

# High temperatures decrease antifungal properties of contact solution

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Exposure to prolonged temperature elevation reduces antifungal activity of a contact lens solution that was implicated in the epidemic of the eye infection *Fusarium keratitis* that occurred between 2004 and 2006, according to a report in the November issue of *Archives of Ophthalmology*, one of the *JAMA/Archives* journals.

Bausch & Lomb introduced ReNu with MoistureLoc, which contains an antimicrobial agent not found in other solutions, in August 2004, according to background information in the article. The first cases of *Fusarium keratitis* related to ReNu with MoistureLoc were reported to the U.S. government in March 2006; total of 154 confirmed cases were identified in the United States. "Bausch & Lomb investigators acknowledged that all original cases appear to be related to ReNu with MoistureLoc produced in their Greenville, S.C., plant," the authors write.

According to the article, in 2006, the Food and Drug Administration (FDA) inspected this facility and cited Bausch & Lomb for inadequate temperature control in the production, storage and transport of products produced there. To assess what effect temperature might have on the growth of *Fusarium* fungus, John D. Bullock, M.D., M.P.H., M.Sc., of the Wright State University Boonshoft School of Medicine, Dayton, Ohio, and colleagues studied six contact solutions, including ReNu with MoistureLoc. "Two bottles of each solution were separately stored at room temperature and 60 degrees Celsius [140 degrees Fahrenheit] for four weeks, serially diluted and then tested for their ability to inhibit

growth of 11 *Fusarium* isolates (seven of which were associated with the keratitis epidemic)," the authors write.

After the 60-degree storage, ReNu with MoistureLoc demonstrated the greatest decline in anti-fungal activity, while Clear Care and ReNu MultiPlus performed the best. When considering just the strains of *Fusarium* associated with the keratitis epidemic, ReNu with MoistureLoc that was stored at room temperature allowed fungal growth in 27 of 84 combinations (different blends of isolates grown in different solutions and at different levels of dilution), compared with 67 of 84 combinations for the bottle stored at 140 degrees Fahrenheit.

"The precise temperature, duration of exposure to elevated temperature and extent of temperature fluctuation that may diminish the antimicrobial activity of a particular contact lens solution is not known, and thus, additional studies may be warranted. However, our findings, coupled with the FDA reports of Bausch & Lomb's failure to regulate the storage and transport temperatures of the products manufactured in their Greenville plant, may be significant," the authors conclude.

"Knowledge of the potential loss of antimicrobial activity of contact lens solutions and other pharmaceutical products when exposed to higher temperatures and the risk of such exposure when storing and transporting those products may help prevent such epidemics in the future."

Source: JAMA and Archives Journals

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