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Distribution and persistence of probiotic Streptococcus salivarius 

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Distribution and persistence of probiotic *Streptococcus salivarius* K12 in the human oral cavity as determined by real-time quantitative polymerase chain reaction.

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Abstract

The bacteriocin producer ***Streptococcus salivarius* K12** is used as a **probiotic** targeting the **oral cavity**, so our study aimed to assess whether its dispersal and **persistence** could be monitored using **real-time quantitative polymerase chain** reaction. To this end, we designed **polymerase chain** reaction primers and a hybridization probe specifically targeting *salA*, which encodes for the prepropeptide of salivaricin A. Using a single individual as our subject, we administered four lozenges of **K12** Throat Guard per day over 3 days, then measured *salA* gene levels for 16 different **oral** sites at six different intervals over 35 days. Four samples each from gingival sulci and from teeth all remained negative. In contrast, in saliva and at all mucosal membranes **K12** was detected, but with varying amounts and time profiles. Relatively high *salA* gene copy numbers, calibrated on the basis of colony-forming units, were seen on the tongue (maximum $4.6 \times 10(4)$ /swab at day 4), in stimulated saliva ($2.4 \times 10(4)$ /ml, day 4) and on buccal membranes ($1.3 \times 10(4)$ /swab, day 8). **K12** was present on both sides of the pharynx but asymmetrically in both quantity and duration. In conclusion, we have developed a **real-time quantitative-polymerase chain** reaction for counting *S. salivarius* **K12** at various sites in the **oral cavity**. In the individual studied, **K12** could be detected at the mucosal membranes for as long as 3 weeks, but with steadily decreasing numbers after day 8. Thus, **K12** may have the potential to control **oral** bacterial infections only when the uptake is repeated frequently.

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