IOCXe 2026 Conference
The 1st International Online Conference on Xenobiotics
22–23 June 2026 | Online
MDPI 25 YRS

Micro- and Nanoplastics in Food Products and Drinking Water: Risk Assessment, Analytical Methods, and Regulatory Framework Development

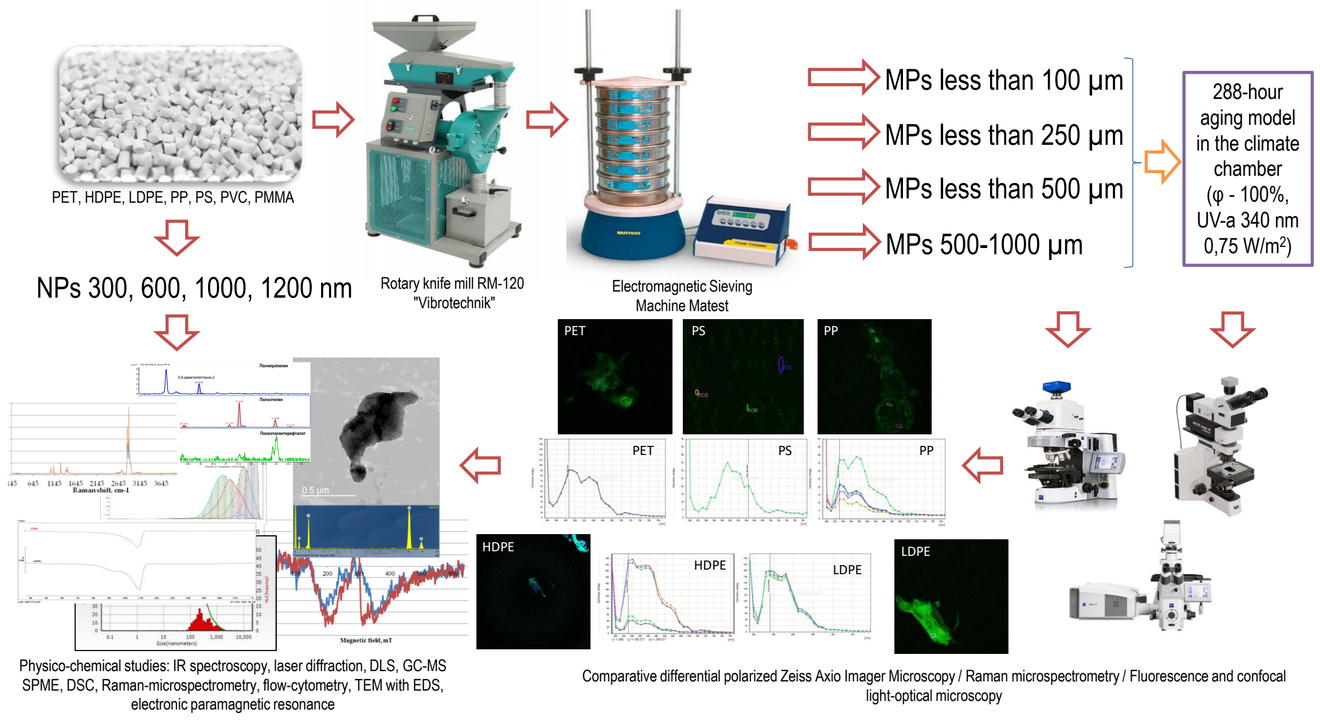
Vladimir Shipelin*, M.D., Ph.D.
Federal Research Centre of Nutrition, Biotechnology and Food Safety
Moscow, Russian Federation

INTRODUCTION & AIM

The relevance of adequately assessing human dietary intake of synthetic polymer particles is undeniable. Through comprehensive research work employing an interdisciplinary approach for the first time in Russia, one of the pressing and emerging issues in modern food hygiene and food safety – the problem of microplastics (MPs) and nanoplastics (NPs) – has been studied.

