

DEVELOPMENT OF A POLYMER FOR QUANTIFICATION OF HARMFUL OCULAR EXPOSURES

Dr David J Turnbull, A/Prof Alfio V Parisi, Dr Tania R van den Ancker

Centre for Rural and Remote Area Health, University of Southern Queensland, Toowoomba, 4350.

Purpose of study:

The adverse effects to ocular health caused by exposure to high levels of solar radiation are of great concern and can result in the severe degradation of vision capabilities. Solar radiation in the blue part of the spectrum (effectively 380 to 550 nm) is found to trigger a reaction in the eye and has been characterized by the International Commission on Non-Ionising Radiation Protection as the blue light hazard. This blue light photochemical injury to the human retina is termed photoreinitis. Photoreinitis can result from either viewing an extremely bright light source for a short amount of time or a less bright source for a longer period of time. Excessive exposure to harmful blue light radiation is linked to the increased risk of macular degeneration in humans. Macular degeneration is recognised as a leading cause of severe blindness in the Australian population. Therefore, protecting the public against excessive blue light has profound implications on public health. In order to achieve this, quantitative scientific data on the radiation that humans are exposed to during daily activities is required. This necessitates the need to assess the different environments that humans use; in particular those environments that significantly reduce ultraviolet radiation but still allow the majority of blue light to be incident on the human eyes.

Conclusions:

A photosensitive polymer is currently being developed that can be used for the measurement of blue light exposures to humans. The prototype polymer only responds to wavelengths associated with the blue light hazard and is expected to be a useful and inexpensive tool for measuring radiation associated with the blue light hazard.

Preferred category:

Toxicology and Environmental Health

Contact details:

Dr David J Turnbull
Faculty of Sciences
University of Southern Queensland
West Street, Toowoomba, 4350
Phone: 07 4631 1407
Mobile: 0413 583 066
Fax: 07 4631 1530
Email: turnbull@usq.edu.au