From Farm to Foreign Market: Overcoming Compliance Challenges for Fruit and Vegetable Products

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Abstract: **This study examines the challenges faced by Uzbekistan's fruit and vegetable exporters in meeting international compliance requirements, with a focus on the European Union (EU) market. It highlights the importance of adhering to food safety and quality standards such as Codex Alimentarius, EU contaminant limits, and Global GAP to ensure successful market access. Using data from the EU's Rapid Alert System for Food and Feed (RASFF) for 2019–2024, the research identifies 3,093 fruit and vegetable notifications, including 38 involving Uzbek products, primarily due to excessive sulphite, ochratoxin A, and cadmium levels. The paper analyzes permissible contaminant thresholds, packaging regulations, and labelling practices, underscoring the need for exporters to align with destination market requirements. Recommendations include stricter domestic quality control, compliance-oriented processing practices, and packaging strategies adapted to cultural preferences. The findings emphasize that implementing international standards can expand export geography, reduce overreliance on a single market, and increase competitiveness of Uzbekistan's fruit and vegetable products in global trade.**

Keywords: standard requirements, export, fruits and vegetables, forecasting, marketing research.

1. INTRODUCTION

At the current time, the share of the Russian Federation in the export structure of products exported from the Republic of Uzbekistan is 13 percent. The Russian Federation is the final consumer of about 60% of products exported to the Republics of Kazakhstan and Kyrgyzstan, which make up 12% of our total exports. This, in turn, shows that almost 20 percent of the Republic's exports are tied to the Russian Federation alone.

In the politically and economically unstable situation observed in the world, in order to maintain the rate of growth of exports, it is considered an urgent task to supply products to new markets based on the requirements for products in the development of new markets.

On March 11, 2022, at a meeting chaired by President Shavkat Mirziyoev on measures to develop industrial cooperation and localize production, it was noted that local industry needed to widely implement international standards in order to enter new markets. In 2019–2021, 2,000 exporting organizations received international certificates, and it was acknowledged that their exports increased by 1.5 times (from 590 million dollars to 920 million dollars) [1].

Also, in the meeting of January 2024, reaching an agreement on bilateral recognition of national certificates with 10 countries in Europe, which will be the largest exporters in 2024, adopting 1.7 thousand international standards and 19 technical regulations, and introducing international quality systems in 1.2 thousand enterprises, quality guaranteed the task of increasing the range of products from 4,000 to 7,500 [2].

2. METHODOLOGY

In the process of preparing a scientific article, the methods of data analysis based on tables, data grouping, statistical grouping based on systematic analysis of abstract-logical thinking, and expert evaluation were used effectively.

3. ANALYSIS AND RESULTS

Production and cultivation of products in accordance with the requirements of international standards not only ensure the competitiveness of the product but also make it popular in foreign markets. World experience shows that protecting the country's population from low-quality imported products is one of the main tasks of every country.

Since 1979, European countries have been systematically protecting their domestic markets from low quality and dangerous imported products. In Europe, since 1979, the Rapid Alarm System (RASFF) and the Rapid Information Exchange System (RAPEX) have been established to protect the population from dangerous food and consumer

products [3].

Since our research work on fruit and vegetable products, it is appropriate to dwell on the Rapid Alarm System (hereinafter RASFF). This system has been approved since January 28, 2002, in accordance with Article 50 of Regulation 178/2002 of the European Parliament and Council. This regulation defines the general principles and requirements of food law and food safety procedures.

Contact points are established in all RASFF member states, between which information on dangerous food or feed products is exchanged. In the event of the detection of a food or feed product that poses a serious threat to human health, it must immediately notify the European Commission through the RASFF system. The Commission evaluates all incoming messages and forwards them to the RASFF system member states for action on the notifications and immediate notification of the action taken.

As a result of the analysis, in 2019-2024, through the RASFF system, inconsistencies were detected in 18627 cases, of which 3093 related to fruits and vegetables [4].

Table 1: Analysis of fruit and vegetable products that do not meet the quality requirements identified through the RASSF portal of the European Union.

