

Sensory characterization of marine oils and development of a sensory lexicon and aroma wheel

W. E. Larsen^{*1}, E. Monteleone², M. Hersleth³.

¹Møreforsking, Ålesund, Norway, ²Dep. of Agricultural Biotechnology, University of Florence, Italy., ³Nofima, Ås, Norway.

^{*}Corresponding address. , PO box 5075, N-6021 Ålesund, Norway

What is the characteristic taste of a marine oil, and does the taste correspond with the product quality?

The Omega-3 industry has standardized methods for analyzing the chemical quality of consumer oils, but lacks a defined methodology and a vocabulary for evaluating the sensory quality. This study was conducted to define the sensory characteristics of marine oils, and to organize them for use as a tool in quality assessment.

Material and method

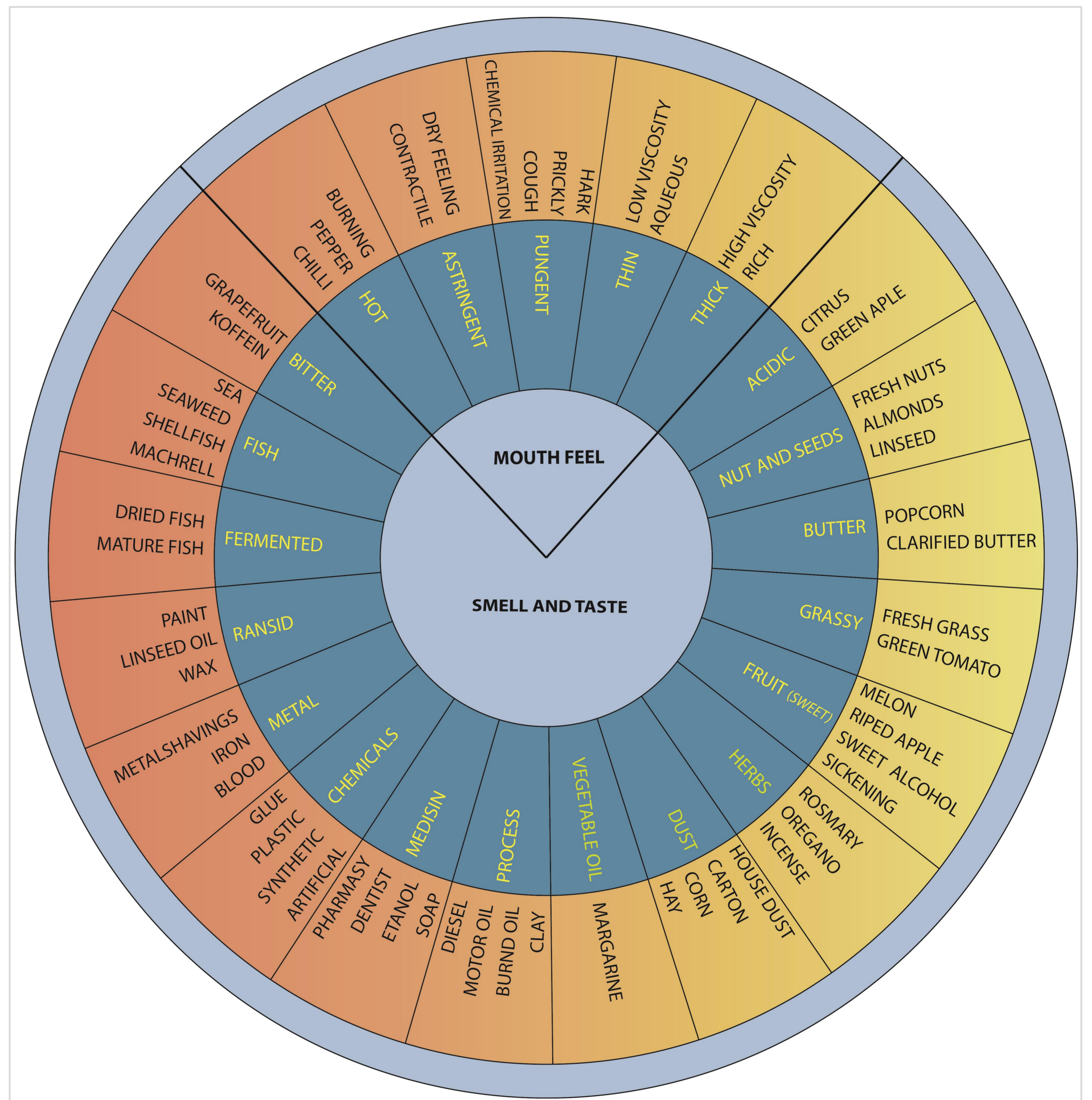
Samples of marine oils were collected from six of the largest producers of omega-3 products in Norway. The oils were collected to capture as much variation in sensory characteristics as possible, i.e. had different fatty acid content and were originating from different fish species and squid.

Altogether 44 samples were evaluated by a professional sensory panel using descriptive analysis. In addition, oils with specific qualities were tested and evaluated by experts from the industry.



Result

A total of 184 aroma and flavor, taste and mouthfeel descriptors were generated. PCA plots showed a high correlation between the smell and taste descriptors and were therefore grouped together. A marine oil sensory lexicon was created by selecting 60 of the descriptors and grouping them together in 21 defined categories. Flavored references were developed for 12 of the categories. An two-tiered aroma wheel, comprising of the 21 categories and 60 descriptors, was created to form a graphical presentation of the sensory lexicon. In addition two main groups are



dividing the categories into “mouthfeel” and “smell and taste”.

Chemical analysis on a selection of the oils has contributed to the understanding of different sensory features. The oils had mainly a low oxidation state and only 4 oils exceeded the GOED (Global Organization for EPA and DHA Omega-3) recommendations.

There is a positive correlation between primary and secondary oxidation products and sensory properties as *rancidity*, *chemical flavour* and *process flavour* and a negative correlation

between primary oxidation products and the *sourness*.

Conclusion and further work

The sensory lexicon and aroma wheel will be a tool for the expert assessors in their quality control and this study was a first step towards standardizing the sensory terminology of marine oils.

Correlation between the main categories and descriptors in the aroma wheel will be investigated further.

Acknowledgement

This work was a part of the project «Sensory quality on Omega-3 oils» funded by Møre og Romsdal County. The work has been conducted in cooperation with six marine oil producers, BASF Brattvåg AS, Berg LipidTech AS, Denomega AS, Epax Norway AS, GC Rieber Oils AS and Pharma Marine AS.

