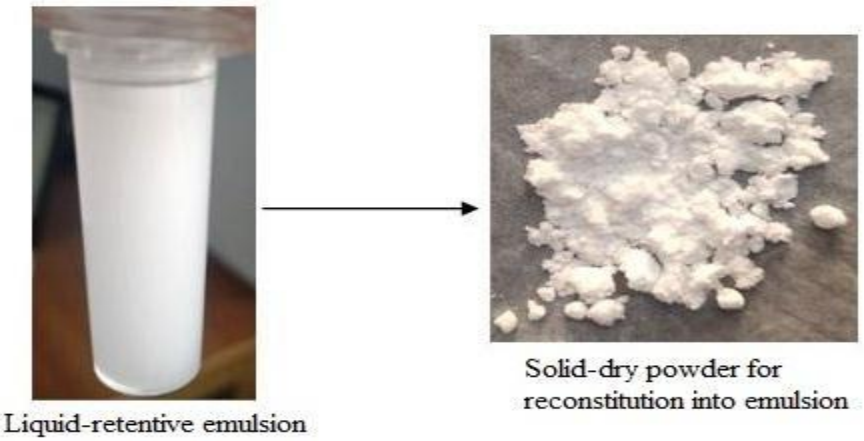
Fig. 1 Typical symptoms of dry-eye syndrome



Cyclosporin A (CsA), a lipid-soluble cyclic endecapeptide, has been found to be effective in the treatment of the immune-mediated dry eye syndrome by enhancement or restoration of lachrymal gland tearing. It is known that the DES eye is characterized by a chronic drying of the conjunctiva and cornea, as well as by decreased tear production and a change in the composition of the tear film. If the CsA ocular bioavailability particularly at extra-ocular tissues (cornea and conjunctiva) is enhanced by developing a suitable CsA-loaded ocular topical formulation, then, the DES management is very efficient while minimizing the CsA systemic absorption into blood stream. Such a topical formulation could also reduce the adverse effects (hypertrichosis or renal dysfunction) of CsA associated with its systemic exposure. Limited CsA aqueous solubility and patient compliance problems associated with the topical oil-based CsA solution pave the development of CsA-loaded oil-in-water nanosized emulsions as one of the

lucrative options. To increase the storage stability of CsA-loaded emulsions, it may be possible to convert the liquid-retentive emulsion into dry-powder emulsion for reconstitution (Fig. 2) before the time of ocular installation because the dry-powder for reconstitution is already commercialized for injections, but somehow the concept of reconstitutable powders is missing in the literature for topical ocular formulations. In fact, the currently developed and DBT-funded formulation should have a commercial viability in this respect.

Fig. 2 Conversion of liquid-retentive emulsion into reconstitutable solid-dry powder for topical ophthalmic application



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