

# Traditional foods from the Black Sea Area countries: minerals and trace elements content

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## BACKGROUND/AIM

Minerals and trace elements are essential for biological processes and play a vital role in normal growth and development. Low intake or reduced bioavailability of minerals may lead to deficiencies, which causes impairment of body functions. Due to the unquestionable importance of minerals in human nutrition, sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), iron (Fe), copper (Cu), phosphorous (P), zinc (Zn), manganese (Mn) and selenium (Se) are being determined, as well as other nutrients, in traditional foods from Black Sea Area countries, in the frame of the European Project BaSeFood (Sustainable Exploitation of Bioactive Components from the Black Sea Area Traditional Foods) [1]. The aim of this study was to produce new analytical data of minerals and trace elements content in traditional foods in order to highlight their potential positive health effects.

## MATERIALS AND METHODS

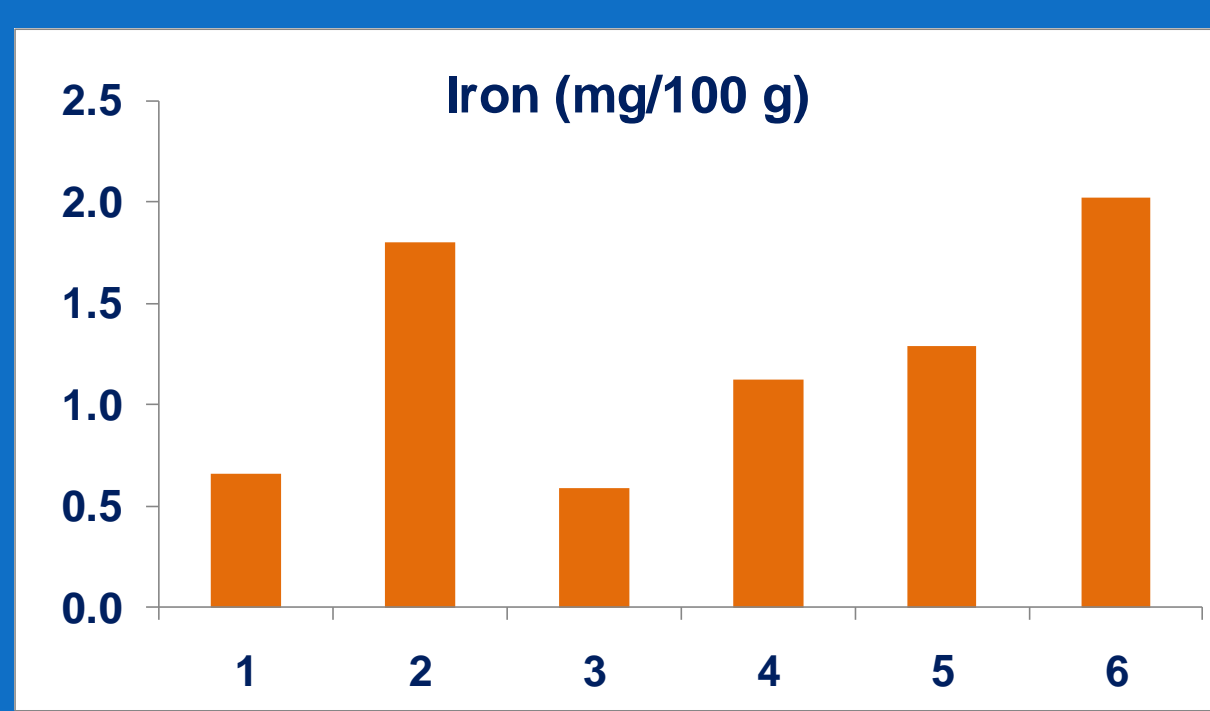
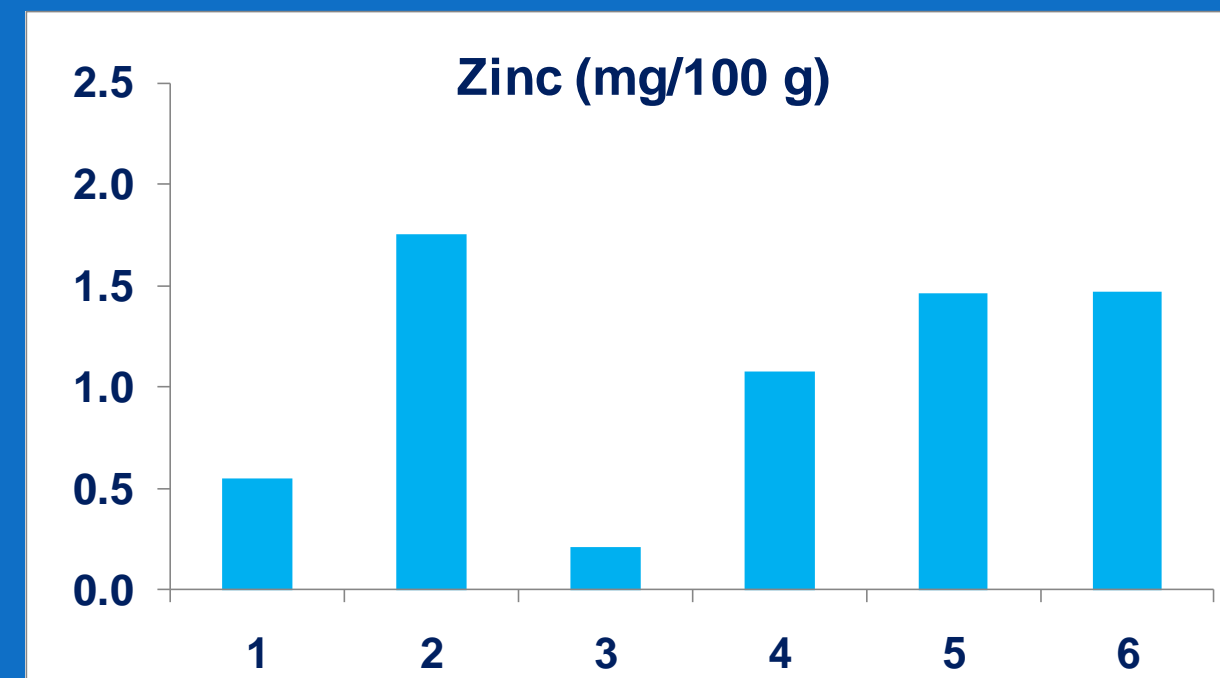
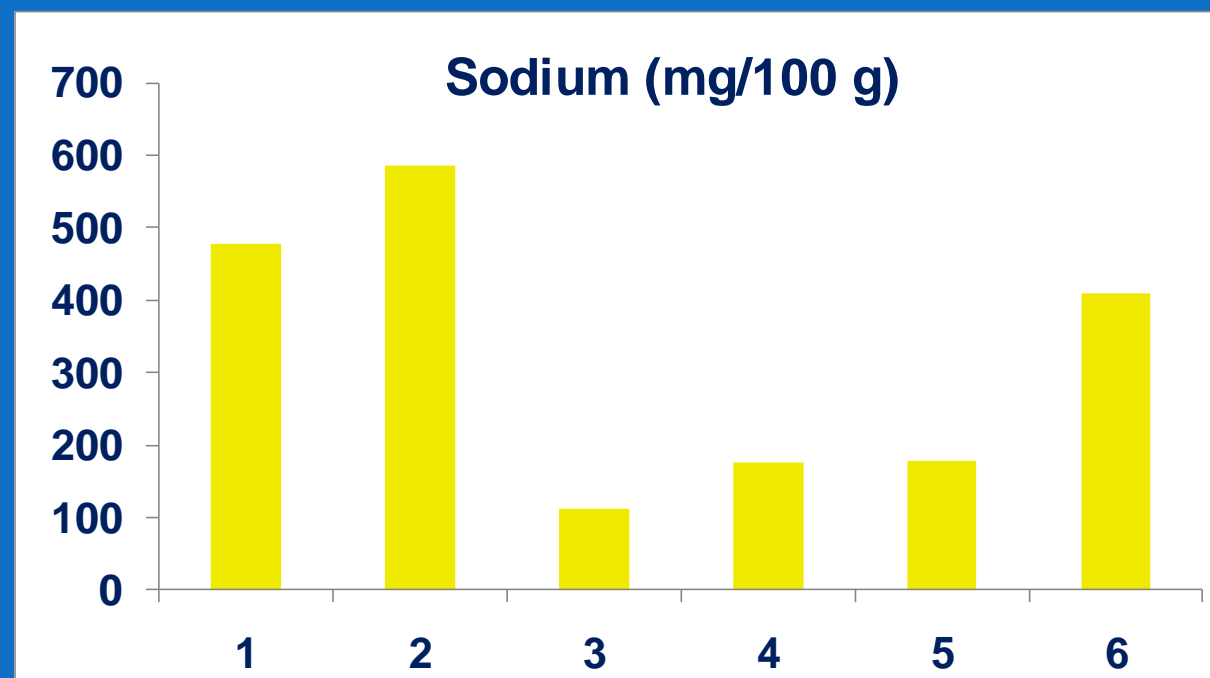
- ✓ All minerals and trace elements were analysed by Inductively Coupled Plasma – Optical Emission spectrometer (ICP-OES) except for selenium which was performed by graphite atomic absorption spectroscopy in the selected traditional foods from Black Sea Area countries.
- ✓ The methods used in this study are accredited by ISO/IEC/17025 or the laboratory participates successfully in proficiency testing schemes.



