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Quality of Fruit and Vegetables as Products in Unprocessed Form

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Abstract

The quality of fruits and vegetables as products in their unprocessed form primarily refers to the influence of pesticides and artificial fertilizers on the change in the composition of water and dry matter in the fruit, and of the dry matter, the most important are carbohydrates, proteins, then lipids, pectins, vitamins, mineral substances, fruit and mineral acids, plant pigments, tannic substances, flavoring substances, enzymes, natural coatings, sorbitol, glucosides and other trace substances. Increased and uncontrolled application of pesticides and use of artificial fertilizers beyond doses and concentrations can lead to a change in the composition of the fruit and an increase in the proportion of residues in it. The research in this paper shows that good production practices directly affect the reduction of pesticide use in agricultural production, which will result in an increase in the quality and safety of fruit use. Accordingly, the market has increased the demand for fruit resulting from good agricultural practices and organic cultivation. From soil preparation, sowing, planting and maintenance of plantations in an environmentally acceptable way, you can get quality fruits and vegetables as products in unprocessed form. It was concluded that the biggest role in the entire chain is played by the agricultural producer/farmer, who should adhere to good agricultural practices, dosage and concentration when treating with protective agents against pests and when feeding only the plants.

Keywords : Fruit quality, food safety, pesticides, doses and concentrations, agricultural practice

Introduction

When considering the quality of fruits and vegetables as products in their unprocessed form, we primarily think of the impact of pesticides and artificial fertilizers on changing the composition of water and dry matter, and of the dry matter,

the most important are carbohydrates, protein, then lipids, pectins, vitamins, mineral substances, fruit and mineral acids, plant pigments, tannic substances, flavoring substances, enzymes, natural coatings, sorbitol, glucosides and other trace substances, which are shown schematically in Figure 1.

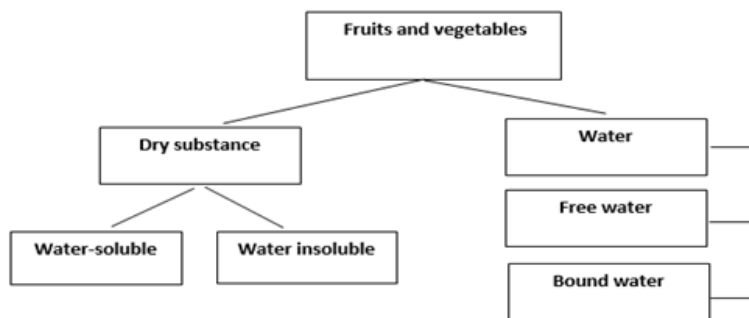


Figure 1: Chemical composition of fruits and vegetables, technology of food
 (https://www.tehnologijahrane.com/enciklopedija/hemijski-sastav-voca-i-povrca#toc-mikrokonstituenti-voa-i-povra preuzeto 25.07.2022.

The purpose of the work is to get acquainted with quality parameters, health compliance, ISO standards, GLOBAL GAP and the HACCP quality system. Many researches are focused on the analysis of existing active substances used in plant production, their impact on human health, the environment, risk assessment, and the constant monitoring of quality, which is necessary to establish a System of sustainable use of pesticides, so that the end result of the product/fruit is healthy correct. (Ožujak, 2021).

The paper will come up with a program of measures that will be a good guide for new and existing farmers who are looking for an answer to the question: How to get a quality product that is healthy and obtained in an environmentally acceptable way.

Establishing A Pesticide Use System

The details required for the establishment of a system of sustainable use of pesticides are:

- Professional education of pesticide users, distributors and advisors.
- Conditions for the distribution and sale of pesticides.
- Regular inspections of machines for pesticide application.
- Special pesticide application procedures and risk reduction measures in certain areas.
- Application of the principles of integrated plant protection.
- Other measures to achieve sustainable use of pesticides. (Novaković et al., 2015).

The maximum level of pesticide residues (MDK), which is expressed in mg/kg of product (Maximum residue level - MRL), is the highest legally permitted level of pesticide residues in food, established on the basis of good agricultural practice and the least necessary consumer exposure. The maximum level of pesticide residues will be within the permitted limits if the specific pesticide was applied correctly and in accordance with good agricultural practice (with the condition that there is no pollution from other sources, e.g. already existing pollution of the environment before the application of the specific pesticide). (Hodžić, 1991).