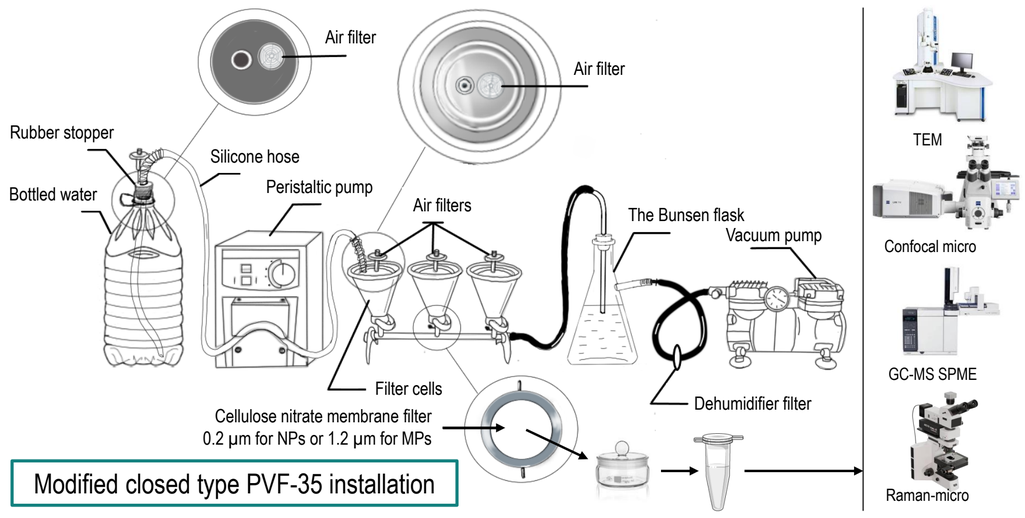
METHOD

The research included preparation of MPs/NPs reference materials, development and validation of analytical methods for detecting MPs/NPs in key food types and drinking water, and exposure and health risk assessment for the general population and occupational groups.



The creation and characterization of MPs and NPs reference samples

The development and validation of analytical methods. Sample's studies



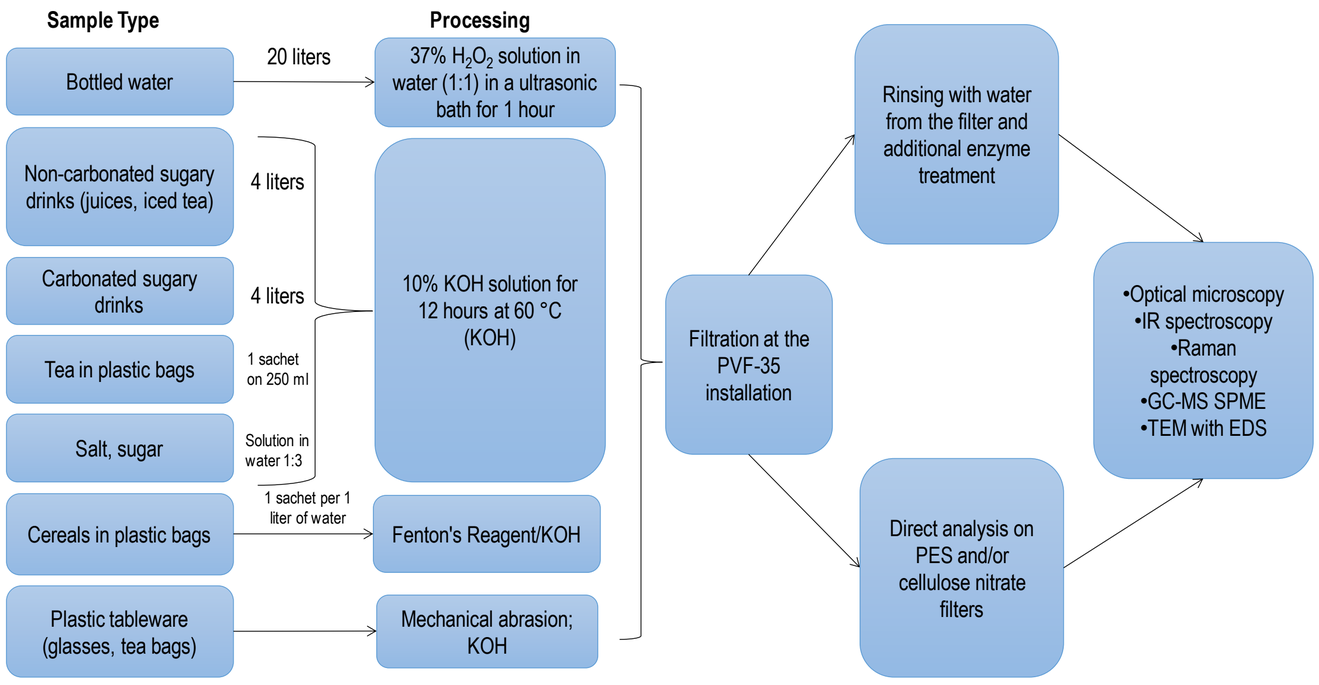
Modified closed type PVF-35 installation

