Oral malodour: Masking or fighting by commercial candies. Investigation by PTR-ToF-MS

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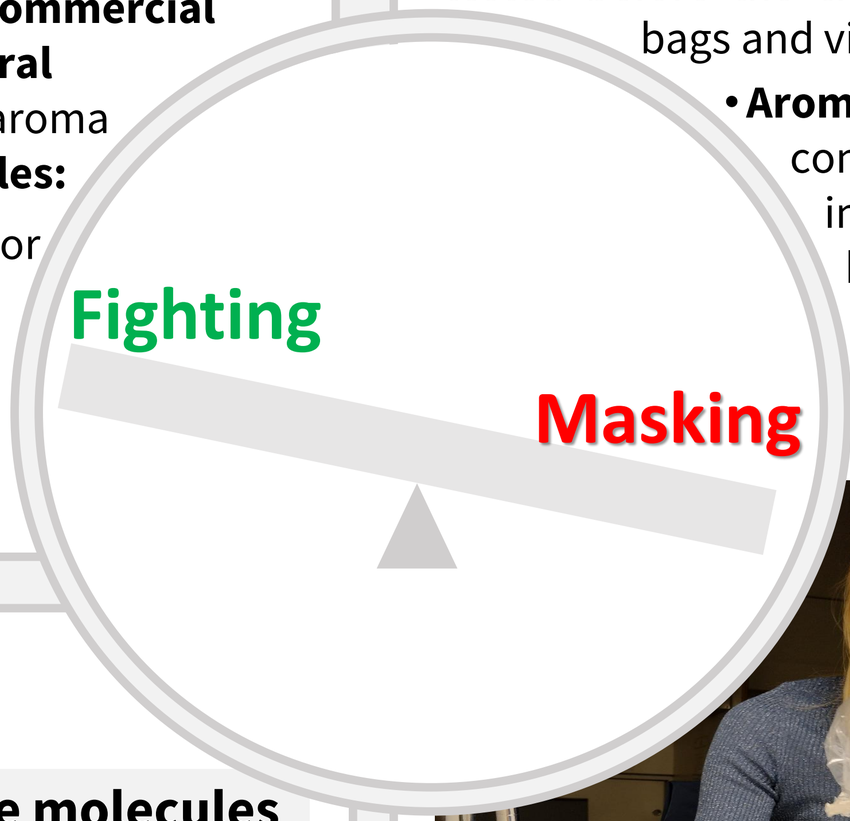
1. Background

Oral malodour is an unpleasant odour emanating from human breath caused by several groups of compounds mainly containing sulfur. Proton-transfer-reaction mass spectrometry (PTR-MS) was recently applied for fast analysis of exhaled breath without sample preparation.

2. Matherials & Methods

•The protocol evaluated the actual effect of **commercial sugar-free breath candies** with a claim for **oral malodour reduction** based on **masking** by aroma compounds or by **addition of active molecules:**

1. Without mint flavour nor active molecules
2. Mint flavor
3. Active molecule 1
4. Active molecule 2



• Different sampling methods to capture aroma release were tested before the experiment: direct injection, Nalophan® bags and vials.

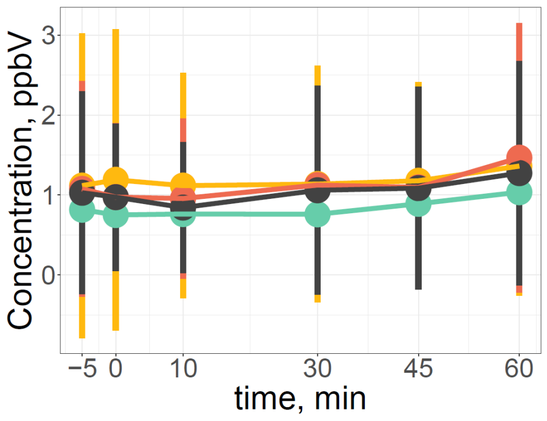
• **Aroma release** before and after the consumption of breath candies was investigated by collecting exhaled breath from **29 participants** in disposable **Nalophan® bags** at six time points (**-5, 0, 10, 30, 45,** and **60 min**) and immediately measured by a commercial **PTR-ToF-MS 8000** Ionicon, Innsbruck, Austria).

