

POTENTIAL BENEFITS OF A NEW FORM OF FOOD FOR AN AGING POPULATION

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Recibido: 08-05-2022 / Revisado: 11-05-2022 / Aceptado: 14-05-2022 / Publicado: 20-05-2022

RESUMEN

Beneficios potenciales de una nueva forma de alimentación para una población envejecida

La población mundial está creciendo rápidamente. Según las nuevas proyecciones, las personas de 65 años o más son el grupo de edad de más rápido crecimiento y para el año 2050 habrá el doble de personas mayores que en la actualidad. El envejecimiento generalmente se caracteriza por cambios fisiológicos, algunos de los que afectan la ingesta de alimentos, los hábitos alimentarios, la selección, preparación y consumo de alimentos. Los cambios relacionados con la edad en la anatomía del cuello y cabeza, flujo salival y disminución de la actividad muscular, entre otros, pueden provocar dificultades para tragar. La elección e ingesta de alimentos también se ven afectadas por cambios patológicos que ocurren en el contexto de enfermedades relacionadas con la edad, como trastornos gastrointestinales, cardiovasculares, inflamatorios, cognitivos, cáncer, diabetes y problemas dentales, entre otros. Los cambios en los mecanismos de deglución conocidos como presbifagia, disfagia, sequedad de boca o xerostomía, hiposalivación, dismasesis y sarcopenia son términos asociados con las dificultades para la ingesta de alimentos. Hoy en día existe la necesidad de desarrollar nuevos alimentos con texturas modificadas que no expongan a los ancianos al riesgo de aspiración de alimentos, atragantamiento y asfixia. Dado que el bolo ideal y seguro para las personas mayores es húmedo y resbaladizo, los geles comestibles representan un alimento muy prometedor para garantizar un aporte adecuado de nutrientes y energía. Sus propiedades tecnológicas facilitan la incorporación de sustancias bioactivas, creando así un sistema alimentario con efecto protector en el envejecimiento, así como en la prevención y manejo de enfermedades relacionadas con la

edad. En el presente trabajo, se tratarán los retos y tendencias de la industria alimentaria asociados a este tema.

Palabras clave: envejecimiento de la población, ancianos, alimentos de textura modificada, gel comestible.

ABSTRACT

The world population is growing rapidly. According to the new projections, people aged 65 and over are the fastest-growing age group and by the year 2050, there will be twice as many seniors as there are today. Aging is generally characterized by physiological changes, some of which affect food intake, eating habits, food selection, preparation, and consumption. Age-related changes in the neck and head anatomy, salivary flow, and decreased muscle activity, among others, can lead to swallowing difficulties. Food choice and intake are also affected by pathological changes that occur in the context of age-related diseases, such as gastrointestinal, cardiovascular, inflammatory, cognitive, cancer, diabetes, and dental problems, among others. Changes in swallowing mechanisms known as presbyphagia, dysphagia, dry mouth or xerostomia, hyposalivation, dysmasesis, and sarcopenia are terms associated with food intake difficulties. Nowadays, there is a need to develop novel food with modified textures that do not expose the elderly to the risk of food aspiration, choking, and suffocation. Since the ideal and safe bolus for the elderly is moist and slippery, edible gels represent a very promising food to ensure adequate nutrient and energy intake. Their technological properties facilitate the incorporation of bioactive substances, thus creating a food system with a protective effect in aging, as well as in the prevention and management of age-related diseases. In the present work, challenges and trends in the food industry associated with this topic will be discussed.

Keywords: aging population, elderly, texture modified food, edible gel.

It is an undeniable and well-known fact that our population is growing rapidly. First time in history, people aged 65 and over are the fastest-growing age group in the world and the number of people in this age group is projected to double by 2050. It means, that in the year 2050 one in six people in the world will be over 65 years old. In 2020 the number of people over 60 was 723 million, by 2030 this number is projected to reach 1.4 billion, while in 2050, is forecast to reach 2 billion. Life expectancy is also increasing, and it is estimated, that by 2050, people will live on average 5 years longer than today.

Older populations can make multiple contributions to communities, families, and society, but an aging society can also affect economic growth, patterns of work and retirement, families, healthcare systems, and the government's ability to provide adequate resources, among others. Ensuring health and so-called healthy aging is now more important than ever as our society is aging. But as we know, this is not an easy task because health is determined by many factors and one of them is nutrition. Among the elderly, nutrition is an important element of health that affects the whole process of aging. Nutritionally wholesome foods are not just a requirement, but a necessity. But what happens when food consumption is affected, and people cannot receive enough nutrients or energy? People's health, social status, and overall quality of life are influenced. This is very common in older age, as with aging food consumption is commonly affected by the physiological and pathological changes that often occur with aging.