No.	Notifying country	Country of origin (Delivery country)	Subject	Decision
1	Denmark	Syria	high sulfur content	Withdrawal from consumers
2	Spain	Germany	hydrocyanic acid is high	Withdrawal from the market
3	Great Britain	Turkey	Inadequacy of the SED substance	Returning from the border
4	Latvia	Uzbekistan	extremely high sulfite content	Returning from the border
5	France	Turkey	extremely high sulfite content	Returning from the border
6	Bulgaria	Turkey	high sulfite content	Returning from the border
7	Latvia	Uzbekistan	extremely high sulfite content	Returning from the border
8	Germany	Turkey	extremely high sulfite content	Returning from the border
9	Slovakia	Turkey	extremely high sulfite content	Returning from the border
10	Latvia	Uzbekistan	extremely high sulfite content	Returning from the border
11	Romania	Turkey	hydrocyanic acid is high	Returning from the border
12	Italy	Turkey	the cyanide content is extremely high	Returning from the border
13	Croatia	Egypt	the amount of clopyrifos is too high	Returning from the border
14	Bulgaria	Turkey	the cyanide content is extremely high	Returning from the border
15	Italy	Turkey	the cyanide content is extremely high	Returning from the border
16	Estonia	Turkey	extremely high sulfite content	Returning from the border
17	Latvia	Uzbekistan	extremely high sulfite content	Returning from the border
18	Germany	Turkey	high aflatoxin content	Failure to market the product
19	Bulgaria	Turkey	chlorpyrifos-methylin fresh grapefruit	border rejection
20	Germany	Uzbekistan	Ochratoxin A in organic raisins	information notification for attention
21	Poland	Uzbekistan	Ochratoxin A in dark raisins	information notification for attention
22	Latvia	Uzbekistan	Ochratoxin A in raisins	alert notification
23	Finland	India	Salmonella (presence /25g) in frozen papaya dices	border rejection

24	Belgium	Uganda	Cypermethrin and omethoate in chili peppers	border rejection
25	Croatia	Croatia	Pesticide residues of formetanate in horn peppers from Bosnia and Herzegovina	border rejection

Source: Analyzed by the author based on data from the RASSF portal of the European Union.

As can be seen from the information in the table above, products that do not meet the requirements of the standard cannot be introduced to the EU markets [5].

In addition, in most cases, the sulfur and sulphite, ochratoxin A and other substances content of dried apricot products, raisins, and mug beans are higher than the established standards, which is the reason for the decision to send the product back from the border.

At the same time, the fruits and vegetables sent from Uzbekistan did not reach the final consumer due to the same indicator: the high content of sulphite (sulfur dioxide), ochratoxin A and cadmium.

Dried fruits are one of the main sources of sulfur spreaders because they are treated with sulfur [6]. The use of sulfur and sulfite compounds during the drying of fruits and vegetables facilitates the drying process of fruits and vegetables and shortens the drying time [7]. In addition, sulfur dioxide eliminates the attack of insects on fruits, preserves the natural color of the dried product, and prevents color changes caused using enzymes or chemicals during production and storage. Also, because excessive use of this substance has a negative effect on human health, clear standards have been established by organizations responsible for world food safety.

To ensure that dried fruits and vegetables supplied to foreign markets by exporting enterprises reach the receiving country without technical obstacles, the author studied the standard requirements of the European Union for fruit and vegetable products.

Table 2: Sulphur dioxide and sulphites limit set by EU legislation for dried or processed fruit and vegetables.

No.	**Product name**	**The maximum amount of sulfur dioxide (mg/kg or ml/l)**
1	Apricots	2000
2	White vegetables, dried	400
3	Frozen vegetables	50
4	Dried tomatoes	200
5	Peaches	2000
6	Grapes	2000
7	Prunes	2000
8	Figs	2000
9	Apple and pears	600
10	Dried ginger	150
11	Onion, garlic and shallot pulp	300
12	Other (including nuts in shell)	500

Source: Developed by the author based on the European Parliament and Council Directive No. 95/2/EC on food additives other than colours and sweeteners.

In the European Union, the permissible limit for sulphite residue is different for different products. For example, sulphite residue in dried apricots, peaches, grapes, plums and figs should be below 2000 mg/kg. The maximum level for dried apples and pears is set at 600 mg/kg, while for other dried fruits and nuts; it is 500 mg/kg [8].

