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FILE: ■Neem (*Azadirachta indica*)
■Gingivitis
■Anti-plaque Activity

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RE: Neem Shows Antiplaque Activity in Clinical Study

Pai MR, Acharya LD, Udupa N. Evaluation of antiplaque activity of *Azadirachta indica* leaf extract gel—a 6-week clinical study. *J Ethnopharmacol.* February 2004;90(2-3):99-103.

Dental disease is recognized as a major public health problem throughout the world, and chronic, low-grade infections such as gingivitis (gum disease) are believed to contribute to heart disease. The leaves, twigs, and seeds of neem (*Azadirachta indica*) have been used in India and South Asia for thousands of years to clean the teeth and fight bacterial and fungal infections. The purpose of this study was to develop a gel containing neem leaf extract and to compare its antiplaque activity with a mouthwash containing chlorhexidine gluconate, a common ingredient in medicinal mouthwashes.

The study was conducted at the Manipal Academy of Higher Education in Manipal, India. The neem extract was prepared from dried leaves collected from the medicinal garden of the College of Pharmaceutical Sciences at the Academy. The leaves were macerated with ethyl alcohol for 1 week and the extract was filtered. A 25% neem extract was formulated into an adhesive polymer gel sweetened with sorbitol and flavored with peppermint oil.

The study involved 36 subjects who were randomly assigned to receive 1 of 3 products: (1) chlorhexidine gluconate mouthwash, (2) neem extract gel, or (3) placebo gel. The subjects were trained to use the products properly and instructed to use them after breakfast and just before going to bed every day for 6 weeks. Plaque levels were evaluated using a standard plaque index at baseline and after 3 and 6 weeks of treatment. Levels of 2 bacteria commonly associated with plaque formation, *Streptococcus mutans* and *Lactobacilli* species, were measured in the saliva before and after treatment.

After both 3 and 6 weeks, the mean plaque index was significantly lower ($P < 0.05$) in the neem gel group than in the chlorhexidine mouthwash group and the placebo gel group.

Average bacterial counts in the saliva decreased significantly more ($P < 0.05$) with neem gel than with the mouthwash or placebo gel.

The authors suggest that neem extract gel is appropriate for treating gingivitis and oral infections because it inhibits the formation of plaque and the growth of bacteria. The neem gel may be particularly useful in younger children and others who are not able to use a mouthwash properly. Additional clinical studies using much larger numbers of subjects, as well as stability and consumer acceptability testing, are needed before this neem gel formulation can move into commercial production.

—*Heather S. Oliff, Ph.D.*

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