Using the developed scheme for concentrating MPs and NPs were studies 81 samples:

- bottled water in various containers (1-5 liters)
- food salt (sea, boiled)
- juices (nectar, reconstituted; 1-2 liters in a container)
- non-alcoholic beverages (in assortment; 1-2 liters in a container)
- cereals (rice, buckwheat), packaged tea (nylon), craft glasses, etc.

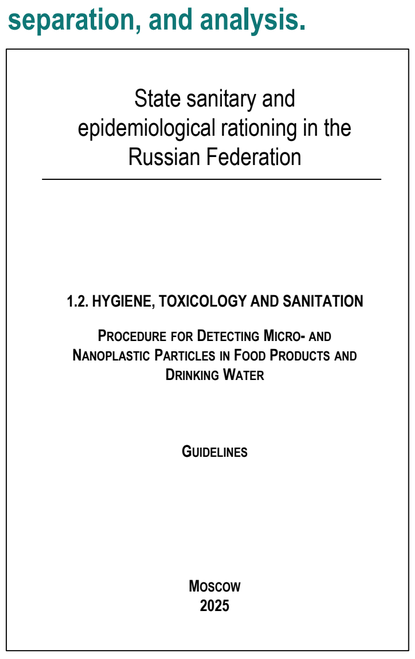
RESULTS & DISCUSSION

MPs contamination levels in most of the 81 tested samples (salt, sugar, juices, cereals, etc.) were relatively low. However, certain bottled waters, nylon tea bags, and paperboard cups were identified as significant MPs/NPs sources with regular use. Athletes consuming bottled water and take-away food in plastic may face elevated exposure.



Algorithm for removing the matrix of food samples during sample concentration

Developed Guidelines "Procedure for Detecting Micro- and Nanoplastic Particles in Food Products and Drinking Water", outlining a structured protocol for sample preparation, separation, and analysis.



The database "Data on consumption in the Russian Federation of food products packaged in plastic containers and products containing the largest amounts of microplastic particles" (494 interviewed and 201 variables) was created and registered with Rospatent (No. 2025626198 dated January 14, 2026)

CONCLUSION

The developed algorithm can be used by organizations conducting large-scale studies on MPs and NPs levels in food products and drinking water to generate a representative body of data. A database was created titled "Data on the Consumption of Food Products Packaged in Plastic Containers and Products with the Highest Detected Levels of Microplastic Particles in the Russian Federation." In combination with a representative dataset on the concentrations of MPs and NPs particles in food products available on the Russian market, this database will allow for the future assessment of their contribution to the total dietary MPs exposure of the Russian population.

The research was carried out within the framework of a subsidy from the Ministry of Science and Higher Education of the Russian Federation for the implementation of a state assignment (FGMF-2025-0004)

*** Correspondence to Vladimir Shipelin: v.shipelin@yandex.ru**

https://sciforum.net/event/IOCXe2026