

Quality Assurance of Bread and Bakery Pastries in Public Institutions According to the Law on Public Procurement

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Abstract: Public institutions, such as kindergartens, are committed to ordering food according to the Slovenian Law on public procurement (ZJN-3), which is compliant with EU legislation. There are many bread manufacturers in the market, therefore contracting authority has the challenging task to provide a diverse and high-quality bread and bakery pastries through the process of public procurement. Each buyer has the option of ordering food through the so-called “short chain”, which allows the ordering of locally produced cereals, bread from the organic and integrated production. The Ministry of Health of the Republic of Slovenia issued a “Guide to Quality Standards of Food in Public Ordering for Educational Institutions” which supports the ordering process. In addition to quality requirements, the buyer divides the tender documentation into several groups and subgroups (e.g. Bread, Bakery pastries and Bread of organic production). The bakery industry is aware that in kindergartens high-quality bread and bakery pastries are required, therefore they already offer products with reduced salt, sugars, fats, products without trans-fatty acids and gluten. Taking into account the appropriate purchasing specifications and good knowledge of legislation, with respect to public procurement law-related orders, children in kindergartens can be provided with high-quality bread and bakery pastries.

Key words: High quality bread and bakery pastries, public institutions, public procurement, quality assurance, quality schemes.

1. Introduction

Balanced, recommended healthy nutrition, eating habits and lifestyle are important factors that have a strong impact on the children’s health and well-being. A well-planned and organized diet in educational institutions, such as in kindergartens, is crucial for educating children about the importance of eating in the life of an individual. Nourishment of children in most of kindergartens includes four meals a day, breakfast, morning snack, lunch and afternoon snack, which cover over 70% of their whole-day energy input needs. The menus are always assembled to include foods that are diverse in colour, with their shape and texture, which encourage children to enjoy their food.

Bread and bakery pastries are the main source of

carbohydrates included daily in the children’s menu. Daily, at least two different types of bread or bakery pastries are offered to children. Kindergartens serve a very wide selection of different types of bread and bakery pastries.

According to the available data from the Chamber of Agricultural and Food Companies at the Chamber of Commerce and Industry of Slovenia, about 332 companies deal with bakery, there are around 800 companies, including craftsmen and sole proprietors, also taking into account those who have bakery activity listed as a secondary activity, which puts the number at around 1,600. Due to the wide range of baked goods in the market, the contracting authorities have a demanding task to set precise quality criteria for each type of bread and bakery pastry.

On the state level public institutions such as schools, kindergartens and hospitals together with the rest of

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public sector are important consumers of food. They spend as much as 120 millions EUR per year on food.

2. Discussion

Educational institutions, as public institutes, are obliged to order food through the Law on public procurement (ZJN-3), which is compliant with the European legislation. The law states that the contracting authority may file an order on the basis of the lowest price or the most economically advantageous offer, using the criteria of food quality schemes. The order must also be in compliance with the Regulation on Public Green Food Procurement [1].

Law on public procurement (ZJN-3) requires a preliminary market check. Public procurement usually starts with the decision to initiate the procedure. The source and amount of funds intended for the execution of a public procurement must be indicated. Direct and indirect budget users must comply with the rules governing public finances in connection with the initiation and execution of the procurement procedure and the execution of a public procurement. The contracting authority may appoint an expert commission to carry out all or a part of the procedure. For the execution or decision-making process in public procurement procedures, another contracting authority may be authorized.

There is also the possibility of so-called short chains, which have many advantages for producers, farmers and consumers, such as ordering locally-produced cereals and bread from organically-produced flour types. In the Law on public procurement (ZJN-3) is a decree which determines the ordering of a minimum proportion of organic foods, so those in the greater part produced in Slovenia are favoured. Among them there are grain and cereal products as well as organic bread and bakery pastries.

The contracting authority must, if possible and economically acceptable, divide the public procurement into smaller segments. The contracting authority has the option of ordering under the

so-called short chains and may award a public procurement for individual segments without applying the procedures of this Act if the estimated value of the excluded segments is less than EUR 80,000 without VAT (value-added tax) and the total value of excluded goods may not exceed 20% of the total value of all segments. The contracting authority chooses the best offer according to the set criteria, which are usually on the basis: offer value, requirements according to the quality scheme, organic bread and bakery pastries and packaging [1].

