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Antimicrobial activities of some substances used in oral cavity spray

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Introduction and Objective

Bad smell breath causes from the microbial accumulation in mouth which can be diminished by microbial reduction. The refresh and waking up feelings can generate from essential oils and the spicy taste of chili extract, respectively. The aim of this study was to investigate the antimicrobial activities of chili extract, essential oils and some additives in the oral cavity spray.

Methods

The antimicrobial activities of the chili extract, capsaicin solution, peppermint oil, clove oil, cinnamon oil, citrofresh and freshcolate against microbes which found in oral cavity such as *Staphylococcus aureus* ATCC 6538P, *Streptococcus mutans*, *Escherichia coli* or *Candida albicans* ATCC 17110 were determined by the broth microdilution method or agar cup diffusion method. The 10 µg/ml ampicillin disk and 10 µg/ml clotrimazole solution were used as positive control for antibacterial and antifungal activities, respectively.

Results

Cinnamon oil exhibited the highest activity against *S. aureus* (MIC= 1%v/v), *S. mutans* (MIC=1%v/v) and *C. albicans* (MIC=0.1%v/v). MIC of clove oil and peppermint oil against *S. aureus* were equally as 5%v/v, whereas clove oil (MIC=1%v/v) showed higher activity against *C. albicans* than peppermint oil (MIC>20%v/v). Both 1%w/v capsaicin solution and chili extract (containing 0.02%w/v capsaicin) did not inhibit *S. aureus* and *C. albicans*. The chili extract could inhibit the growth of *S. aureus*, *S. mutans*, *C. albicans* at concentration of 100%, 25% and 25%, respectively, whereas it could not inhibit the growth of *E. coli*. By comparison, freshcolate could not inhibit the growth of *S. mutans* whereas citrofresh and cinnamon oil exhibited this activity.

Conclusion

The cinnamon oil and other selected substances exhibited the interesting antimicrobial activities against the microbes found in oral cavity.

Keywords: Oral cavity spray, antimicrobial activities, substances

The spray pattern of oral cavity sprays containing the herbal extracts

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Introduction and Objective

The dispersion of oral spray from the spray nozzle into the oral cavity should be considered for its spray pattern which can affect to the acceptance of the user. The developed oral cavity spray containing chili extract and other various herbal sprays were tested for their spray pattern. To determine the spray dispersion into the oral cavity this study employed the high speed camera to take the photo when they sprayed into the air.

Methods

The six oral spray products comprising herbal extracts were tested for their spray pattern with the high speed camera which their spray angle was measured to indicate and compare the spray behavior. The speed for taking the photo was 1/3000 sec and photo was selected at the order of 120 which the detection of spray angle was performed at the position close to the spray nozzle. The antimicrobial activities of the oral cavity sprays against *Streptococcus mutans*, *Staphylococcus aureus* and *Candida albican* were determined with agar diffusion method. The 10 µg/ml ampicillin disk and 10 µg/ml clotrimazole solution were used as positive control for antibacterial and antifungal activities, respectively.

Results

The spray angle of six oral cavity sprays (code O1, O2, O3, O4, O5 and O6) were 48.5, 41.0, 32.1, 24.9, 47.0, 31.0° with the spraying time of 0.151333, 0.154333, 0.144667, 0.148667, 0.192000, 0.061667 sec, respectively. This result could be used to adjust the spray component such as the amount of viscosity inducing agent for developing the oral cavity spray with proper spraying characteristic. The developed oral sprays containing chili extract and volatile oils could inhibit *Streptococcus mutans*, *Staphylococcus aureus* and *Candida albican*.

Conclusion

The spray angle obtained from the high speed camera could be employed to signify the spray pattern of the oral cavity spray containing the herbal extracts.

Keywords: *Spray pattern, oral cavity spray, herbal extracts*