**Taste Sensor Assessment of docusate sodium: a case study with novel medicated paediatric lollipops** **to manage constipation**

**Xiunan Li1**, Catherine Tuleu1, Hend Abdelhakim2.

1 School of Pharmacy, University College London, London, UK;

2 Global Business School for Health, University College London, London, UK.

**Background and aims.** Medicated lollipops could be an attractive paediatric dosage form due to their ease of use, improved compliance, and suitability especially for on-demand therapies1. However, they face limitations such as imprecise dosing when not fully consumed, sugar content, and restrictions in incorporating thermosensitive or intensely aversive active pharmaceutical ingredients (APIs). To address these issues, this study explores a novel strategy: a sugar-free lollipop partially coated with a rapidly disintegrating polymeric film containing an API dose. Presently, this concept was applied to docusate sodium (DS), a laxative for the management of constipation. Polyethylene glycol (PEG) was selected as the film-forming polymer. Although DS is deemed bitter and unpleasant2, there is no quantitative taste data available. Therefore, this study aimed at 1) characterizing the taste profile of DS using an electronic tongue (E-tongue) and 2) exploring the potential for taste masking of DS via polymer-based partial coating strategies.

**Methods.** DS at varying concentrations and formulations containing sucralose with/ without PEG 1450 (**Table 1**) were evaluated using the INSENT taste sensing system TS-5000Z, equipped with lipid membrane sensors: three bitterness sensor (BT0, AN0, C00) and astringency sensor (AE1). Analysis of variance was performed on the mean sensor outputs to assess the results.

**Table 1. Samples evaluated by INSENT E-tongue.**

|  |  |
| --- | --- |
| **F1** | 2.5 mg/mL DS + 0.25 mg/mL sucralose |
| **F2** | 2.5 mg/mL DS + 0.50 mg/mL sucralose |
| **F3** | 2.5 mg/mL DS + 0.75 mg/mL sucralose |
| **F4** | 2.5 mg/mL DS + 0.25 mg/mL sucralose + 30mg/ml PEG 1450 |
| **F5** | 2.5 mg/mL DS + 0.50 mg/mL sucralose + 30mg/ml PEG 1450 |
| **F6** | 2.5 mg/mL DS + 0.75 mg/mL sucralose + 30mg/ml PEG 1450 |

**Results.** C00 and AE1 sensor outputs confirmed a dose-dependent response to DS (**Figure. 1**), consistent with its anionic surfactant properties and C00 sensor’s sensitivity to anionic bitterness. The sensor output suggested that DS is bitter and astringent in a clinical setting. At 2.5 mg/mL (*0.56 mM; commercial paediatric oral solution streng*th), DS exhibited pronounced bitterness and astringency, which were only slightly reduced by sucralose alone (p > 0.05). In contrast, the combination of sucralose with 30mg/mL PEG significantly reduced bitterness (p < 0.05) and completely masked astringency (p < 0.05). (**Figure. 2**)



**Figure 2. Bitterness and astringency sensor output for all formulation compared to 2.5 mg/mL of DS in water.**



Figure 1. Mean sensor output of DS

**.**

**Conclusion.** The PEG-sucralose mixture demonstrated a strong taste-masking potential to optimize acceptability of DS for constipation. Confirmation with human panels is warranted.

# **References:**

# 1. Sangle et al. (2023) A review on medicated lollipop: A novel dosage form. Int J Sci Res Arch. DOI: 10.30574/ijsra.2023.8.2.0304

2.Hannoodee et al. Docusate. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2025 Jun 19]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK555942/ PMID: 32310402