Figure 1. Selected Traditional Foods from Black Sea Area countries.

## RESULTS AND DISCUSSION

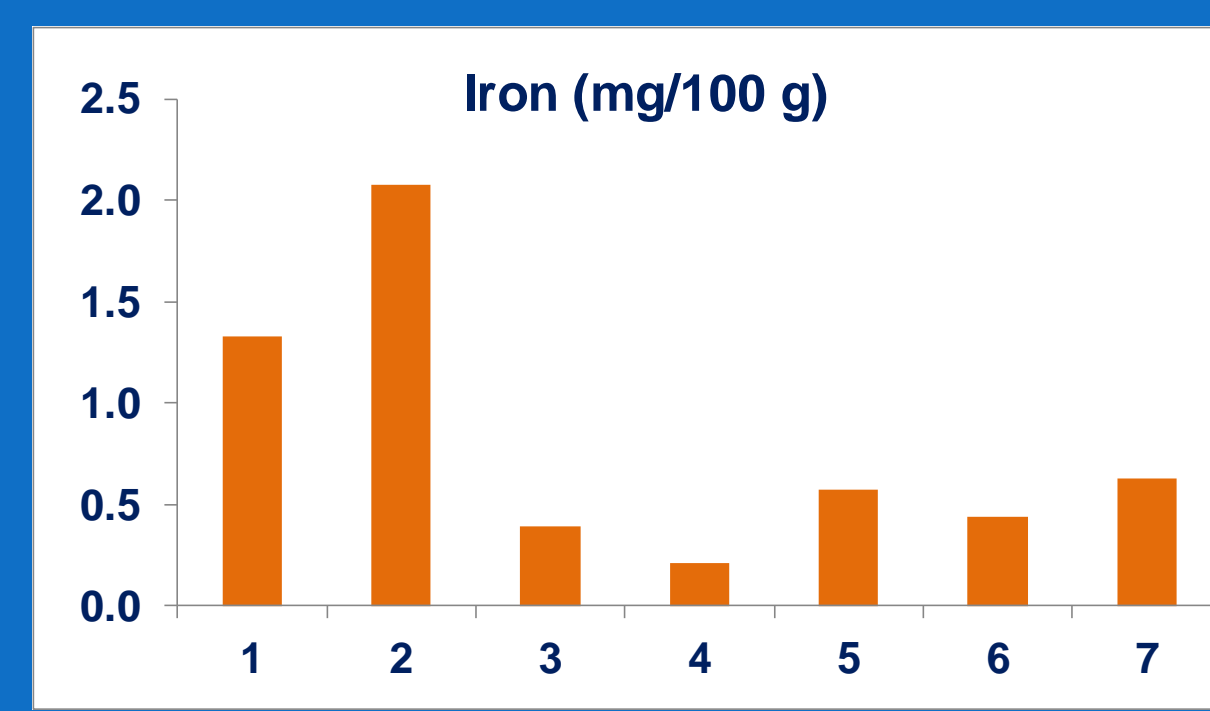
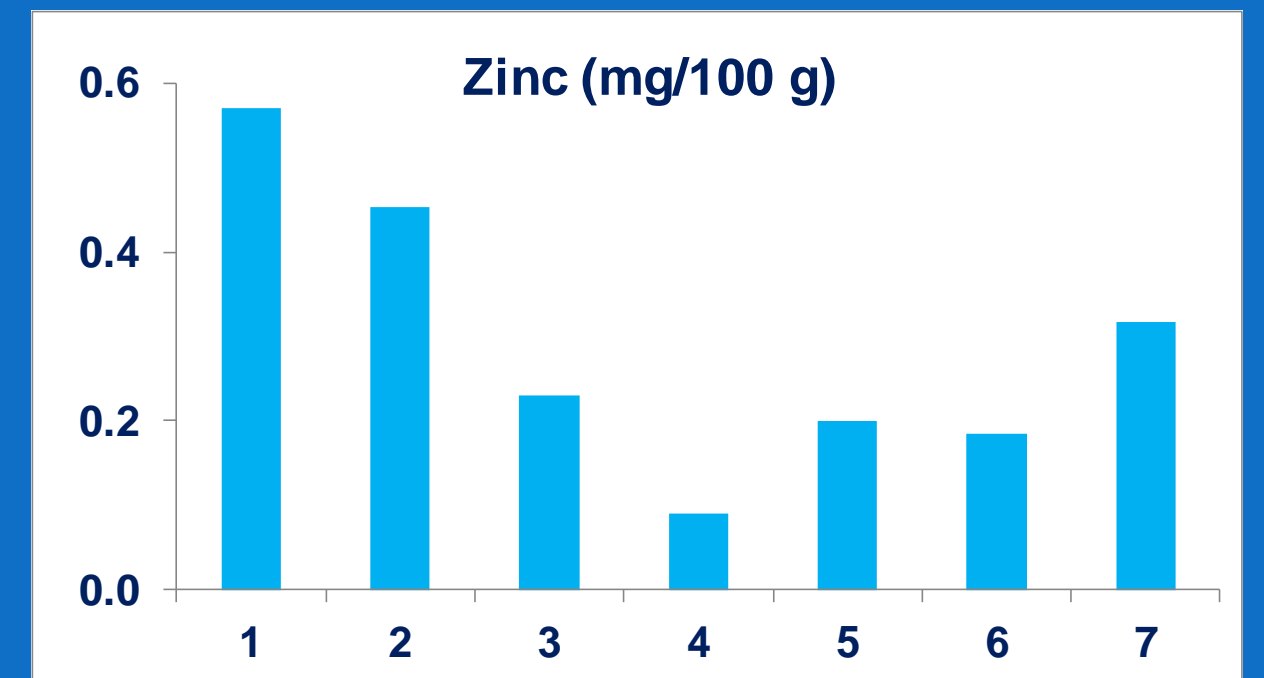
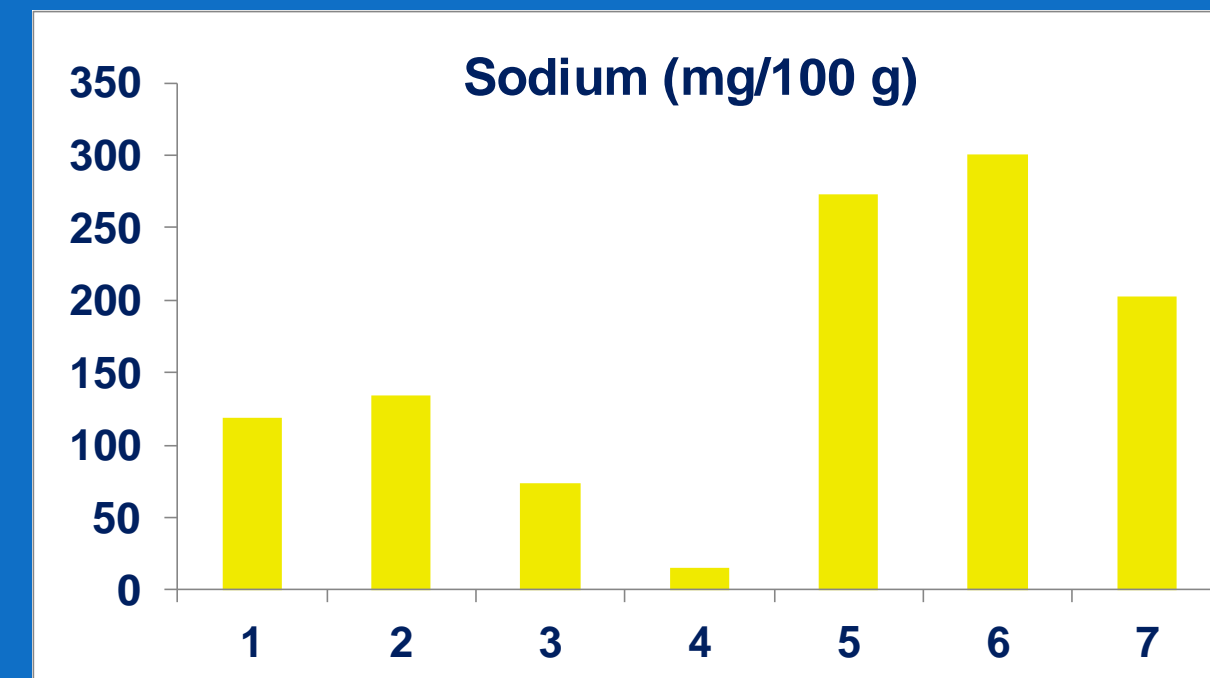
### CEREAL OR CEREAL BASED FOODS



In this group, all the foods had a selenium content lower than 16.0 µg/100 g (limit of quantification, LOQ). Tsiteli doli bread presented the highest Na and Zn contents and the second highest Fe content, among the foods analysed from this group.

- 1 – Baked layers of pastry stuffed with pumpkin
- 2 – Tsiteli Doli Bread
- 3 – Cornmeal mush
- 4 – Buckwheat porridge crumby
- 5 – Bulgur pilaf
- 6 – Sour rye bread