The Food and Agriculture Organization of the United Nations (FAO) develops standards that define safety requirements to ensure the safety and high quality of food products.

The Codex Stan 130-1981 standard was developed by FAO, which specifies the safety requirements for dried apricot products. This standard covers dried apricot products that have been suitably treated or processed and are offered for direct consumption [9]. We look at the requirements in the table below.

Table 3: Requirements specified in Codex Stan 130-1981

No.	Quality Criteria	Maximum allowed
1	Sulphured and/or sorbic acid treated dried apricots	not more than 25% m/m
2	Unsulphured dried apricots not treated with sorbic acid	not more than 20% m/m
3	Sorbic acid and its sodium and potassium salts	500 mg/kg
4	Sulphur dioxide	2000 mg/kg
5	Aphlotoxins	4 ppb
6	Aerobic bacteria	10 exp 5 cfu/1g
7	Yeast	10 cfu/gr
8	Mold	10 cfu/gr
9	Total coliforms	10 cfu/gr
10	Ecoli	These substances should not be included in the product
11	Staphylococcus	
12	Salmonella	

Source: Developed by the author based on Codex-Stan 130-1981 of the Food and Agriculture Organization (FAO).

It is considered necessary for business entities that want to export their products to the markets of EU countries to fulfill the above requirements.

Table 4: Maximum levels for certain contaminants in foodstuffs

Nitrate			
No.	**Foodstuffs**	**Maximum levels (mg NO3/kg)**	
1.1	Fresh spinach (Spinacia oleracea)	Harvested 1 October to 31 March Harvested 1 April to 30 September	3000 2500
1.2	Preserved, deep-frozen or frozen spinach		2000
1.3	Fresh Lettuce (Lactuca sativa L.) (protected and open-grown lettuce) excluding lettuce listed in point 1.4	Harvested 1 October to 31 March: lettuce grown under cover lettuce grown in the open air	 4500 4000

		Harvested 1 April to 30 September: lettuce grown under cover lettuce grown in the open air	3500 2500
1.4	Iceberg-type lettuce	Lettuce grown under cover Lettuce grown in the open air	2500 2000
Aflatoxins			
No.	**Foodstuffs**	**Maximum levels (µg/kg**	
		B_1	Sum of B_1, B_2, G_1 and G_2	M_1
2.1.1	Ground nuts to be subjected to sorting, or other physical treatment, before human consumption or use as an ingredient in foodstuffs	8,0 (5)	15,0 (5)	—
2.1.2	Nuts to be subjected to sorting, or other physical treatment, before human consumption or use as an ingredient in foodstuffs	5,0 (5)	10,0 (5)	—
2.1.3	Ground nuts and nuts and processed products thereof, intended for direct human consumption or use as an ingredient in foodstuffs	2,0 (5)	2,0 (5)	—
2.1.4	Dried fruit to be subjected to sorting, or other physical treatment, before human consumption or use as an ingredient in foodstuffs	5,0	10,0	—
2.1.5	Dried fruit and processed products thereof, intended for direct human consumption or use as an ingredient in foodstuffs	2,0	4,0	—
2.1.9	Following species of spices: Capsicum spp. (dried fruits thereof, whole or ground, including chillies, chilli powder, cayenne and paprika) Piper spp. (fruits thereof, including white and black pepper) Myristica fragrans (nutmeg) Zingiber officinale (ginger) Curcuma longa (turmeric)	5,0	10,0	—
Ochratoxin A			
No.	**Foodstuffs**	**Maximum levels (mg NO3/kg)**	
2.2.3	Dried vine fruit (currants, raisins and sultanas)	10,0	
2.2.11	Other dried fruits	—	
(Metals)			
Lead			
No.	**Foodstuffs**	**Maximum levels (mg/kg wet weight)**	

3.1.10	Vegetables, excluding brassica vegetables, leaf vegetables, fresh herbs and fungi*. For potatoes the maximum level applies to peeled potatoes	0,10
3.1.11	Brassica vegetables, leaf vegetables and cultivated fungi*	0,30
3.1.12	Fruit, excluding berries and small fruit*	0,10
3.1.13	Berries and small fruit*	0,20
Cadmium		
3.2.14	Vegetables and fruit, excluding leaf vegetables, fresh herbs, fungi, stem vegetables, pine nuts, root vegetables and potatoes*	0,050
3.2.15	Leaf vegetables, fresh herbs, cultivated fungi and celeriac*	0,20
3.2.16	Stem vegetables, root vegetables and potatoes, excluding celeriac*. For potatoes the maximum level applies to peeled potatoes	0,10

* The maximum level applies after washing the fruit or vegetables and separating the edible part.

