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Editorial

Current Approaches in Using Plant Ingredients to Diversify Range of Bakery and Pasta Products

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There is a growing interest in the industry to manufacture food products containing health-promoting nutrients and to prevent nutrition-related disorders. The addition of plant ingredients represents a valuable strategy to improve food nutritional properties, contributing to reducing nutrient deficiencies. The use of natural ingredients, composite and gluten-free flours or applying physical treatments to raw materials in the manufacture of bakery and pasta products represent a common practice. Plant ingredients encompassing polysaccharides and fibers, prebiotics and probiotics, lipids, vitamins and minerals, and antioxidants added in food recipes are of interest for both researchers and those working in the food industry. Dough, the intermediate product of baked goods and pasta, is typically made from wheat. Wheat dough presents unique and particular rheological properties that enable the bulk to be stretched and deform without breaking; it is elastic and tenacious, and able to maintain its assigned shape even when subjected to physical stress. Wheat flour is a versatile raw material due to the variable quality of wheat and the small amount of improvements needed to be added in order to obtain the desired bread quality. In this Special Issue, Vartolomei and Turtoi [1] considered the use of rosehip powder as a natural alternative to synthetic ascorbic acid in breadmaking. As stated by these authors, wheat bread with rosehip powder presented an enhanced physicochemical profile, with the volume and porosity being higher than wheat bread, while the elasticity decreased slightly. Some researchers have approached the enrichment of wheat dough bread with plant-based ingredients of high nutritional profile, such as legume flours, which contain valuable proteins related to amino acid composition, complementary to that of cereals. As an example, soybeans and lentils have been subjected to convenient processing techniques such as germination to enhance the nutritional profile of the legumes, as well their sensory profile, as investigated in this Special Issue by Ungureanu-Iuga et al. [2]. As observed in this work, the simultaneous incorporation of these germinated legume flours in wheat flour affected dough behavior during mixing, extension, and fermentation. Baked goods with high nutritive value and minimum impairment of quality can be accomplished due to the germination process.

The enrichment of bakery and pasta products with bioactive compounds and associated fibers, along with the increase in starch resistance to digestion, have gained noticeable importance, and can be considered a valuable approach regarding the enhancement of human health through the diet, knowing that starch possess a high glycemic index. One way to reduce the glycemic index of starch-based food consists of modifying flour by hydrothermal processing, which determines the increase in slowly digestible starch and resistant starch content. Another way to reduce the digestibility of starch is the supplementation of food with phenolic compounds from fruit by-products. In this Special Issue, Iuga et al. [3] provide an in-depth assessment of starch digestibility as affected simultaneously by the parameters of hydrothermal treatment and by the addition of grape peels. Polyphenolic compounds' associated fibers from grape peels and hydrothermal treatment exhibited a synergistic effect on wheat dough and pasta characteristics, reducing resistant starch content and rising fiber content, total polyphenols and antioxidant activity. At the same

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time, a clean label product was generated by using food industry waste and applying an eco-friendly treatment.

The use of whole flour from cereals or pseudocereals in bread making has become a concern in the bakery industry. One of the reasons for their use is related to their nutritional profile which encompasses fiber components, especially beta-glucans and arabinoxylans, as well as bioactive substances accompanying dietary fiber. Due to the fact that most types of whole flours have unfavorable baking and sensory characteristics, many research groups have focused on various milling technologies in order to eliminate this inconvenience. In this sense, Skřivan et al. [4] presented a special disintegration equipment and evaluated the impact of novel grinding technology on microstructure and properties of the flours. According to them, this technology is suitable for achieving fine granulation of bran particles and to does not result in very substantial damage of starch granules, especially in rye and wheat.