The contracting authority has the opportunity to include foods that are in the Quality Scheme. The scheme includes foods produced in an integrated way, season foods and ecologically produced food, farm goodies, guaranteed traditional specialties, foods with designated origins and designated geographical indication. The quality schemes are defined in the Agriculture Act.

European quality schemes are regulated in the European decree. A product that is produced according to the principles of a particular quality scheme has a special character, which is determined by the method of production, the influence of the geographical area in which the product is produced or processed and also with traditional production methods. Quality schemes are available to all manufacturers. Anyone involved in the quality scheme must comply with clearly defined conditions, which are set by the law. They are in the form of production (organic production, delicacies from our farms and integrated production) or in the product specification (designation of origin, geographical indication, guaranteed traditional specialty and higher quality).

As an additional requirement, we usually also require quality signs such as:

- Quality Schemes in the Republic of Slovenia: guaranteed traditional specialty, geographical indication, integrated production, designation of origin, ecological sign, higher quality, natural mineral water

• Quality Schemes in the EU: guaranteed traditional specialty, geographical indication, designation of origin

Protected designation of origin—all stages of production and processing of the agricultural product must be carried out in a specific geographical area.

Protected geographical indication—at least one of the production phases of the agricultural product must be carried out in a specific geographical area.

Guaranteed traditional specialty—production is not limited to a specific geographical area, which means that products produced according to the specification can be produced throughout the territory of the Republic of Slovenia and the EU (in case of European protection). These products are produced either in the traditional way, from traditional raw materials or from a traditional recipe.

Higher quality—the agricultural produce or foodstuff differs positively in its characteristics from other similar agricultural products and foodstuffs.

Organic production—agricultural produce or food is produced and processed according to natural methods and procedures.

Integrated production—the agricultural product is produced with methods that use the regulated authorized agro-technical measures.

Goodies from our farms—agricultural products and foodstuffs are produced or processed on the farm according to recipes typical of farm products and using the bulk of their own raw materials or materials

from the local environment.

The Ministry of the Environment has appointed three certification bodies, namely:

- Bureau Veritas d.o.o.
- Institute for Control and Certification in Agriculture and Forestry (KON-CERT).
- Institute for Control and Certification of the University of Maribor (IKC UM).

At all three bodies, the contracting authority has the option of verifying the suitability of the certificate required for the selected higher quality bread [2].

For the successful implementation of the public procurement, the contracting authorities in educational institutions also have a “Guide with quality criteria for foods in Educational Institutions” issued by the Ministry of Health of the Republic of Slovenia [2]. Example of the quality requirements is bread and bakery pastries. The bread is made from flour of various types, water, yeast and salt. Additional ingredients for bread, such as other foods and additives may also be added as defined by the rules. All products must be labelled in accordance with the regulations. The loaves must have the correct shape. Bread must be properly baked, with a nicely baked crust and not burned. The taste and smell must be pleasant and typical for each type of bread, and the texture must also be appropriate. Since bread, pastries and other types of bakery products are the most important source of salt in the diet of Slovenians, it is necessary to choose less salty products.



http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/podrocja/Kmetijstvo/zascita_kmetijskih_pridelkov_zivil/HEME_KAKOVOSTI.pdf.

Table 1 Guide with quality criteria for foods in Educational Institutions.

WHITE BREAD

Basic description: White wheat bread

Quality requirements	Made from wheat white flour with ash from 0.45% to 0.55%, a portion of wheat flour can be replaced by the flour of other cereals as a percentage permitted by the rulebook; basic and additional raw materials, the content of additives must comply with the requirements of the Regulation; Preservatives are not allowed; appearance, taste, smell, color and consistency must be characteristic of white wheat bread.
Packaging and quantity	Packed in appropriate packaging (foil) according to customer's requirements.
Storage and transport of the product	Transport without specialty, protected from external influences.

Table 2 Guide with quality criteria for foods in Educational Institutions.

