

A “MOUTHFEEL WHEEL” TERMINOLOGY FOR COMMUNICATING THE MOUTHFEEL ATTRIBUTES OF MEDICAL NUTRITION PRODUCTS (MNP)

Camille Corbier¹, Annelies Van de Stelt¹, Phiala Mehring², Elise J.M. van Eijnatten¹, Caroline Withers³

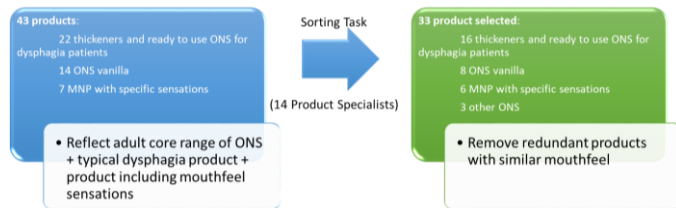
¹Danone Nutricia Research, Nutricia Advanced Medical Nutrition, Utrecht, The Netherlands, ²Sensory Science Centre, MMR Research Worldwide Ltd, Whiteknights, Reading RG6 6UR, UK, ³MMR Research Worldwide Ltd, 104-110 Crowmarsh Battle Barns, Preston Crowmarsh, Wallingford, Oxfordshire OX10 6SL, UK

INTRODUCTION

Product texture and mouthfeel contribute significantly to product perception and appreciation (1). For **medical nutrition products (MNP) mouthfeel also contributes to both swallowing efficiency and safety (2)**, therefore impacting the nutrition (3) and fluid intake of individuals in need of adapted textures (e.g. dysphagia patients). The need for **international terminologies in a medical context** has been expressed through several initiatives. Main reason for this was the inconsistency in mouthfeel terminology usage per country and care provider, which is especially important for preparing and selecting a safe and acceptable MNP for specific individuals. However, **typical mouthfeel language is not specific for MNP**, making it challenging to develop and communicate about optimal products for individuals in need of adapted textures (4). Therefore, the objective of the current study was to: **Develop a hierarchically structured vocabulary of mouthfeel attributes elicited by MNP.**

METHOD

PRODUCT SELECTION:



PRODUCT ASSESSMENT:

The assessment was done by an Expert Panel consisting of 11 trained sensory experts (females; between 35-65yrs) with minimum 4 years' experience.

PROTOCOL:

At the start of each product evaluation the palate was cleansed with warm water and crackers. Each product was:

- presented in 15mL aliquots with random 3-digit codes and served at ambient temperature
- poured or spooned into the mouth (dependent on consistency)
- manipulated in the mouth to assess body and then held for 4 seconds to enable other mouthfeel attributes to be assessed
- swallowed and aftereffects were assessed immediately and after 60 seconds

PROCESS:



DATA ANALYSIS:

Individual **cophenetic distance matrices** were generated from the sorting task. The average distance matrix was submitted to a nonmetric **Multi-Dimensional Scaling (MDS)** to produce a three-dimensional sensory space which shows distances between terms based on the differences between the perceived mouthfeel and texture.

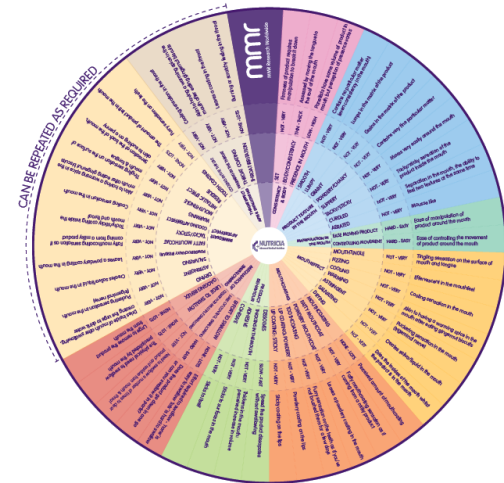
Agglomerative Hierarchical Cluster analysis was performed using Euclidian distance (6) with Ward's method as the aggregation criterion to check the subgrouping of the categorical terms.

RESULTS

The mouthfeel and texture of 33 MNP were described by 51 mouthfeel attributes clustered in 9 umbrella terms:

- **Consistency/ Body:** some products have a set consistency and are thick in the mouth whilst others may be unset and liquid.
- **Product texture in the mouth:** whether the product is, for example, grainy, sticky or powdery in the mouth (pre-swallowing).
- **Manipulation in the mouth:** the nature of the products determines how easily it is to manipulate in the mouth.
- **Mouth effect:** impact of the product on the palate: warming, cooling, drying, etc.
- **Mouthcoating:** various products leave different coating sensations in the mouth; fatty, powdery or coating the teeth, etc.
- **Product behavior:** after 60 seconds and after cleansing the palate with water. This set of post swallowing effects can be evaluated at different time points (temporal impacts on the mouth and throat).
- **Mechanics of swallowing:** viewed through the lens of the trained sensory panelists. Linking this category to patient's information will enable the impact of the functionality of these products to be evaluated.
- **Immediate aftereffect:** after 60 seconds and after cleansing the palate with water. This set of post swallowing effects can be evaluated at different time points (temporal impacts on the mouth and throat).
- **Throat effect after swallowing:** after 60 seconds and after cleansing the palate with water.

A Mouthfeel Wheel showing a hierarchical representation of umbrella terms and mouthfeel attributes that can be used to describe the mouthfeel characteristics of MNP



CONCLUSION

This structured vocabulary should assist expert panels, Health Care Professionals, care givers, individuals in need of adapted textures (e.g. dysphagia patients), chefs, food technologists and sensory scientists in their interpretation and use of **terminology** related to mouthfeel of MNP.

Ultimately this mouthfeel wheel should be used as a **communication tool** between parties aiming to improve, select and/or develop MNP with **optimal mouthfeel characteristics** for medical nutrition users.

As a next step, combining this language with physicochemical measurements and sensory profiling with hedonic and safety and/or comfort testing with pre-selected target groups should help to **increase understanding** on how to **improve targeted textural products** for end users.

REFERENCES

- (1) Foster et al., 2011; (2) Boylston, Ryan, Brown, & Westfall, 1996; (3) Cichero et al., 2017; Dunne & Dahl, 2008; (4) Chen & Rosenthal, 2015; Varela et al., 2013; (5) Withers et al., 2014; (6) Courcoux et al., 2012.