

## Chewing Gum of an Decapeptide, KSL (W), as an Antiplaque Delivery System

J. Faraj<sup>1</sup>, R. Dorati<sup>1</sup>, Y. Capan<sup>2</sup>, K. Leung<sup>3</sup>, P. DeLuca<sup>1</sup>

<sup>1</sup> University of Kentucky, college of Pharmacy, <sup>2</sup> Hacettepe University, Turkey, <sup>3</sup> US Army Dental and Trauma Research Detachment, IL (USA)

**Purpose:** To prepare a gum formulation containing KSL (W) as an antibacterial agent, cetylpyridinium chloride (CPC) as surface active agent, and using calcium carbonate, calcium phosphate, sodium bicarbonate and colloidal silica as abrasive agents. The factors influencing in vitro and chew-out release of KSL (W) from the gum formulations were investigated. **Methods:** The release of KSL (W) from the gum formulation was studied in artificial saliva at 37°C using a chewing apparatus. A chew-out study was also included and the KSL (W) was analyzed by reversed-phase (RP) HPLC. **Results:** The rate of in vitro release of decapeptide from gum formulation containing xylitol (sweetening agent) was ~ 40% and 65% over 30 and 60 minutes of chewing, respectively. The incorporation of CPC blended with other components in the gum base decreased the in vitro release of KSL (W) by 10% and 30% over 30 and 60 minutes of chewing, respectively. Addition of CPC to the gum base separately from the other components enhanced the in vitro release of KSL (W) from 30 to 65% over 30 minutes of chewing time. A chew-out study showed that the presence of abrasive agents (calcium carbonate, calcium phosphate, and colloidal silica) in the gum formulations increased the release of the decapeptide, ~ 93-98% in a sustained manner over 30 minutes of chewing. On the other hand, formulations containing sodium bicarbonate as abrasive agent showed lesser in vitro and chew-out release rate of the peptide, ~ 17% and 74%, respectively, over 30 minutes of chewing time. **Conclusion:** The in vitro and the chew-out release studies suggested that KSL (W) is suitable for the delivery in the oral cavity, thereby serving as a novel antiplaque agent. The addition of CPC separately from the other components improved the consistency and taste of gum formulations. The calcium carbonate and calcium phosphate appear to be promising abrasive candidates in the gum formulation.