



## TOXIC RESIDUE OF CHEMICAL ELEMENTS IN DIFFERENT FRUITS AS A RESULT OF EXCESSIVE FERTILIZATION AND MISUSE OF AGRICULTURAL PESTICIDES IN IRAQ

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### Abstract

This study determines the concentration of nitrates using Green Test Eco in imported and local fruits and vegetables grown in greenhouses and open agriculture in the State of Iraq. This study aims to measure the percentage of toxic substances remaining in the fruits as a result of adding fertilizers and chemical pesticides. Tested using Green Test Eco, a mobile device that performs rapid measurements of nitrite ratios in different fruits and the device has a permissible level for each fruit where six crops have been selected (tomatoes 300, Eggplant 300-Potatoes 250-cucumbers 400-Onions 80 -green pepper 250) and this allowed amount is for one kilogram. A very high concentration of nitrates was observed in imported vegetables and fruits such as potato 440, cucumber 425, eggplant 338, and tomato 316.24. While the results were recorded less in the fruits planted in the greenhouse also, but to a lesser rate, which are potatoes 420 and cucumber 377.5 and eggplant 367.5 and tomato 271, while the results of the examination of local fruits planted in open fields are edible and less than the allowable standard and did not record any increase in the level of nitrite. In pepper and onion crops, therefore, we advise the consumer to eat the fruits grown in the local open fields and reduce the consumption of hidden fruits grown in greenhouses as a result of excessive use of pesticides and fertilizers to increase the amount of production, which affects the amount of nitrates in the fruits..

**Keywords:** Nitrate Concentration, Imported Vegetables and Fruits, Greenhouses, Open Fields, Green Environmental Test

### Introduction

The pesticide residues in vegetables and fruits recorded a danger to human health, and these chemicals are sure to cause many diseases (Jana and Moktan, 2013). Insecticides are defined as toxic substances used to exterminate insects. These materials are used to get rid of insects that transmit diseases in some areas. Many experiments and research have proven that these chemicals used have a detrimental effect on the environment and human health in the long run (Brkić *et al.*, 2017), meaning that symptoms and diseases do not appear dynamically in humans until after a long period, such as cancer symptoms that appear suddenly. The role of nitrogen fertilizers increases in the growth, performance and quality of products in agriculture to achieve more production and leads to excessive use or misuse of nitrogen fertilizers to increase the level and concentration of nitrates and nitrites in vegetables and other food products, which is an important indicator of quality because of its impact on human health (Ziarati and Arbabi-Bidgoli, 2014). Nitrates are contained in all vegetables, fruits, drinking water, juices, etc. A person consumes it daily in various forms. Nitrates alone are not a deadly poison to living organisms however; they can be chemically converted to nitrites under various conditions, which in turn can cause serious poisoning (Ranasinghe and Marapana, 2018). The current industrial revolution has increased fertilizer production, which has now caused global concern due to its harmful effects on the environment and human health (Raczuk *et al.*, 2014).

### Material and Method

This experiment was conducted in Babel governorate in the laboratories of the Technical College, Al-Musayaib, where the reading was taken in 2019 and testing the fruits on the market from various sources from grocers and farmers, the fruits were collected daily and the toxic residue ratio was measured using a mobile device for this experiment (Nitrite device "Green test Eco", which measures the remaining organic matter in the fruits and is Russian in origin produced by the company ANMEZ), the procedure was indicated in a previously published paper (Raczuk *et al.*, 2014).

### Results and Discussion

The results were obtained from the examination of most fruits imported from outside Iraq, which were found to contain a high amount of toxic substances compared to field crops grown, especially potatoes, eggplant and cucumber imported from abroad (Ranasinghe *et al.*, 2018). From the results of the examination it was found that the fruits planted under the greenhouse are the dangerous to humans and animals from the fruits grown in the open field and that most of the fruits containing the remaining materials are primarily potatoes fruits and in the second class the eggplant (Chung *et al.*, 2011). The reason is that the farmer adds high chemicals while harvesting the fruits and also that the farmer uses chemical pesticides with a long-term toxic residue compared to the crop-collecting periods.