BREAD, WITH POTATOES

Basic description: Bread with potatoes

Quality requirements	Made from wheat or other flours and with the addition of a minimum of 8% potato flour or potato flakes. All basic and additional raw materials, the content of additives, must comply with the requirements of the Regulation; Preservatives are not allowed; appearance, taste, smell, color and consistency must be characteristic of bread with potatoes.
Packaging and quantity	Packed in appropriate packaging (foil) according to customer's requirements.
Storage and transport of the product	Transport without specialty, protected from external influences.

Table 3 Guide with quality criteria for foods in Educational Institutions.

BREAD ROLL, WHOLEGRAIN

Basic description: Wheat wholegrain bakery

Quality requirements	Made from whole wheat flour or whole grain wheat groats with ash up to 2%. It can contain up to 20% of other flour; all basic and additional raw materials, the content of additives must comply with the requirements of the Regulation; Preservatives are not allowed; appearance, taste, smell, color and consistency must be characteristic of whole grain bakery.
Packaging and quantity	Packed in appropriate packaging (foil) according to customer's requirements.
Storage and transport of the product	Transport without specialty, protected from external influences.

Contracting authority in the kindergarten provides quality foods in such a way that the contents of the tender documentation are divided into several groups and subgroups. Bread and bakery pastries are a large group. Bread of organic production and also bakery pastries of organic processing represent a special group.

Example: ECO WHOLEGRAIN WHEAT BREAD
Rich in fibre
Ingredients: wheat wholegrain flour, wheat flour, water, sunflower oil, yeast, salt from organic production. The content of insoluble fibres is 6.4%, content soluble fibre 1%. Produced by: Bakery XY, address of the bakery Net weight: 700 gr Use before: day, month, year SI-EKO-001 EU agriculture/outside the EU.



There are many types of bread in the BREAD group (wheat bread, black bread, wheat mixed, wheat wholegrain, corn bread, oat bread, soybean bread, buckwheat bread, buckwheat bread with walnuts, rye bread, rice bread, mixed bread, bread with potatoes, bread with the addition of turmeric, bread with the addition of activated carbon, bread with the addition of red beet, bread with the addition of barley) and an additional demand that the bread is already sliced to suitable thickness and packed. In the same way the pastries group describing the requirements for different types of flour, different shapes and grams of pastries is defined.

Since bread is the most important source of salt in the nutrition of Slovenians, contracting authorities order bread with less salt. The bakeries responded to this demand. They also offer bread and bakery pastries without added additives, with less fat, without trans-fat acids, less sugar, and no gluten.

Example from the tender documentation

Group: Bread, Pastries									
No.	Type of goods	Assessed quantity	Unit of measure	Price for unit without VAT (EUR)	Value for evaluated quantity without VAT (EUR)	Amount of VAT (EUR)	Value for evaluated quantity with VAT (EUR)	No. of foods in the quality scheme	No. of foods by the measure “multiple ecological foodstuffs”
1	2	3	4	6	$7 = 3 \times 6$	$8 = 7 \times \text{VAT rate}$	$9 = 7 + 8$	10	11
1	Wheat semi-white bread (T-850), 0.7 to 1.0 kg, cut and packaged				0.00	0.00	0.00		
2	Wheat white bread (T-500), 0.7 to 1.0 kg, cut and packaged				0.00	0.00	0.00		
3	Wheat mixed bread without additives, 0.7 to 1.0 kg, cut and packaged				0.00	0.00	0.00		
4	Corn mixed bread without additives, 0.7 to 1.0 kg, cut and packaged				0.00	0.00	0.00		
	Total value of the conclusion				0.00	0.00	0.00		
	Group pastries								
5	Wheat white bakery with different shapes (rolls, bombets, ...), 30 to 50 g/pc				0.00	0.00	0.00		
6	Corn mixed bakery of different shapes (rolls, buns, ...), 60 to 70 g/pcs,				0.00	0.00	0.00		
	Total value of the conclusion				0.00	0.00	0.00		

In kindergartens there are more and more children with allergies to nuts, soya, eggs and milk. When reading the declarations, it can be found that there are still many bakeries that use these foods as additional ingredients and therefore they are often listed as allergens.

