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# Investigations of the perception of taste and smell: possible future applications of NMR relaxometry

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For many years the research of taste perception and food preferences are conducted in DBBS. Recently, also the perception of olfactory sensations is studied.
We are looking for the factors affecting the different perception of the same stimulus as well as factors that could improve the quality of taste and olfactory sensations in the case of their disorders.
In a paper published recently (*Hartman-Petrycka M et al. Alterations in taste perception as a result of hyperbaric oxygen therapy. Appetite (2016), doi: 10.1016/j.appet. 2016.08.004*) we found that in patients undergoing hyperbaric oxygen therapy (HBOT) because of non-healing wound - in addition to improving wound healing - reception of taste sensations get better. The improvement of taste reception had become the cause of reducing demand for eating sweet desserts, chocolate and crisps after the application of HBOT.
Based on our earlier experience including the results presented above, we suppose that NMR relaxometry could be applied in study of HBOT's influence on the molecular dynamics of serum blood components. This could help to understand the mechanism of influence HBOT on the organism, especially on the perception of taste and smell, regulation of food intake, metabolism and regenerative processes.

NMR relaxometry could also enrich our knowledge about physiology of chemical senses by evaluation molecular dynamics of flavours and fragrances, as well as about the influence of their dynamic condition on sensory organs.
It is well known, that taste perception is affected on physicochemical properties of food, such as temperature, texture, appearance, etc; for example: cold ice cream has a nice taste, but melted ice cream is too sweet and not very tasty. NMR relaxometry could evaluate the molecular dynamics of ingredients in mixture and in fluids depending on the temperature, composition, additives.

Olfactory sensations are as important as taste sensations for the quality of human life. Flavour ingredients are used in the food industry as well as in pharmacy, aromatherapy and cosmetology.
Essential oils are commonly used as fragrances. For health reasons it is very important to use the highest quality essential oils. However, they are expensive and are often falsified. Furthermore, they are used in small concentrations, and it is important to dilute them in appropriate media. NMR relaxometry could be useful to detect counterfeit and contaminated essential oils as well as to select the best medium.
The other important aspect of application of NMR relaxometry could be determination the molecular traits of the aging of food ingredients, pharmaceuticals and cosmetics to improve the quality and safety of products.