Chewing problems are commonly caused by the loss of teeth. Dysmastication or difficulty chewing due to tooth loss is common in older adults, especially those in low-income groups. Another very common cause of chewing problems in the elderly is a decrease in tongue pressure and jaw-opening force. Swallowing function is also affected, and the oral preparation of food requires more time due to a decrease in muscle mass and tissue elasticity. The beginning of age-related changes that affect swallowing functions is called presbyphagia and it represents changes in the swallowing mechanism in healthy older people. Dysphagia or swallowing disorder is simply defined as a disorder of swallowing safety and can cause malnutrition and morbidity by aspiration pneumonia. Age-related diseases, such as stroke and dementia are significant risk factors for the development and severity of dysphagia. A decrease in salivary flow (hyposalivation), leading to dry mouth (xerostomia), is common in older people. People who suffer from xerostomia or hyposalivation are at a bigger risk of dental caries, tooth loss, oral infections, and periodontal disease. These conditions also affect nutritional status, eating habits, speech, and taste. Some age-related diseases can also

affect food consumption or lead to specific dietary requirements, such as cardiovascular disease, hypertension, cancer, chronic obstructive pulmonary disease, osteoarthritis, osteoporosis, diabetes, dental problems, depression, dementia, and a combination of chronic diseases, among others.

As a result of these pathological or physiological problems, the food and nutritional requirements of the elderly have increased. There is now a need to develop new foods with a modified structure that do not expose the elderly to the risk of aspiration, choking, and suffocation. A core challenge for the food industry is to provide the elderly with safe, nutritious, and healthy food with soft texture, that is tasty and delicious. Edible gels have a soft texture, and structural stability, and are affordable, biocompatible, and biodegradable, they represent a promising food form for the elderly not only as an additive for texture/viscosity modification but also as a stand-alone food. The benefits of gel as a stand-alone food are not only in soft and stable texture that is safer for the elderly but also gel microplates represent an ideal material for encapsulation and targeted delivery. Therefore gels can be used to develop foods containing bioactive or other compounds that can help protect people from serious age-related diseases as they have antioxidant, anti-inflammatory, anticancer, and immunomodulating activities. Designing foods with textures suitable for seniors and containing bioactive ingredients may be a promising contribution/strategy to the aging population to improve human nutrition and health.

A new form of food usually involves fear in people, but gels are not new to the food industry, they have been used for years. A number of foods are marketed in a gel form that offers convenience to the consumers e.g. desserts, jam, jelly, confectionery products, and sport-energy gels, among others. Food gels also have a key role to play in modern food design, for example, in structuring foods with desired sensory texture, preservation of the food's sensory characteristics, increasing shelf life, replacing fats, and designing 3D food shapes.

Analyses such as texture profile analysis, rheological and viscosity measurements, syneresis, scanning electron microscopy, differential scanning calorimetry, and stability studies, among others, can be performed to characterize the technological properties of the gels produced. One important analysis that needs to be conducted to analyze the quality of edible gels is sensory analysis. In order to develop an edible gel that would be accepted and used by consumers, research needs to be conducted on the preferences and opinions of seniors. This can be achieved through consumer sensory analysis, most specifically through qualitative methods such as focus groups and interviews. Since up to 80 % of our decision-making is based on emotion, consumer neuroscience can be used to determine consumers' preferences or opinions more accurately about a product. Electroencephalography (EEG) is a technique for recording electronic activity.

Electrodes are applied to the scalp to measure changes in the brain's electrical field. EEG is used to detect customer preferences. Microemotions, such as happiness, sadness, anger, disgust, surprise, and neutral emotions of consumers can be measured based on uncontrolled facial expressions and mimic elements while tasting the samples. This can be achieved via Face Reader.

CONCLUSIONS

Edibles represent a promising new form of nutrition for a growing segment of our population, e.g. seniors. They have properties suitable for the elderly and can ensure safe food consumption as well as the treatment and prevention of age-related diseases, thanks to the possibility of incorporating relevant bioactive substances.

ACKNOWLEDGMENTS

This work was supported by the Slovak Research and Development Agency under Grant No. APVV-20-0078. "Development of edible gel-based foods and applications in a target segment of the aging population".