Personalised Nutritional Powder for Elderly Developed in OPTIFEL European Project

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Abstract. A personalized nutritional powder for elderly containing minerals and vitamins was developed by CENTIV GmbH for further applications in the FP7 European OPTIFEL project by designing and processing of novel food products such as nutrient dense smoothie products. The amount of the powder used for each person, in each product, is calculated using a food calculator, which was developed within the same FP7 European OPTIFEL project, named OPTIFEL Personalised Nutritional Calculator. The personalized nutritional powder consisting of several minerals and vitamins, has been agglomerated in a Fluid Bed Dryer using maltodextrin as carrier, in order to obtain a higher solubility, homogenization of all the nutrients, a desired supplement with a neutral taste, free of color and which can be added in any drinks or food matrix for enrichment in a certain concentration. It will not influence the final taste and has great solubility. Developing innovative food and services tailored to elderly populations is a new challenge for key players involved in food industry and catering. The population targeted by the OPTIFEL project is elderly cooking at home or making use of meal-on-wheels services for whom the project will develop food products adapted to their taste, habits, needs and constraints.

Keywords: elderly, enriched nutritional powder, fluid bed drying, personalised food

Introduction. Elderly people are a target group with specific needs regarding food safety, nutrients, texture, taste and convenience. This group is not homogeneous and processed meals will have to be adapted. Nowadays, food science provide solutions in terms of formulation, processing and packaging to offer a safe food product based on fruits and vegetables and to adapt the texture, taste and convenience to this target group. The European population has been ageing since the 50s and prospects show that this trend will be increasing in the next decades with a peak in 2040 (EC, 2011). EU Parliament highlights estimates that show that 40% of patients in hospitals and between 40 and 80% of people in elderly care homes are malnourished (EU Parliament resolution, point 44 & point z, 2011). The absorption of nutrients changes during aging. Only vitamin A and C absorption is slightly increased while that of carbohydrates, proteins, fat, calcium, vitamin B12, pantothenic acid and folic acid is reduced. (Pathy et al., 2006). The elderly nutrition is characterised by a certain number of deficiencies – notably but not exclusively B6 and B9 vitamins, calcium and proteins– mainly due to decreased food intake, which takes it origin in appetite loss due to a combination of several factors (Ferry et al., 2007). By contributing to design a new generation of varied and tasty fortified food products adapted to their needs, taste, and physical capacities, the elderly’s quality of life will be highly improved. The European FP7 OPTIFEL project “Optimised Food Products for Elderly Populations” is coordinated by the National Institute of Agronomic Research (INRA) France (http://www.optifel.eu/the-project/), 26 European public and private partners including leader industries and SMEs.

Aims and objectives. The European OPTIFEL project “Optimised Food Products for Elderly Populations” aims to develop innovative products
based on vegetables and fruits for elderly populations to increase length of independence. One of its objectives is the preparation of novel functional and/or innovative liquid food products (fruit beverages, smoothies, soups) fortified with: dietary fiber (soluble fiber), proteins and/or mineral-vitamin powder. Therefore, a personalized nutritional powder for elderly containing minerals and vitamins was developed by CENTIV GmbH for further applications in OPTIFEL project by designing and processing of novel food products such as nutrient dense products.

Materials and methods. The personalized supplement powder was designed in accordance with elders’ nutritional needs and consists of several vitamins and minerals. All the raw materials have been agglomerated in a Fluid Bed Dryer in order to obtain a higher solubility and homogenization of all the nutrients. It can be easily dissolved in liquids. Different polysaccharides were tested with respect to their ability as good carriers. Maltodextrin as a “nonsweet” nutritive saccharide polymer has shown to be a very good carrier, as by controlling the various factors, it is possible to control the degree of hydrolysis, and obtain a consistent product.

Results and Discussion. The minerals and vitamins powder (MV) developed is a food supplement with a neutral taste, free of color and which can be added to any drink or food matrix for enrichment in a certain concentration. It will not influence the final taste. Agglomeration of the targeted vitamins and minerals with maltodextrin helped ensure uniform distribution of small amounts of ingredients in the final mix powder. The amount of the powder used for each person, in each product, is calculated using a food calculator, which was developed within the same FP7 European OPTIFEL project, named OPTIFEL Personalised Nutritional Calculator (http://www.centiv.de/calculator/, Bethke et al., 2016). Several OPTIFEL products were enriched with the developed minerals and vitamins powder, as it follows: the apple base purée developed by project partner IRTA (Institut de Recerca i Tecnologia Agroalimentaries) from Spain (Guàrdia et al., 2016; Picouet et al., 2016), and the “Nutrient dense” apple smoothie developed by project partner Instytut Ogrodniczta from Poland.

Conclusion. Foods for elderly should contain enough nutrients – in relation to nutritional recommendations and actual portion size and number, on daily or weekly basis. Fortification is recommended for all products intended for meals-on-wheels services, nursing homes, hospitals, because malnutrition and risk of malnutrition are common. The minerals and vitamins powder developed is an innovative way of enrichment based on a personalized supplementation due to its direct correlation with the OPTIFEL Personalized Nutritional Calculator.

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