The level of pesticides in food must not be higher than prescribed, and the food must be healthy. The above facts are questionable considering that there is not sufficient control and analysis of the quality of fruits and vegetables in unprocessed form, so the question of the quality of what is marketed from the field to the table is becoming more frequent. From the above facts, there is an increasing need for advisors and training of pesticide users. Any exceedance of the MDK value indicates the need to:

- Risk assessments for consumers of that product.
- Warnings to product manufacturers to apply pesticides in accordance with good agricultural practice, i.e. instructions for pesticide application.
- The initiation of inspection services to strengthen the control of samples of products where the MDK value was found to be exceeded by analysis, as well as of the producers who supply the market with these products. (Mijanovic & Varupa, 2021).

Quality Assurance of Fruit and Vegetable Products

If pesticide residues in a product are at a level higher than the prescribed MDK value and the risk assessment shows that they pose a risk to consumers, the Rapid Alert System for Food and Feed (RASFF) circulates information and measures are taken to consumer protection. In Bosnia and Herzegovina, the consumer protection association deals with this issue, although by looking at the most frequently asked questions, we can conclude that consumers of fruits and vegetables do not give details when it comes to the quality of what is eaten fresh and served healthily. (Bosnia and Herzegovina, 2019). One of the reports of the Food Safety Agency of Bosnia and Herzegovina, based on analyzes conducted in 2016 on 139 fruit and vegetable samples: apples, head cabbage, lettuce, peaches (including nectarines), strawberries, tomatoes, cucumber, wheat flour, oranges (including tangerines), and fruit porridge for children. Not a single sample of wheat flour and fruit pulp for children contained pesticide residues, and in five samples the presence of pesticide residues above the MDK was determined. Of the five contested samples, four were imported, and one was domestically produced. (Agro klub, 2017).

When it comes to quality assessment and conditions regarding the quality of fruit and vegetable products intended for the end consumer, it is important to highlight the physical, chemical and sensorial properties, as well as the composition of the product; type and quantity of additives and other substances used in production. Fruit means all types of fruit that are healthy, of appropriate maturity, fresh or preserved by physical procedures, including processing procedures after picking the fruits that have reached the consumer, Figure 2.

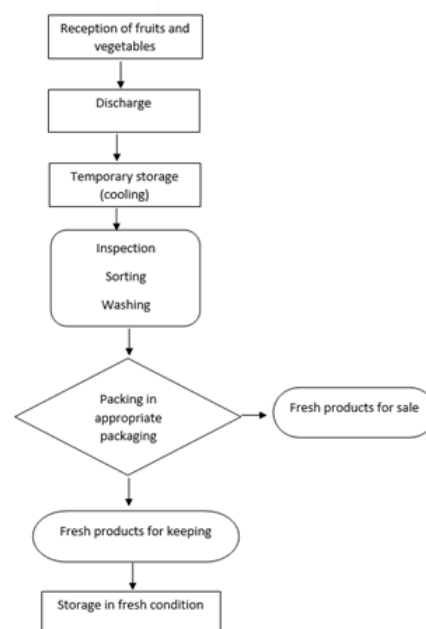


Figure 2: Post-harvest preparation of fruits and vegetables for consumers

(<https://www.tehnologijahrane.com/enciklopedija/branje-i-priprema-voca-i-povrca-za-skladistenje#toc-priprema-voa-i-povra-za-skladitenje>, preuzeto 26.07.2022.)

High-quality and safe production of fruits and vegetables is possible with the application of legal regulations “from field to table”. The largest organization for food safety (CAC), established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) deals with the development of standards, codes of practice, guidelines and recommendations that governments should follow when enacting national legislation. CAC documents are:

- Food safety standards related to the maximum levels of pesticide residues, additives, contaminants (including microbiological contamination) that may be present in fruits and vegetables.
- Standards in the form of guidelines on processes or procedures (codes of practice, HACCP).
- Standards for food labeling that may be related to health (allergens, labeling of nutritional values), with consumer protection (quantities and measurements, production date), or for consumer information (halal standard, organically produced food).
- Standards for individual products that determine what a product is.

The most important norms in the field of agricultural and food industry are:

- Global Food Safety Initiative (GFSI).
- Global Gap for fruits and vegetables (GLOBALGAP, i.e. EUREPGAP) is a global scheme and reference for Good Agricultural Practice. The GLOBALGAP system is applied to primary fruit and arable production and prescribes the determinants of Good Agricultural Practice. (Šić Žlabur, 2016).

The role of producers, processors and supervisory services is to be a part of all of the above, to follow the good production practices of the above-mentioned organizations is a guarantee for a quality product.