Currently, it is a challenge to produce flour of different particle sizes with high concentrations of components such as proteins, fibers, minerals, etc. Moreover, the milling fraction varies in physical, chemical and functional–technological properties, and offers the possibility to produce flour with specific characteristics for diverse uses in food products. One the other hand, pseudocereals have gained interest in the bakery industry due to their nutritional value, being richer in fiber, lipids, minerals and vitamins than wheat. In addition, due to their high protein quality, the supplementation of wheat flour with pseudocereals solves the wheat protein deficiency in lysine, threonine and methionine. However, the replacement of wheat flour with pseudocereals impacts dough and bread quality, since these grains do not contain gluten. This aspect is approached by Coţovanu and Mironeasa [5] in an extensive study related to the substitution of wheat flour with different milling fractions of buckwheat seed flour. The results showed that the dough's rheological properties were affected in various ways, depending on the amount and particle size of buckwheat flour, thus influencing the quality of bread.

A current trend regarding bakery products includes the diversification of the assortment range to satisfy consumer demands. Some consumers want baked goods without sodium or with a low sodium content, while others want gluten-free products. In this Special Issue, these aspects were approached. The review written by Codină et al. [6] presents sodium chloride effects on bread making from technological and sensory points of view, revealing different options for salt reduction in foods, focusing on bakery products. Moreover, the physiological role of sodium chloride, its effect on the human body and legislative recommendations on its consumption, were highlighted. Various gluten-free raw materials can be used to replace wheat flour in the production of bakery products, satisfying consumers needs for a gluten-free diet. The performance of different grains in gluten-free bread applications was investigated by Banu and Aprodu [7]. Their work presented a comparative analysis of quinoa, sorghum, millet and rice flours and breads in terms of proximate composition, resistant starch, antioxidant activity and total phenolic content. As observed in the work, the quinoa, sorghum and millet may represent reasonable alternatives for developing functional gluten-free bread due their huge potential. The use of gluten-free raw material in bread making represents a challenge, since in the absence of gluten, dough presents poor viscoelastic properties, being unable to develop a protein network, a fact that impacts gluten-free bread quality. By including some alternative ingredients such as hydrocolloids, enzymes, emulsifier, and fibers or fruit and vegetable by-products in the formulation of gluten-free bread, the viscoelastic properties can be improved, as well the nutritional and sensory profile. In this regard, Djeghim et al. [8] found that different types of fruits and vegetable by-products could be used as economical and inexpensive methods to improve gluten-free bread, enhancing the quality characteristics up to a certain addition level, depending on the by-product type.

Baked goods may have a low protein content due to the reduced amino acid profile possessed by cereals. The use of ingredients from oil seeds has been approached in many studies over recent years due to the fact they have higher protein content than cereals.

Moreover, they are rich in omega-6 and omega-9 essential fatty acids, fiber, and natural antioxidant compounds, comprising tocopherol, beta-carotene, chlorogenic acid, caffeic acid and flavonoids. The oil seeds can be added as raw or processed material in the food formulation products. As an example, the use of roasted flaxseed flour in biscuits with partial substitution of wheat flour has been reported to result in promising healthy and nutritious alternative to consumers, as observed by Man et al. [9]. According to them, the replacement of wheat flour with 25% roasted flaxseed flour has improved the manufactured biscuits from nutritional, textural and sensorial points of view, without affecting their aftertaste. In another study published in this Special Issue, Szydłowska-Czerniak et al. [10] investigated the possibility of manufacturing biscuits with new and attractive characteristics for the consumer, with improved antioxidant potential. According to their results, by the incorporation of rapeseed press cake flour and the replacement of margarine by rapeseed oil in the formula of wheat flour-based biscuits, the nutritional quality of biscuits was enhanced in terms of antioxidant activity. Nevertheless, these biscuits may result in a critical loss of consumers' acceptance and purchase intent, with the transferal of this ingredient incorporation to the industry level and the launching of these biscuits to the market being unfeasible.

The works included in this Special Issue underline the current tendencies in the use of plants' ingredients to improve the technological, nutritional, and sensory properties of bakery and pasta products. Moreover, the employment of some physical treatments, the optimization of the amount added, and the characteristics of such plant ingredients used to diversify the range of bakery and pasta products were highlighted.

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