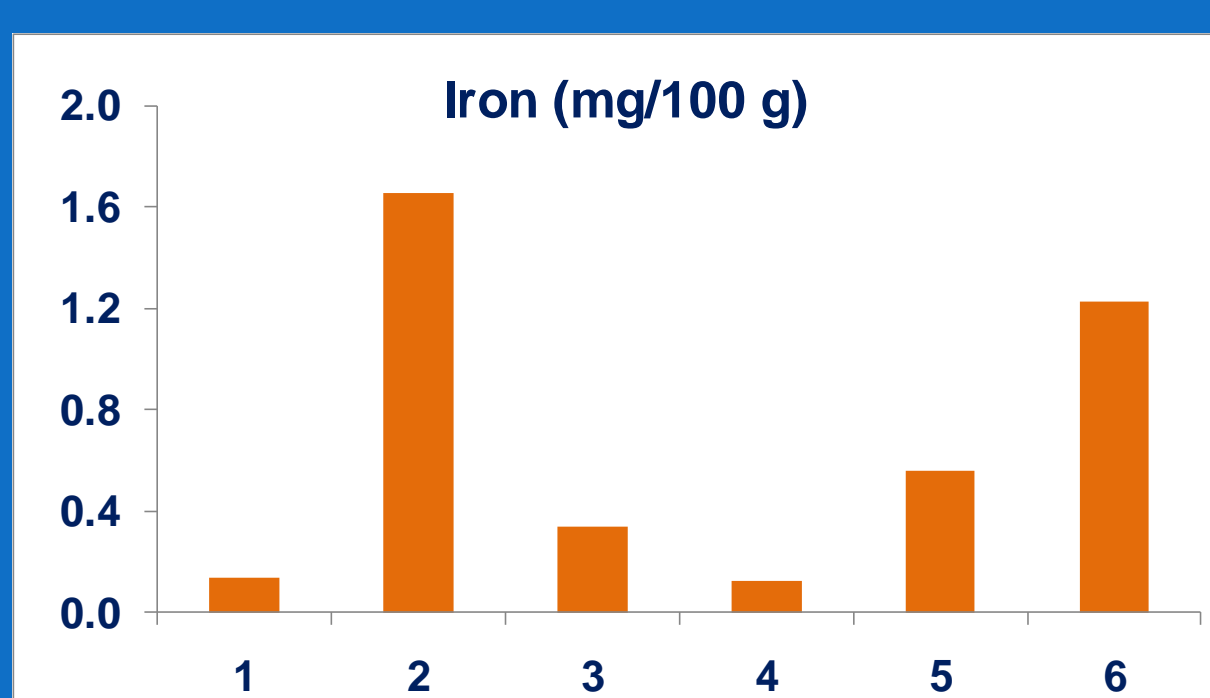
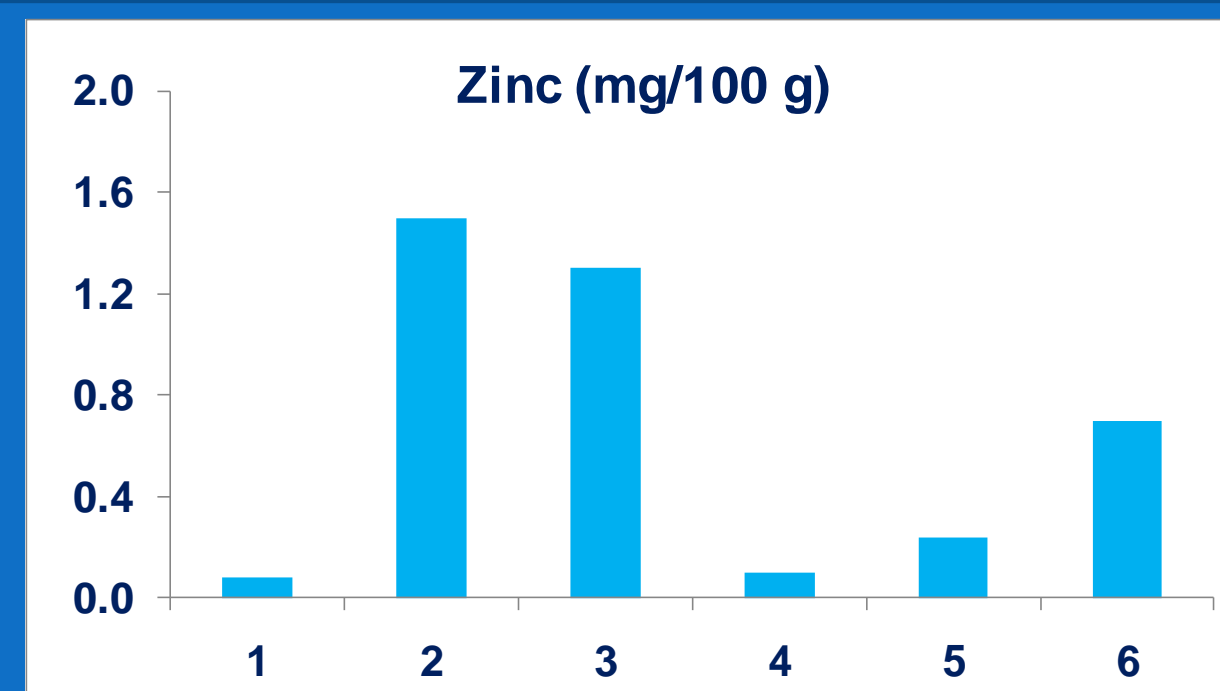
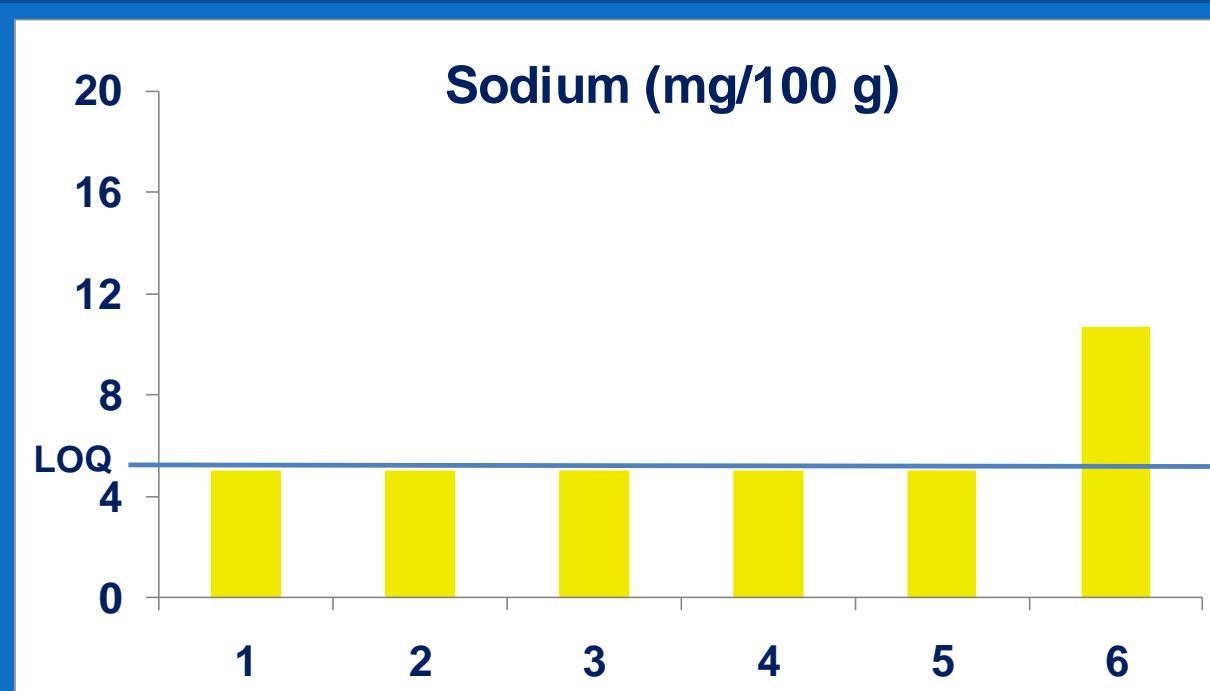
### VEGETABLE OR VEGETABLE BASED FOODS



Transcarpathian green borsch had the highest Na content. The highest content in Fe and Zn was found in Nettles with walnut sauce and Rodopian dried beans, respectively. All the foods within this group had a selenium content below LOQ.

