

New Momentum in Healthy Nutrition: A Proposal for a Nutrient-Energy Density Score Concept

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Abstract

Life expectancy is increasing globally however later life years are often connected to ill-health. One of the reasons is that non-communicable diseases (NCDs) are on the rise and societies face challenges in a continuous increase in the global prevalence of overweight and obesity. This is partly due to the sedentary lifestyle and a trend to processed foods with the availability of cheap and high energy dense foods combined with large portion sizes. As a consequence a major part of the world population has an inadequate and too high intake of energy and in parallel a too low intake of essential nutrients like vitamins and minerals. There is substantial evidence for a link of lifestyle factors and the risk for NCDs, like osteoporosis, diabetes, cardio-vascular disease, cancer and others. The introduction of nutrient profile scores and indices for energy may help consumers in their food choices and allow food companies to design and promote healthier food items. The goal is to use a nutrient-energy density score to rate food products based on their nutrient and energy profile. The consumer can use the system as a "nutritional navigation system" to make informed choices and optimize the diets. The proposed approach provides a win-win situation for the consumer for long term health and the food industry for new and innovative food items.

Keywords: Nutrient-energy density; Healthy nutrition

One of humankind's most remarkable health-related achievements is increased life expectancy. In almost every country worldwide over the last century, lifespan increased considerably and still continues to increase. However, for many people this gain in life years may not be a gain in years of healthy life too, since one or more prolonged illnesses frequently dominate the last one or two decade of life. Furthermore, various non-communicable diseases (NCDs) are on the rise and societies face challenges in a continuous increase in the global prevalence of overweight and obesity [1-5]. Besides the sedentary lifestyle and the urbanized obesogenic environment, good taste, availability, and affordability of energy-dense/nutrient-poor food items, in combination with large portion sizes and low satiating power, may be the main reasons for overeating and consequent weight gain. In parallel, the majority of the world's population has inadequate intake and status of one or more of the essential vitamins and minerals [5-7].

There is substantial scientific evidence to link different lifestyle factors, including high consumption of energy-dense/nutrient-poor foods to overweight, obesity and NCDs like osteoporosis, diabetes, cardio-vascular disease, cancer and others. These conditions not only detrimentally affect individual health and well-being, but their higher prevalence and chronic nature place heavy economic burden on the society as well. Actually the great majority of premature deaths due to certain NCDs could be prevented via modifiable lifestyle factors such as nutrition and physical activity [7-10]. The challenge is to understand better how nutrition modulates health and to identify, develop and implement nutritional solutions which promote a healthy life. In our time plenty of food choices are available, including a variety of processed foods, which tend to be energy-dense and nutrient-poor. Currently consumers have to make food-related decisions with very little insight on the interpretation of energy and nutrient composition of different food items. Furthermore, the average consumer has limited knowledge on how diet impacts health. As a consequence, people generally consume too many calories and at the same time do not get the optimal amount of essential nutrients like vitamins, carotenoids, polyunsaturated long chain fatty acids, amino acids and minerals. However, recently there is an increasing interest among consumers to choose the healthiest foods available [10-13].

As nutrient profiling of foods is rapidly becoming the basis for regulating nutrition labels, health claims, and marketing activities,

a number of models and scoring systems have been developed by researchers, regulatory agencies, and by the food industry. Some of these tools have focused on nutrients to limit, others have emphasized nutrients with health benefits, or some others combined both. Nutrient profile models are often tailored to specific goals and include the Nutrient Adequacy Ratio (NAR), the Nutrient Quality Index (NQI), the Natural Nutrient Rich Index (NNR) and the Calories-For-Nutrient Score (CFN). Their development should cover the selection of index nutrients and reference amounts, the development of an appropriate algorithm for calculating nutrient density, and the validation of the chosen nutrient profile model against healthy diets. However, these food rating systems obviously focus on individual foods without taking into account different meals, menus or the diet. The Nutrient Rich Food Index (NRF) is a comprehensive and validated food guidance system which can be also applied to food groups, meals, menus or total diets. Use of nutrient profile scores and indices may help not only consumers in their food choices, but also allows food companies to design and promote healthier food items. Considering the beneficial impact of a nutrient dense/low energy diet on health, the nutrient density approach can be a valuable tool also in health education and dietary guidance. Despite the above, none of the nutrient profile models made it into a broader application [13-16].

Considering the importance of this approach, it is now proposed to develop further one of the existing scores (Nutrient Rich Food Index, NRF), in order to make it more applicable by the food industry and to directly help consumers to follow diets which provide adequate energy and nutrient intake. The NRF9.3 system has been already positioned within the broader context of dietary education and guidance and is being applied to studies of affordable nutrition, food preferences,

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and perceived value for money. Enabling food producers to optimize their products and services through the nutrient-energy ratio and by reducing the amount of certain ingredients, would be a major step forward along the road to good nutrition [15]. This approach, that takes behavioral nutrition and the economics of food choice into account, could hold the key to tackle both over- and under-nutrition issues worldwide. The nutrient-energy density concept should have further implications also for nutritional policy making, nutrition labels, health claims, and marketing [17].

However, translating the concept of nutrient-energy density into healthier everyday dietary habits requires the combination of nutrient profiling methods with other strategies. The goal to develop nutrient-enriched products that bridge deficits in consumers' diets is proposed to be approached via two steps:

1. Further science-driven development of an existing nutrient-energy density score (NRF) to rate current or future food products based on their nutrient and energy profile. This will be used as a "nutritional navigation system" for both food producers to optimize their products, and for consumers to make informed choices and optimize their diets.

2. Development of a "food and nutrition map" as tool for communication and for advocacy to translate and transfer nutrition information in a way that is both useful and valuable to the consumer.

The next concrete step is to bring together academia, regulatory bodies, consumer organizations and industry partners to develop and agree on an optimized nutrient-energy density approach and initiate a developmental process and its implementation.

Conflict of Interest

The authors are employed by DSM Nutritional Products, a bulk supplier of nutritional ingredients.

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