**Table 1 :** Examination results of Nitrate average measured value for imported fruits

No	Kind of vegetable	Standard limit (mg/kg)	measured value 1 (mg/kg)	measured value 2 (mg/kg)	measured value 3(mg/kg)	measured value 4 (mg/kg)	The average
1-	Tomatoes	300	310	316	319	320	316.24
2-	Eggplant	300	360	440	340	412	388
3-	Potatoes	250	320	480	500	380	440
4-	Cucumbers	400	400	320	480	500	425
5-	Onions	80	30	40	30	40	36.25
6-	Green pepper	250	320	320	250	260	242.5

It was observed from Table No. 1 of the imported vegetables when measuring the nitrate concentration that it is higher than the standard limit in vegetables such as potatoes,

eggplant, cucumbers, and tomatoes. As for products that contain nitrate levels below the permitted standard, such as onions and green peppers.

**Table 2 :** Examination results of Nitrate average measured value for local fruits grown inside greenhouses

No	Kind of vegetable	Standard limit (mg/kg)	measured value 1 (mg/kg)	measured value 2 (mg/kg)	measured value 3(mg/kg)	measured value 4 (mg/kg)	The average
1-	Tomatoes	300	210	316	250	310	271.5
2-	Eggplant	300	360	440	340	330	367.5
3-	Potatoes	250	320	480	500	420	420
4-	Cucumbers	400	400	380	320	410	377.5
5-	Onions	80	90	40	35	32	49.25
6-	Green pepper	250	320	250	260	240	245

In Table 2, in which the ratio of nitrates to vegetables that were grown in greenhouses was measured, the ratios recorded a high decrease for most readings than they were in imported vegetables, but without some estimation of nitrate concentration is higher than the permissible limit, as in potatoes and eggplant, while the rest of the vegetables were

less than Allowed proportions. And in the Table No. 3 less nitrate ratios were recorded than the permissible percentages of vegetables grown in open fields, which are healthy for humans and within the extent possible to be dealt with from the remaining nitrate ratios (Fakhreddin *et al.*, 2014), and this is what our study aims in this work.

**Table 3 :** Examination results of Nitrate average measured value for in the open field

No	Kind of vegetable	Standard limit (mg/kg)	measured value 1 (mg/kg)	measured value 2 (mg/kg)	measured value 3(mg/kg)	measured value 4 (mg/kg)	The average
1-	Local tomatoes	300	265	270	300	280	278.75
2-	Local eggplant	300	280	270	240	290	270
3-	Local potatoes	250	240	230	200	220	222.5
4-	Local cucumbers	400	380	330	310	315	333.75
5-	Local onions	80	40	40	35	55	42.5
6-	Local green pepper	250	240	250	230	250	242.5

## Conclusions

A high concentration of nitrate content is found in vegetables like eggplant, potatoes and imported cucumber. The highest values were: for potatoes from (430-420) mg / kg and the allowable standard limit are (250 mg / kg), and eggplant from (388-376.5) mg / kg and the allowable standard limit is (300 mg / kg), the imported option 425 mg / kg (standard limit 400 mg/kg), tomato 243.16 mg / kg (standard limit 300 mg / kg). This is not recommended to eat these vegetables because of the high percentage of nitrate residue due to its risks to human health. As for local vegetables, the proportions allowed for the remaining nitrate values have been recorded, that is, less or equal to the internationally permitted limit, and it is advised to eat these products and that the fruits planted in open farms are better than the fruits grown in greenhouses, because most pesticides and fertilizers that are added to homes The closed ones evaporate and descend again on plants, which increases the period of their survival in the fruits (Ayaz *et al.*, 2007).

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