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Clinical and microbiological efficacy of an antimicrobial mouthrinse in oral malodor.  
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The purpose of the present study was to evaluate the effects of a newly formulated mouthrinse containing chlorhexidine, cetylpyridinium chloride and zinc lactate (Halita®), on clinical and microbiological parameters. Eight subjects complaining of oral malodor were included in a double-blind placebo-controlled parallel study design. Entrance criteria required a score  $\geq 1$  on a 0-5 organoleptic scale, VSC level  $\geq 170$  ppb (Halimeter®) and a tongue coating score  $\geq 4$  according to Winkel Tongue Coating Index. Untreated periodontitis with probing pocket depths  $\geq 5$  mm and intake of antibiotics in the previous month were the exclusion criteria. Patients enrolled in the study abstained from oral hygiene and ingestion of food and liquids eight hours before examinations. At baseline examination the following variables were recorded: full-mouth odor organoleptically, two consecutive measurements of VSC levels by means of Halimeter®, Tongue Coating Index, and a standardised microbiological sample from the tongue dorsum for culture analysis (total aerobic and anaerobic counts, numbers and proportions of *P. gingivalis*, *P. intermedia*, *B. forsythus*, *F. nucleatum*, *P. micros* and enterics). Patients were randomly assigned to the test or placebo group, and instructed to gargle with the mouthrinse twice daily during one minute for a period of two weeks. After the treatment phase the same variables were recorded.

T-test was used to analyse intra and intergroups differences. The tested mouthrinse obtained higher mean reductions in organoleptical scores ( $-1 \pm 0.5$  vs  $0 \pm 0$ ) ( $p < 0.01$ ) and VSC values ( $-134 \pm 141$  vs  $-10 \pm 112$ ) (NS) as compared with the placebo. Tongue coating scores remained unchanged in both groups. Regarding microbiological parameters, test was able to reduce total CFUs in anaerobic blood-agar plates ( $-2.1 \pm 2.7$  vs  $-0.5 \pm 0.7$ ). By contrast, the number of colonies in aerobic blood-agar plates increased in the test group ( $1.8 \pm 2.4$  vs  $-0.3 \pm 1$ ) (NS).

The tested mouthrinse was statistically significant more effective in improvement of organoleptic values than placebo. Halita® showed higher tendency to reduce anaerobic tongue microflora than placebo.

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Subgingival, tongue and saliva microflora in halitosis patients.

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The purpose of this investigation was to describe the microbiology of halitosis patients and try to correlate these microbial parameters with malodor associated variables.

Eight patients were selected on the basis of an organoleptic score  $\geq 1$  (scale from 0-5), a level of volatile sulphur compounds (VSC)  $\geq 170$  ppb (in mouth air evaluated by means of Halimeter), and a Winkel Tongue Coating Index  $\geq 4$ . Patients with periodontal pockets  $\geq 5$  or antibiotic intake in the previous month were excluded. Samples from three different oral sources were taken: subgingival samples, from the mesio-buccal site of the first molars, with 2 paper points in each one, and pooled in a RTF vial; tongue coating samples, by means of a tongue scraper, and a standard loop; and unstimulated whole saliva samples. Samples were transferred to the laboratory within 2 hours, and inoculated on TSBV and two series of blood-agar plates, for aerobic and anaerobic incubation. Statistics: descriptive statistics and Pearson correlations were used to evaluate the data.

Tongue coating and saliva samples harboured high prevalences ( $>50\%$ ) of *P. gingivalis*, *P. intermedia*, and *F. nucleatum*. Total anaerobic counts showed positive correlations with Halimeter VSCs ( $r=0.42$ , saliva samples) and organoleptic scores ( $r=0.43$ , saliva samples;  $r=0.52$ , tongue coating samples). Total aerobic counts in saliva and in tongue coating, and total anaerobic counts in subgingival samples, showed negative correlations with most malodor parameters.

Conclusions: high prevalences of periodontal pathogens were detected in tongue coating and saliva samples from non-periodontitis halitosis patients. Halitosis levels were correlated with total anaerobic counts in saliva and in tongue coating.