Mostly, foods by their chemical composition, structure, physical and thermal properties represent heterogeneous systems. In such an environment, additives enter numerous interactions with other food ingredients, so special attention is paid to allergens in bread and bakery pastries.

All ingredients contained in a foodstuff causing allergies or hypersensitivity are included in the list of substances or products in Annex II of Regulation 1169/2011 [3].

On the list of allergenic substances there are cereals

containing gluten, eggs, peanuts, soya beans, milk, nuts (almonds, hazelnuts, walnuts, Indian nuts, American nuts, Brazilian nuts, pistachio, macadamia, sesame seeds).

Educational institutions have a catalogue of allergens, prepared in accordance with Regulation (EU) No. 1169/2011 on the provision of information on allergenic foods to consumers [3].

Contracting authority with their expertise and with a good description of bakery products influences the industry in order for it to focus on new modern technological procedures that reduce the use of unwanted additives, contain less salt, sugars, preservatives and are free from trans-fatty acids.

The bakery industry has therefore repeatedly introduced changes in the technological processes of producing bakery products, which have led to the need

Table 4 Allergenic substances present in bread of the chosen producer Annex II of Regulation 1169/2011.

Example: Allergenic substances present in bread of the chosen producer

The name of the bread	Gluten	Eggs and egg products	Soy and soy products	Milk and milk products, lactose	Nuts	Sesame
Buckwheat bread	Wheat	-	-	-	Walnuts, Hazelnuts Almonds	-
Buckwheat bun	Wheat	-	-	-	Walnuts	-
White bread	Wheat	-	-	-	Walnuts, Hazelnuts Almonds	-

to control biochemical, chemical and physical processes. For this purpose, the use of individual additives or combinations of various additives has been established [4]. Many additives with different chemical structure have different applications in the preparation of various bakers' products: they facilitate mechanical processing, affect the sensory properties of bakery products, contribute to preserving freshness and extending durability.

In technological processes, various emulsifiers, hydrocolloids, lifting agents, flour treatment agents, organic acids, additives for the microbiological stabilization of products or preservatives are often used. The texture properties of bakery products are influenced by the addition of hydrocolloids, which have been increasingly used in the baking industry in recent years [5]. The lifting agents provide an appropriate volume and structure of products in technologies where yeast is not used. Flour treatment agents improve the baking characteristics of the flour, increase the elasticity of gluten, and thus help achieve the desired properties and structure of various products. The spoiling of baked products with prolonged durability is a major problem due to the development of mould, which is associated with high costs. Traditionally it is prevented by the addition of chemical preservatives, in particular with salts of weak organic acids [6].

Sweeteners are also unwanted. In Regulation (EU) No. 1129/2011 there is a list of sweeteners and foods to which sweeteners can be added [7].

Emulsifiers are also used in the processes, which contribute to the improving properties of the dough

during treatment and improved sensory properties of the finished product, such as texture properties, core softness, greater volume and prolonged freshness [8].

DATM (diacetyl ester tartrate monoglyceride tartrate mono- and diacetyl esters and mono- and diglycerides of fatty acids) is a very important emulsifier used in the baking industry. It is also one of the most commonly used emulsifiers [8, 9].

Lecithins are also used as emulsifiers, which are usually a mixture of different phospholipids, which are otherwise found in yolk, unrefined oils and elsewhere. Soya is the most important commercially used source of lecithin. But since it contains genetically modified organisms and allergens, sunflower or rapeseed lecithin is increasingly used instead.

Yeast is the most commonly used rising agent in cereal products. In heavy, rich dough, where large amounts of added sugar, fat or eggs will greatly slow down or prevent yeast activity, chemical rising agents are used [9].

Preservatives are substances that prolong the shelf life of foods by protecting them against deterioration caused by microorganisms and/or protect them against the development of pathogenic microorganisms. Their use depends on the composition of the product, the way it is packaged, the storage conditions and the expected shelf life of the product. The development of mould is the most common defect of bakery products [10]. Bread comes from the stove practically sterile. However, since mould spores are present everywhere in the air, there may be a subsequent contamination of the crust or in cut bread also contamination of the core.

