University of Naples Federico II
Department of Pharmacy
International PhD course in
Nutraceuticals, Functional Foods and Human Health

Assessment of Exposure to Emerging Contaminants in Widely Consumed Foods: An Integrated Approach to Food Safety

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Project description (237 words**)**

In recent years, attention towards emerging contaminants potentially present in food has grown significantly, particularly for substances such as microplastics, veterinary drug residues, pesticides, and packaging-migrating from contaminants. These compounds, often not yet regulated at the national or European level, can accumulate along the food chain and pose a potential risk to human health. Some substances are of particular concern due to their suspected or proven endocrine-disrupting activity, potentially mimicking normal hormonal homeostasis at various levels (1).The project proposes an investigation aimed at detecting and quantifying contaminants in widely consumed food products, with a focus on both animal- and plant-based processed foods. The approach will involve the selection of representative foods based on national consumption data and the development and validation of analytical methods for contaminant identification. Additionally, biocromatography will be employed, utilizing biomimetic stationary phases (phosphatidylcholine, cholesterol and/or proteins), which is considered a predictive tool for assessing the passage of molecules through biological barriers and their toxicity. This will be correlated with toxicity data from cell lines (2,3,4). A further approach involves the use of Permeapad®, a high-performance membrane system already validated for buccal membrane permeability (5,6), which offers greater reproducibility. Based on the obtained data, a risk analysis will be conducted using available toxicological information and comparison with reference thresholds (where available). The expected results will help identify food categories at higher risk, providing useful tools for the development of prevention policies and regulatory updates.

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FUNDS