•The experiment consisted of **four different sessions** with at least one day in between. In each session, participants took one type of candy **(mean weight 0.75 gr x 3**) and let them melt in their mouth, after which their exhaled breath was measured.

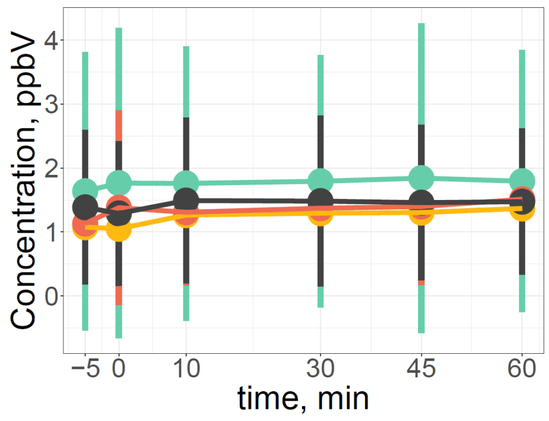
3. Results

No effect of mint flavour or active molecules

CH_4SH^+ /t.i. Methanthiol

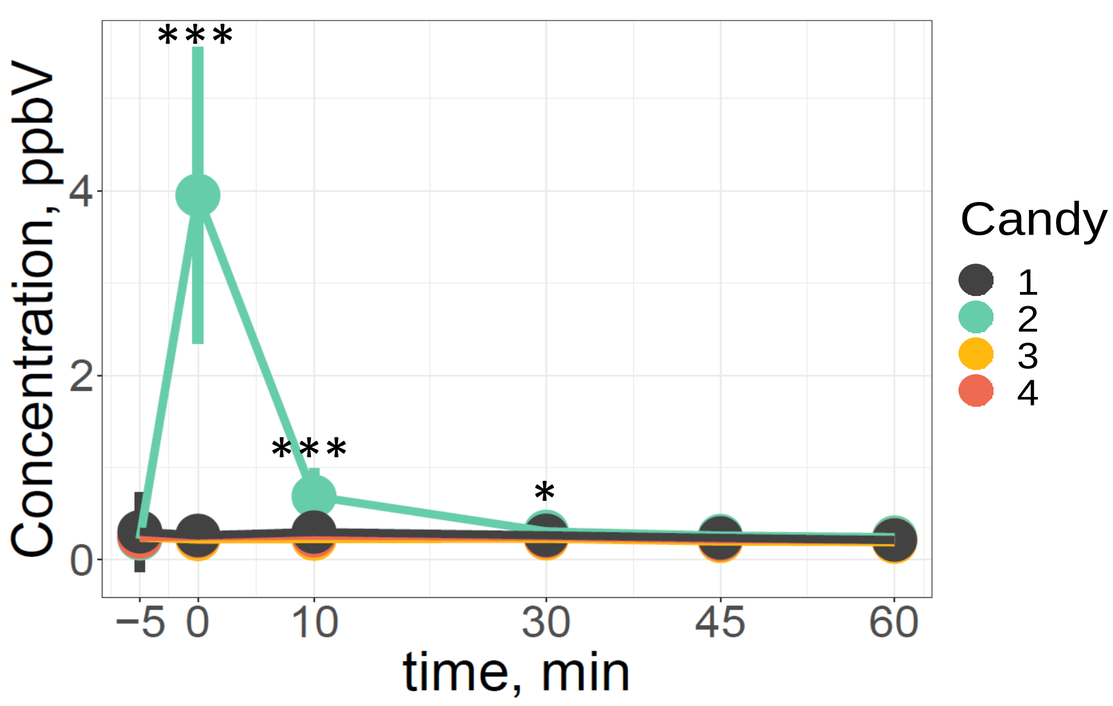


$C_2H_6SH^+$ /t.i. Dimethyl sulfide



Effect of mint flavor for 30 min after candy consumption

$C_{10}H_{17}^+$ /various monoterpenes



Mean concentration and standard deviation of aggregated data (n=29)
** - the level of significance according to repeated measures ANOVA test (p<0.01)*

4. Conclusions

• A protocol using Nalophan® bags over direct sampling was preferred for the efficient screening of oral malodour because it showed good signal stability over time, and it complied with Covid related restrictions.

•The claim of oral maloudor control of different commercial breath candies was examined:

✓**Masking effect** by aroma compounds can be present for **ca. 30 minutes**.

✓**No active control** of **breath sulfur compounds** was observed.

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