- 1 – Rodopian dried beans
- 2 – Nettles with walnut sauce
- 3 – Nettle sour soup
- 4 – Vegetable okroshka
- 5 – Kale soup
- 6 – Transcarpathian green borsch
- 7 – Ukrainian borsch

### FRUIT OR FRUIT BASED FOODS

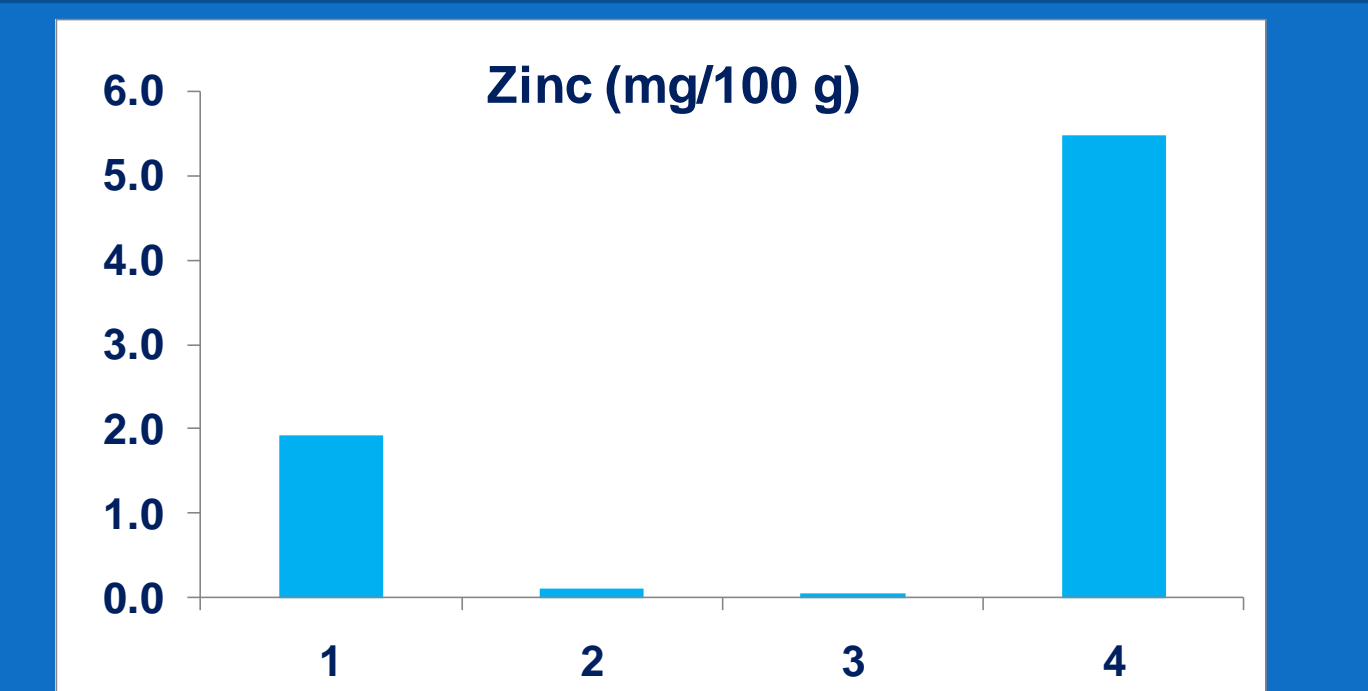
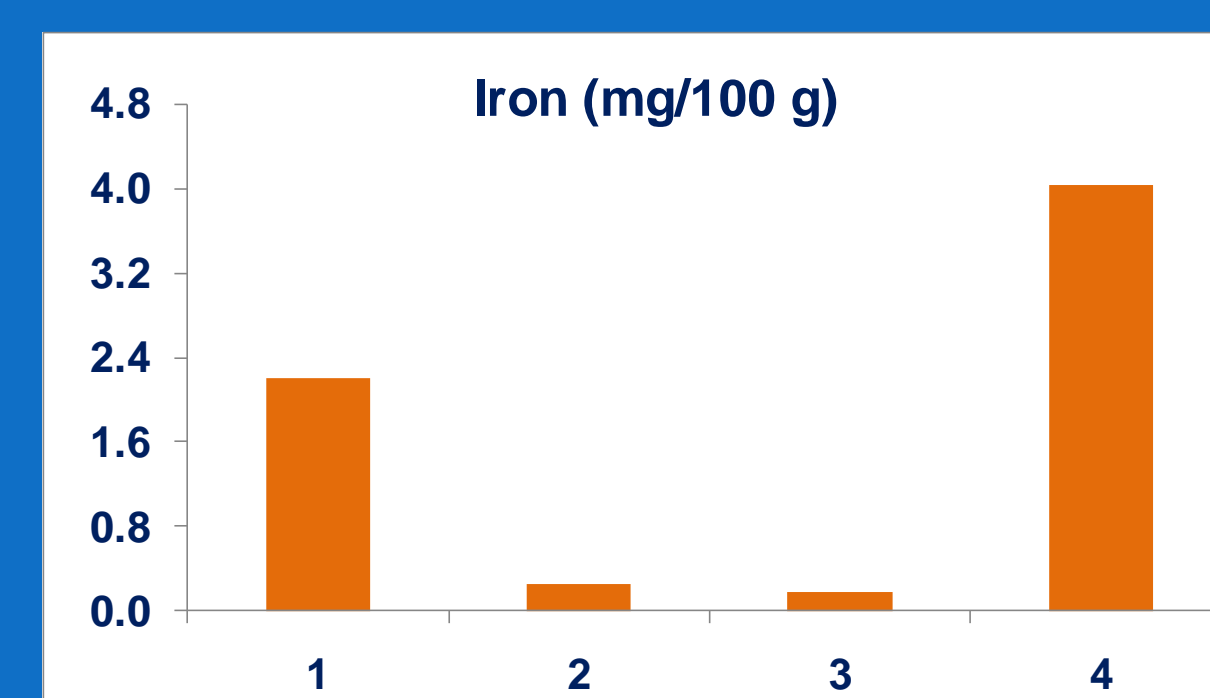


In this group, churchkhela and rose jam had a selenium content higher than 31.0 µg/100 g (data not shown) and for the other traditional foods selenium content was lower than 16.0 µg/100 g (LOQ). All foods had a Na content < 5.0 mg/100 g (LOQ), except for uzvar.