When cutting slices of bread, the air needed for the mould development comes between the slices [8].

Enzymes are also used in the production of bakery products.

Regulation (EC) No. 1332/2008 of the European Parliament is the main regulation on enzymes used in foodstuffs, including enzymes used as additional technological means. It is planned that by the end of the year 2017 the Commission should establish a public register of all food enzymes for which valid applications have been submitted. In order to increase transparency, the Commission has published a list of valid applications for enzymes for which EFSA will assess the risk or prepare a scientific assessment of safe use (EC, 2017). The list can be found on the Commission website [11, 12].

Under the Food Additives Regulation (Regulation 1333/2008), two enzymes have been approved: invertase (E 1103) and lysozyme (E 1105) [11,12].

Due to the increasing number of children with celiac disease, kindergartens also need gluten-free bread and cakes.

Contracting authorities are aware that the use of additives, emulsifiers and hydrocolloids in these products is necessary. The production of gluten-free bakery products is a major technological problem for bakeries. Most gluten-free breads have significantly worse properties compared to conventional wheat breads (smaller volume, non-characteristic colour, different core structure, core more easily crushed) and changed composition with lower protein content and higher fat content. The production of gluten-free bakery products is based on the replacement of wheat with gluten-free raw materials such as rice, corn, buckwheat, amaranth and quinoa. They use different starch types such as corn, potatoes, rice, beans. The typical highly elastic properties of gluten are replaced by the addition of various types of hydrocolloids such as guar gum, xanthan, carrageenans, alginates that form a stable structure. In order to consolidate the structure of the dough, protein supplements such as

milk, egg proteins and the addition of enzymes such as transglutaminases, proteases are used. Additives of emulsifiers such as DATEM, lecithin contribute to the ability to retain gases in the dough and improve the texture of the core. Additions of various dairy products such as whey, milk powder and similar substances are possible. Numerous combinations allow the production of a wide range of gluten-free bakery products, which can also be very different quality [8, 9].

3. Conclusion

Educational institutions have the opportunity to influence the baking industry through public procurement with knowledge and legislation to bring their products closer to the desired quality requirements of kindergartens, to reduce various substances added to bread, such as additives, preservatives, salt, sugar and emulsifiers. Most educational institutions have this logistic option to order bread and bakery pastries daily. This means that their products are freshly baked, so the use of preservatives is not needed. The bakery industry is already aware that contracting authorities want a variety of products, as the children evaluate the bread and pastries and quickly detect the inadequate characteristic, inappropriate structure, freshness, the insignificant aroma, the smell, the taste and also crumbling of the bread. Bakeries are forced to adapt their offer, offering more and more special types of bread, smaller shapes and weight at reasonable prices. Yet contracting authorities are still demanding product groups where the use of emulsifiers, hydrocolloids and other additives is virtually necessary. In the case of gluten-free bakery products, without additives, it is virtually impossible to make a quality product [8].

In their demands, the contracting authorities have a direct impact on the baking industry, which due to that influence develops new processes in the baking industry, such as the production of bread and bakery pastry by reducing the use of various additives. In

terms of replacing bakery additives, traditional methods are applied, such as the use of acid dough or using other ingredients and technological agents such as enzymes, dietary yeast, soyaflour and the like. Sour or acid dough is a well-established additive in the preparation of various types of bakery products, and has very positive effects on bread quality, freshness and durability.

In technological processes, additives are also replaced by using different methods of product protection after preparation, such as after-treatment, various packaging methods.

Enzyme additives contribute to improving the texture, appearance and nutritional properties of products, and can also improve the aroma of products and their durability. In the baking industry, enzymes are already widely used. Most enzymes are already commercially available [13].

Nevertheless, the quality grading of food is still too narrow. Food is much more important, as it has ecological, social, psychological and finally economic significance.

It is necessary to think about the quality of foods widely in terms of food safety, as well as in terms of nutritional and physiological needs of the individual. Last but not least, the appearance is also important, since food is far more than just the ingestion of microbiologically and chemically safe substances.

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