



## ASSESSMENT OF NITRITE LEVELS IN FRUITS, VEGETABLES AND HERBS FROM DIFFERENT AGRICULTURAL SOURCES

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**Abstract:** This study evaluated nitrite concentrations in fruits, vegetables and leafy plants from a local open market and a supermarket in Galați, Romania. Nitrite determination used the spectrophotometric Griess reaction ( $R^2=0.9969$ ;  $LOD=0.0056 \mu\text{g/mL}$ ;  $LOQ=0.0188 \mu\text{g/mL}$ ). Nitrite content ranged from 5.9 to 80.5 ppm, highest in parsley, red beetroot and carrot. Statistical analysis showed a right-skewed distribution. Results highlight the influence of plant type, agricultural practices and post-harvest conditions on nitrite accumulation. **Keywords:** nitrites, Griess reaction, plant products, food safety, spectrophotometry.

### • Introduction

This study evaluates nitrite content in fruits, vegetables and herbs from a local open market and a supermarket in Galați, Romania, exploring correlations between agricultural source, plant type and nitrite accumulation.

### • Material and method

Reagents (Sigma-Aldrich): glacial acetic acid, sodium nitrite, sulfanilic acid,  $\alpha$ -naphthylamine, zinc powder.

Equipment: Rayleigh UV201 double-beam UV-Vis spectrophotometer. The Griess reaction was used: in acidic medium, nitrites form a diazonium salt with sulfanilic acid, which couples with  $\alpha$ -naphthylamine to produce a pink-red azo compound measured at 540 nm.

### • Results and discussions

Nitrite concentrations ranged from 5.9 to 80.5 ppm across 19 plant samples: low (5.9–6.9 ppm) — cucumber, potato, celery, dill, sorrel; medium (11–26 ppm) — red orach, lettuce, spinach, bell pepper; high (34–51 ppm) — cherries, strawberries (selected varieties); very high (64–80.5 ppm) — carrot, red beetroot, parsley.

### • Conclusions

The spectrophotometric Griess method proved suitable for nitrite determination in plant products ( $R^2 = 0.9969$ ;  $LOD = 0.0056 \mu\text{g/mL}$ ;  $LOQ = 0.0188 \mu\text{g/mL}$ ). Nitrite concentrations varied widely (5.9–80.5 ppm), with highest values in parsley, red beetroot and carrot. The right-skewed distribution reflects the sporadic nature of nitrite accumulation, influenced by agricultural practices, post-harvest conditions and plant type. In the absence of EU legislative limits for nitrites in fresh vegetables (unlike nitrates, regulated by Regulation EU 2023/915), these findings underline the importance of monitoring nitrite levels in plant-based foods for public health protection.

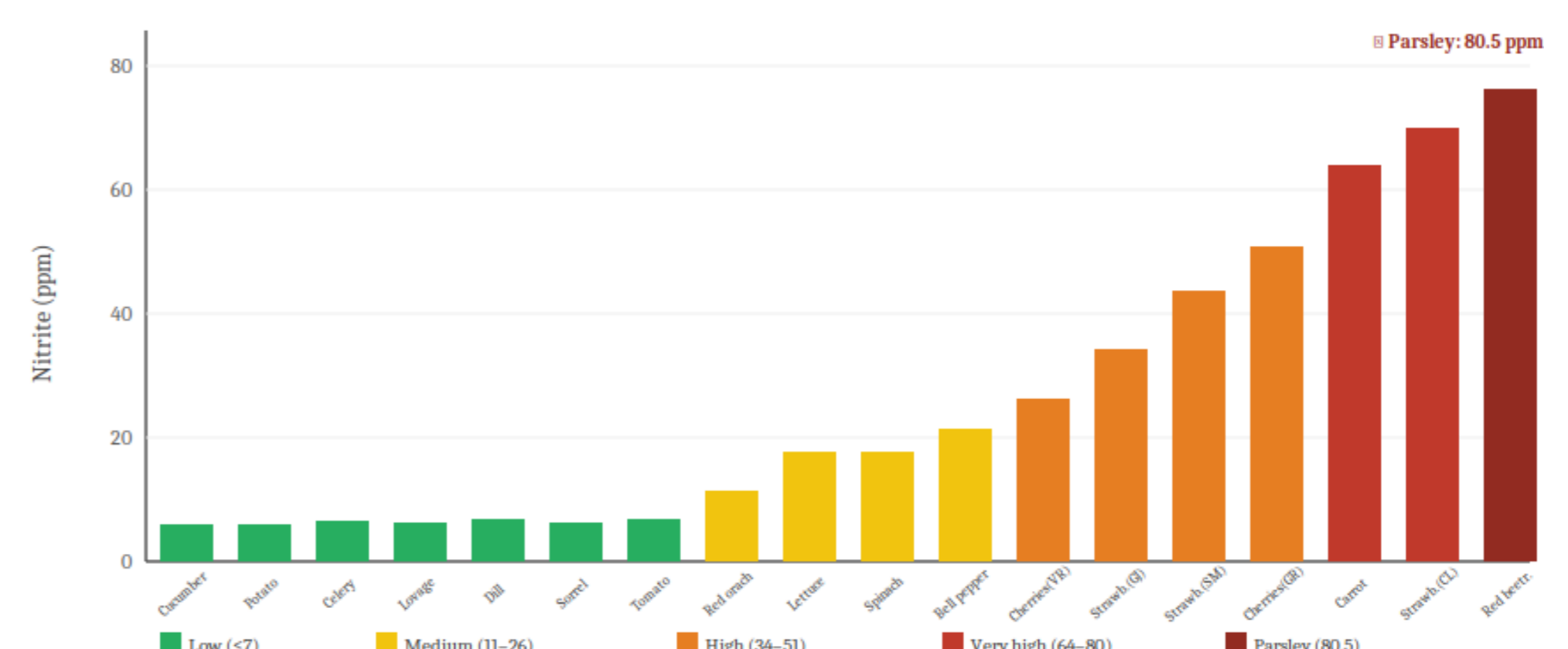


Table 1. Nitrite concentrations in plant-derived samples (selected)

Plant product	Mean $\pm$ SD (ppm)	Median (ppm)
Cucumber	5.90 $\pm$ 0.35	5.90
Spinach	17.88 $\pm$ 0.87	17.90
Bell pepper	21.57 $\pm$ 0.95	21.60
Strawberries (Giurgiu)	34.31 $\pm$ 1.43	34.50
Cherries (Greece)	51.00 $\pm$ 1.05	51.11
Strawberries (Călărăși)	70.05 $\pm$ 2.08	70.20
Carrot	64.19 $\pm$ 1.04	64.30
Red beetroot	76.39 $\pm$ 0.26	76.50
<b>Parsley</b>	<b>80.48 <math>\pm</math> 1.47</b>	<b>80.50</b>

Data represent mean  $\pm$  SD of triplicate determinations. Highest value highlighted in red.

Fig. 1. Nitrite concentrations in plant products (ppm)



### References

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