- 1 – Rose jam
- 2 – Churchkhela
- 3 – Plums jam
- 4 – Watermelon juice
- 5 – Fruit of the evergreen cherry laurel
- 6 – Uzvar

### OILSEEDS OR OILSEED PRODUCTS

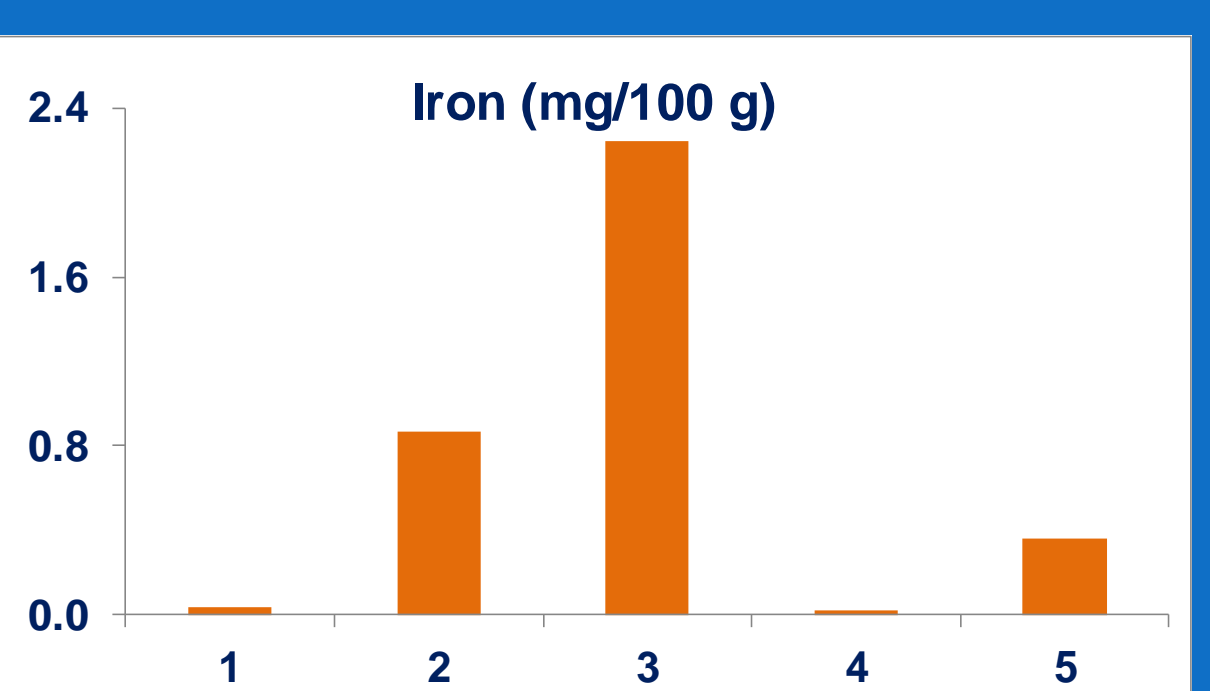
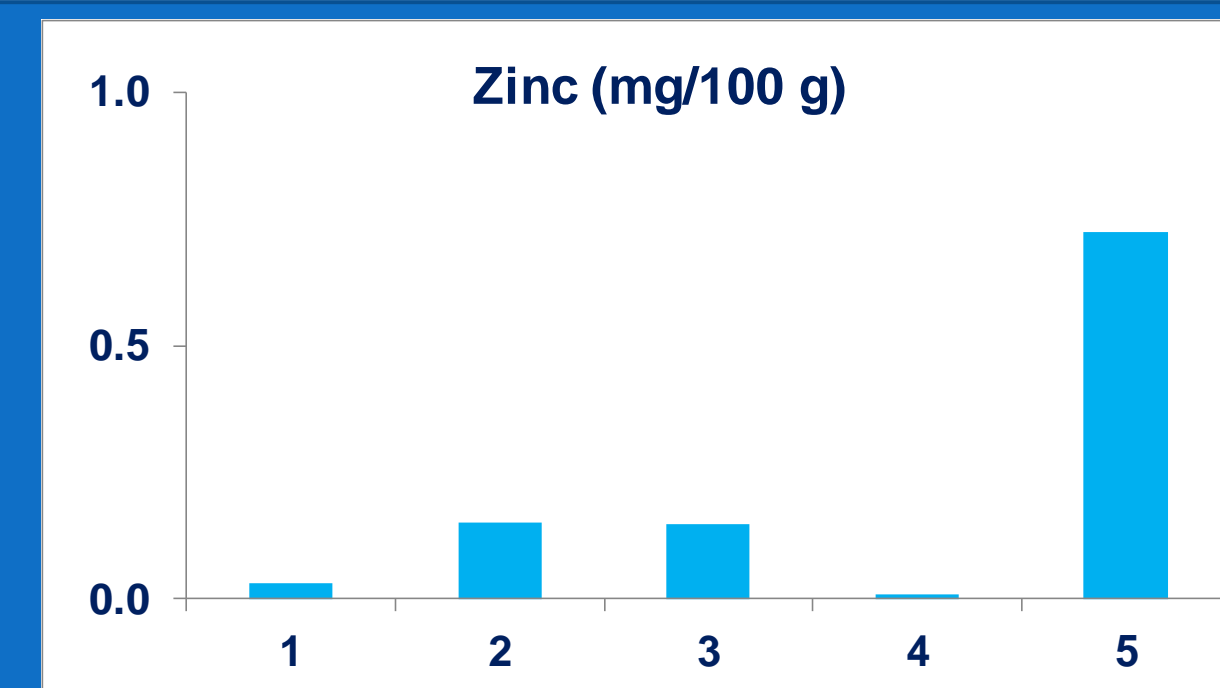
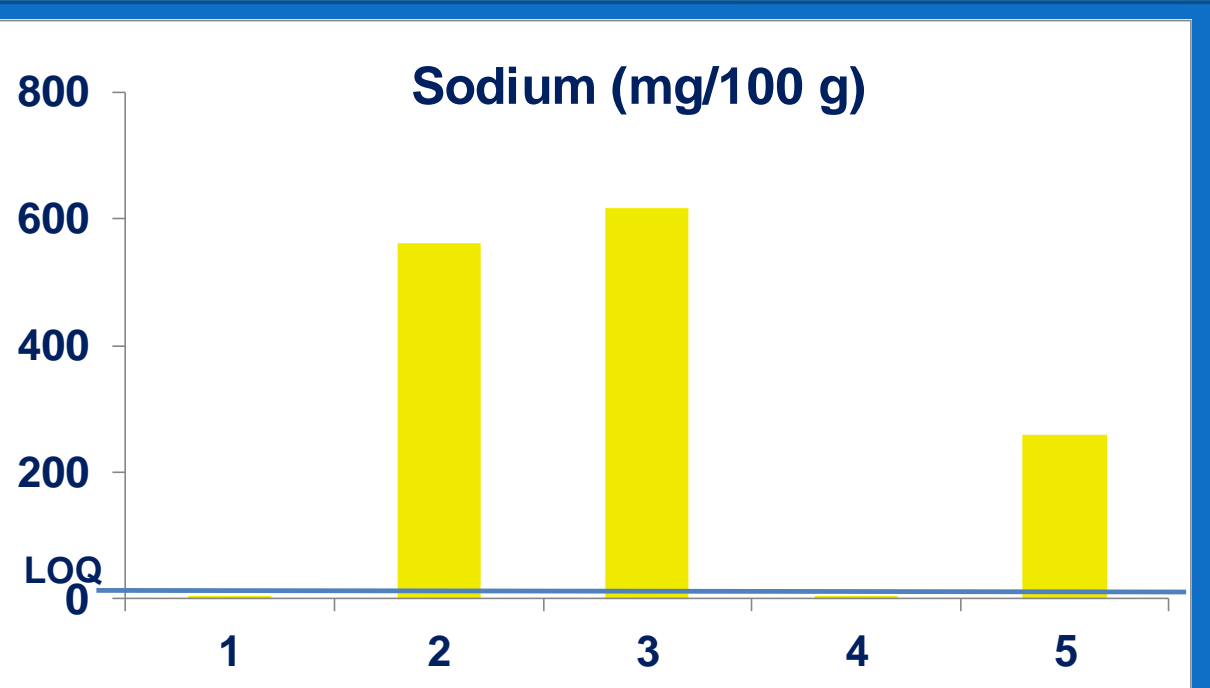
In this group, all the analysed traditional foods had a sodium content lower than LOQ. Roasted sunflower seeds presented the highest Zn and Fe contents followed by Halva.