Conclusion

By connecting the producer’s information with the end consumer and his expectations, pesticide users are helped to understand the use and benefits of applying pesticides in agricultural production in terms of fruit quality. Thus, consumers’ awareness of the quality and healthfulness of the fruits and vegetables they consume every day, both fresh and in other forms, is raised. For the establishment of a system of sustainable use of pesticides, an important role is played by:

- Producers, as the best controller of pesticide use and guidelines for achieving product quality.
- Distributors and wholesalers, who should continuously demand the presentation of the results of the analysis of the composition of the fruit after harvest.
- It is important to constantly control - supervise producers by the Inspection Services, to work on the quality of the products that farmers - agricultural producers achieve in production.
- The Government’s Food Safety Agency, which ensures the healthiness of the product by constantly monitoring the

quality of the obtained fruits and vegetables and analyzing the composition before placing them on the market.

- In the entire chain, advisory support to farmers/producers is also important, which ensures the correct application of pesticides (type, combination, time, method, dose, concentration) and the participation of the advisory service during supplementary feeding in agricultural production.

With the aforementioned participation, producers are directed towards good agricultural practices that lead to the sustainability and healthiness of fruit and vegetable products.

References

1. Ožujak. (2021). Specifikacija proizvoda, Dokazana kvaliteta voća, Hrvatska voćarska zajednica. Zagreb. Retrieved from https://poljoprivreda.gov.hr/UserDocsImages/dokumenti/hrana/Dokazana_kvaliteta/Specifikacija_proizvoda_Dokazana_kvaliteta_vo%C4%87e.pdf
2. Novaković, V., Bokulić, A., Deždek, B., Čelig, D., Budinščak, Ž., Hamel, D., Ivić, D., Novak, M., Pavunić, M. Z., Peček, G., Poje, I., Prpić, I., Rehak, T., Ševar, M., Šimala, M., & Turk, R. (2015). Priručnik za sigurno rukovanje i primjenu sredstava za zaštitu bilja, Ministarstvo poljoprivrede RH, Zagreb. Retrieved from <https://www.bib.irb.hr/1081864>
3. Hodžić, S. (1991). Opća farmakologija i toksikologija. IP Svjetlost Sarajevo. Retrieved from <https://www.worldcat.org/title/opca-farmakologija-i-toksikologija-za-veterinare-medicinare-i-farmacete/oclc/453268997>.
4. K. A., & Varupa, A. (2021). By rationalizing the consumption of pesticides for plant growing to the required nutritional values. *AS Nutritional Health Journal*, 5(7), 24-27. Retrieved from <https://naukaitehnologija.iu-travnik.com/wp-content/uploads/2022/08/3-Aida-Varupa-Krsto-Mijanovic-RATIONALIZATION-OF-PESTICIDE-CONSUMPTION-FOR-CULTURES-GROWN-IN-CENTRAL-BOSNIA.pdf>
5. Bosnia and Herzegovina. (2019). Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina. Bosnia and Herzegovina. Retrieved from <http://www.mvteo.gov.ba/Content/Read/ekonomski-razvoj-i-poduzetnistvo-zastita-potrosaca>.
6. Agro klub. (2017, January 02). Control of fruit and vegetables for pesticide residues. Retrieved from <https://www.agroklub.ba/poljoprivredne-vijesti/kontrola-voca-i-povrca-na-ostatke-pesticida/29820/>
7. Šić Žlabur, J, Voća, S., Dobričević, D. (2016). Priručnik za vježbe iz modula “Prerada voća i povrća”. Agronomski fakultet sveučilišta u Zagrebu. Retrieved from <https://www.bib.irb.hr/569482>
8. Šarić, T., Gadžo, D. (1998). Utjecaj poljoprivrednih hemikalija na okolinu. Sarajevo.
9. Agro klub. (2017, January 02). Control of fruit and vegetables for pesticide residues. Retrieved from <https://www.agroklub.ba/poljoprivredne-vijesti/kontrola-voca-i-povrca-na-ostatke-pesticida/29820/>

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10. Jašić, M. (2010). Picking and preparing fruits and vegetables for storage. *Fruit and vegetable technology. Food Technology*. Retrieved from <https://www.tehnologijahrane.com/enciklopedija/branje-i-priprema-voca-i-povrca-za-skladistenje#toc-priprema-voa-i-povra-za-skladitenje>
 11. Jašić, M. (2012). Chemical composition of fruits and vegetables. *Food Chemistry. Food Technology*. Retrieved from <https://www.tehnologijahrane.com/enciklopedija/hemijski-sastav-voca-i-povrca#toc-mikrokonstituenti-voa-i-povra>

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