Source: Developed by the author based on Commission Regulation (EC) No 1881/2006 setting maximum levels for certain contaminants in foodstuffs.

In addition to the above safety and quality requirements, the European Union, the United States and a number of developed countries' trade networks may also require documents on the cultivation and processing of products based on the requirements of the Global GAP, Organic, ISO 22000, FSCC 22000 and HACCP standards.

In foreign countries, great attention is also paid to product packaging. The author recommends the factors that need to be considered in the packaging of exported products.

- The presence of information specified in the legislation of the country of export on the packaging of the product for export (for example, in several countries, if the information on the product packaging is not translated into their official language, the sale of the product is prohibited. Also, in order not to spend too much on stickers, it is necessary to provide information on the packaging itself in the language of the country that is being exported);
- Product packaging based on the values of the exporting country (while German residents buy goods with detailed information about the product, in Japan, product packaging shows high respect for the buyer. In Iran, it is forbidden to have pictures of women on product packaging and several other values-related circumstances should be taken into account);
- When packaging fruit and vegetables, it is advisable to consider its size (packaging in 250, 500 grams and 1 kg will give the consumer more choice and convenience).

4. CONCLUSION

To conclude, the article addresses compliance challenges for fruit and vegetable products grown in Uzbekistan in foreign markets. It highlights the urgent need to supply products to new markets while following standard requirements. We analyzed through the RASSF portal there have been 3097 notifications during six years (2019-2024) regarding fruit and vegetable products. Out of total notifications, 38 cases are related to fruit and vegetables that have originated in Uzbekistan. The analysis of products that do not meet quality requirements in the EU markets underlines the significance of adhering to international safety and quality standards for fruits and vegetables. It also explores the European Union's permissible limits for contaminants in foodstuffs and underscores the need for businesses to fulfill these requirements to export products to EU countries. Additionally, the article discusses the importance of following

packaging requirements, as well as making proposals to ensure that products are competitive in target markets. The study's findings demonstrate the need for implementation of international standards in export operations to expand export geography and quantity, reduce one market dependency, and penetrate products into European markets.

REFERENCES

[1] Mirziyoev Sh.M. "Priority tasks to be implemented in export, investment and industry in 2024". Presidential meeting. Tashkent. 2024.
[2] Mirziyoev Sh.M. "On measures to develop industrial cooperation and localize production". Presidential meeting. Tashkent. 2022.
[3] Khojiev E.Yo. „O‘rik mahsulotlari eksportini oshirishda marketing tadqiqotlaridan foydalanishni takomillashtirish”. Toshkent. Ilm-fan va innovatsiya. p. 103, 2023.
[4] https://webgate.ec.europa.eu/rasff-window/screen/search
[5] Regulation (EC) No 178/2002 of The European Parliament and of the Council on laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. 2002.
[6] Shoaei F., Heshmati A., Khorshidi M. The risk assessment of sulphite intake through dried fruit consumption in Hamadan, Iran. Journal of Food Quality and Hazards Control. 6:121-127,2019.
[7] Stražanac D., Gross-Bošković A., Hengl B., Bašić S., Sokolić D. Use of sulphur dioxide and sulphites (E 220-E 228) in canning of crab meat. Meso: prvi hrvatski časopis o mesu. 21: 269-278, 2019. [DOI: 10.31727/m.21.3.5].
[8] The European Parliament and Council Directive No 95/2/EC on food additives other than colours and sweeteners. pp. 27-29. 1995. Rev.2006.
[9] Standard for dried apricots CXS 130-1981. pp. 3-4,2019.