Roasted sunflower seeds had a selenium content of 24.0 µg/100 g (data not shown) and for the other traditional foods the content was lower than 16.0 µg/100 g (limit of quantification).

- 1 – Halva
- 2 – Flax oil
- 3 – Mustard oil
- 4 – Roasted sunflower seeds

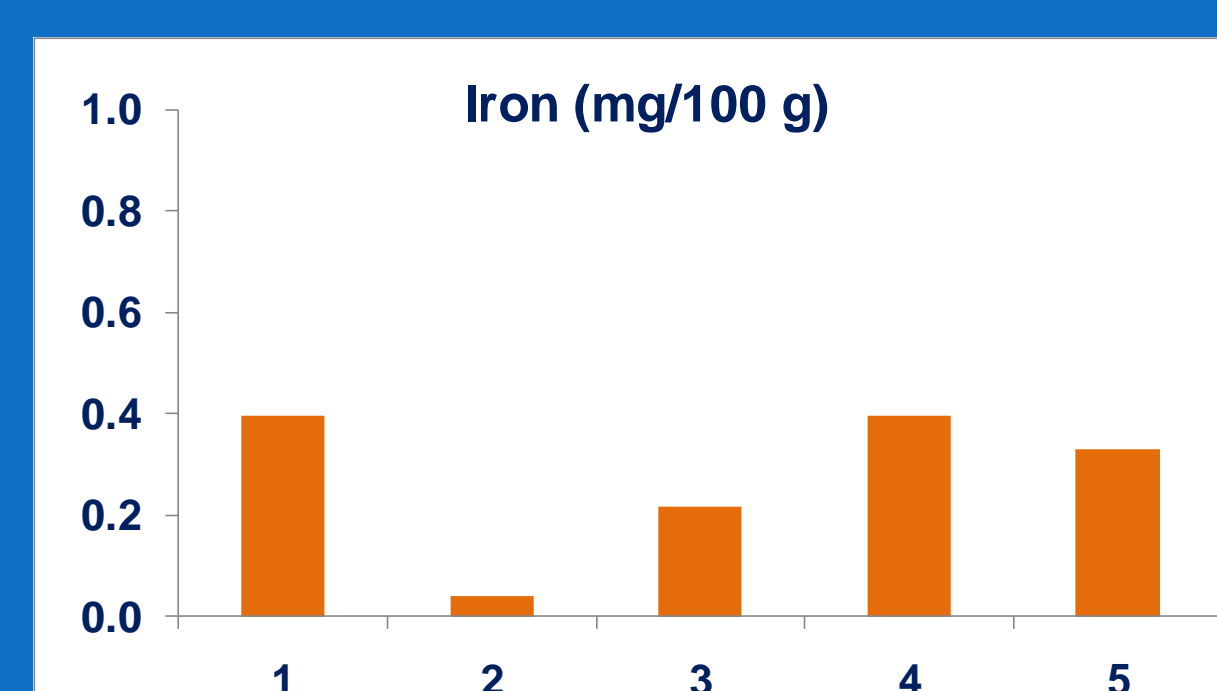
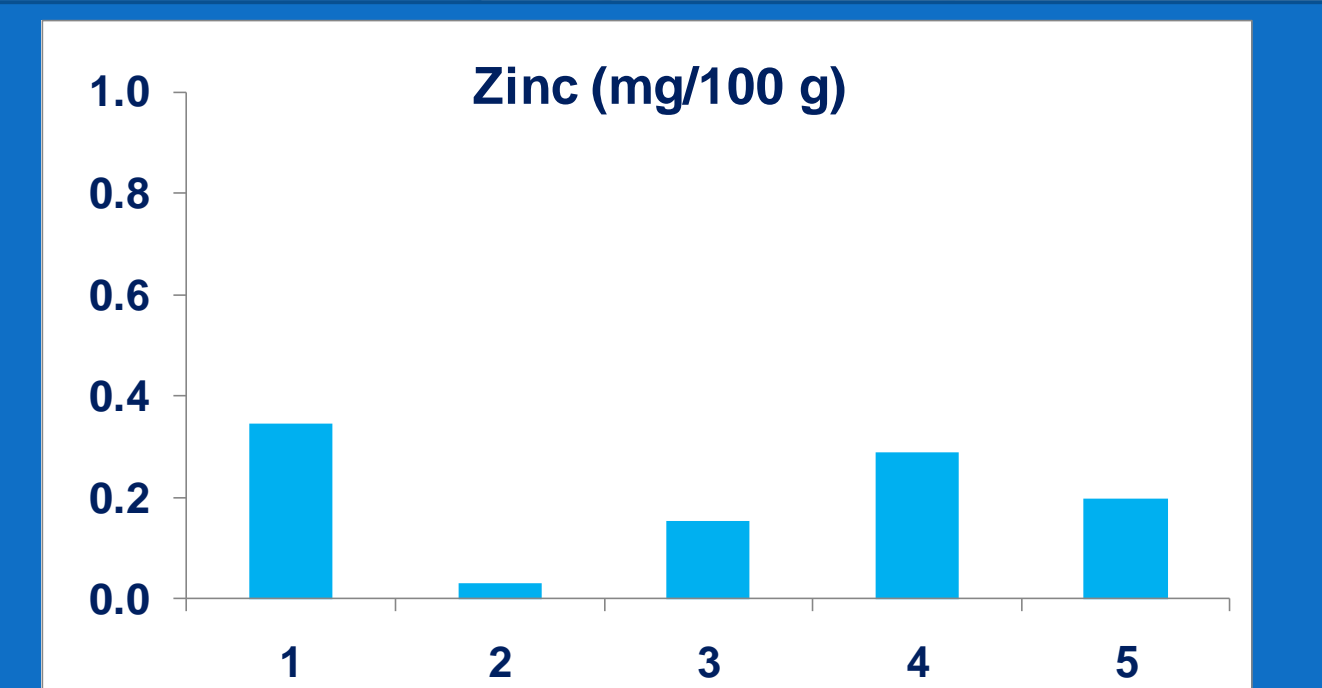
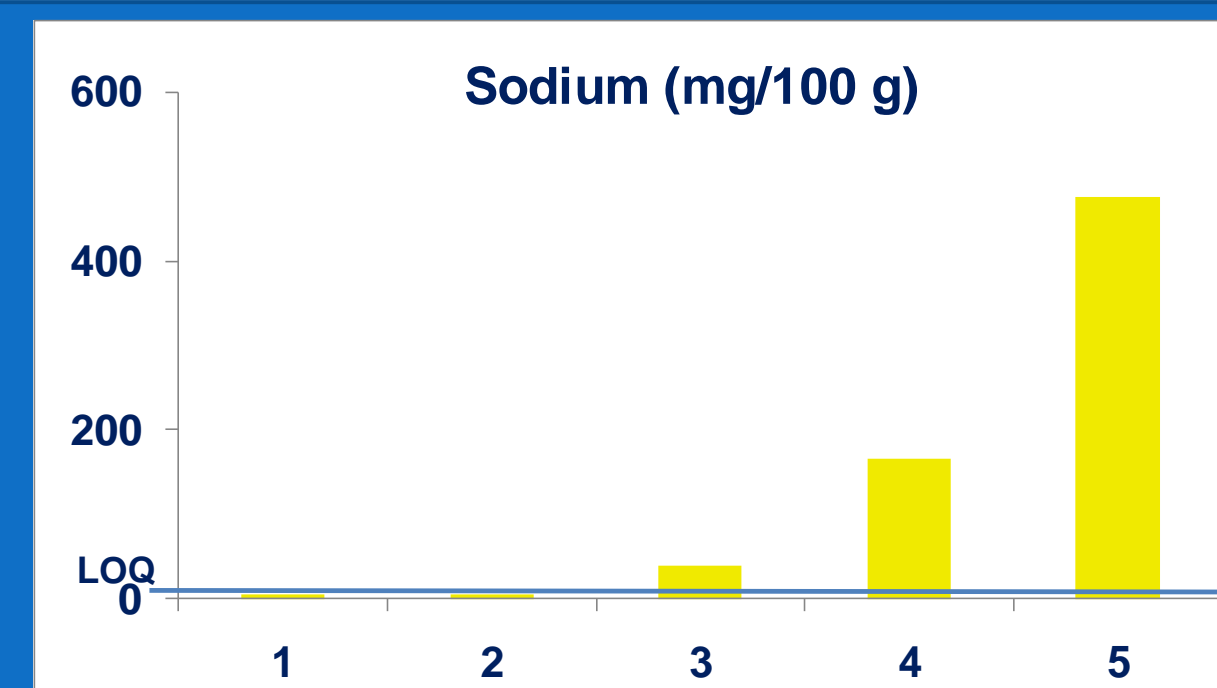
### HERBS, SPICES AND AROMATIC PLANTS



A very high Na content was found in this group for wild plum sauce and herbal dish. In this group, all the foods had a selenium content below LOQ. Herbal dish presented the highest Fe content and cottage cheese with dill and garlic the highest Zn content.

- 1 – Mursal tea
- 2 – Wild plum sauce
- 3 – Herbal dish
- 4 – Black tea
- 5 – Cottage cheese with dill and garlic

### LOW OR NON-ALCOHOLIC FERMENTED FOODS



Also, in this group, all foods had a selenium content below LOQ. Zn and Fe ranged from 0.153 to 0.347 mg/100 g and from 0.217 to 0.397 mg/100 g, respectively, except for elderberry soft drink, where lower values were found.

- 1 – Millet ale
- 2 – Elderberry soft drink
- 3 – Kvass southern
- 4 – Sautéed pickled green beans
- 5 – Sauerkraut

## CONCLUSION

A great variability was found for minerals content in the analyzed traditional foods from Black Sea Area countries. Roasted sunflower seeds is one of the foods that contributes the most for Fe and Zn intake, while baked layers of pastry stuffed with pumpkin and tsiteli doli bread contribute significantly for Na intake. Careful assessment is required in order to evaluate the consequences that these foods might have in human health taking into account the recommended daily intakes of minerals.

## ACKNOWLEDGEMENTS

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## REFERENCES

[1] D'Antuono L.F., Soares Costa H., Sanches-Silva A. (2010). BaSeFood: Sustainable exploitation of bioactive components from the Black Sea Area traditional foods. Nutrition Bulletin, 35, 272-278