

## SUMMARY

The term environmental contaminant means a wide range of chemicals and biological agents that can be dangerous to humans.

The contaminants, we are interested, can be found in food of plant origin as a result of improper agricultural practices (use of inappropriate, unregistered pesticides in the wrong quantities and periods of agricultural production).

It is well known, the adverse health effects of these substances are proportional to the amount of substance absorbed and the exposure time as well as influenced by the particular characteristics of each substance.

The acknowledged benefits of using plant protection products in agriculture must be associated with the potential health risks to the consumer taking them for food.

It is well known that the harmful effects of these substances on health are proportional to the amount of the substance absorbed and the time of exposure as well as influenced by the particular characteristics of each substance.

The term 'plant protection products' identifies a range of chemicals used to destroy harmful organisms or to prevent their effects in agriculture, control plant life processes and/or control/destroy the growth of unwanted weeds or weeds. The origin is synthetic and they take different names depending on their use: fungicides, insecticides, herbicides, acaricides and represent, for the most part, substances of toxic, if not even carcinogenic nature, with an important impact on humans, fauna, soil and subsoil, influencing the quality of food, water and the environment.

The project had the following objectives:

- To develop and validate a multi-residue method in fruit and vegetables according to SANTE/11813/2017 also in the framework of the flexible purpose accreditation system for the research of the following active ingredients:

2 fenilfenolo	Dimetoato	Pirimifos-metile
Bitertanolo	Formetanato	Piriproxifen
Boscalid	Fostiazate	Procimidone
Carbendazim	Lamda-cialotrina	Propamocarb
Clorpirifos metile	Linuron	Propargite
Diclorvos	Metalaxyl	Tetradifon
Difenoconazolo	Ometoato	Tetrametrina

- To develop and validate a single residue method in fruit and vegetable foods in accordance with SANTE//11813/2017 also under the flexible purpose accreditation system for the research of the following active ingredients:

BAC	Haloxyfop-p	Glifosate
DDAC	Fluazifop	Mepiquat
2,4-D,	Fluazifop-p	Chlormequat
MCPA	Dichlorprop	nicotina
MCPP-p	Dichlorprop-p	
Haloxyfop	Fluoroxypyr	

These methods applicable to matrices of plant origin can also be extended to water and soil and possibly to biological samples of human and animal origin.

For the realization of the project and the conception of the new analytical methodologies, high performance and high sensitivity techniques (of latest generation) were used, such as GC-MS/MS and LC-MS/MS, both triple quadrupole.

In addition, the experience gained over 15 years in the field of the pesticides and these analytical techniques has facilitated the achievement of our objectives by perfecting innovative, rapid, effective and low cost control systems in accordance with the technical standards ISO EN 17025.

In particular, an effective method has been developed for the detection of Glyphosate that would allow, after an extraction phase, to inject the sample into LC-MS/MS, using a chromatographic column does not require any pre-treatment, as is the case with the classical methods in use.

Also for the research of Fluoroxypyrr, a molecule notoriously difficult to analyze, given the low sensitivity that is obtained with the LC-MS/MS technique, a method and a chromatographic run was developed. These would allow to increase the resolution and therefore the sensitivity of the peak obtaining an excellent signal-to-noise ratio.

The best results were obtained for the research of BACs and DACCs, testing and validating a method that involved the complete elimination of water from the sample preparation and in the mobile phases of the chromatographic stroke, including the internal and external washing phase of the syringe. It is well known that it is impossible to find water totally free of these contaminants because they are used as detergents. Having eliminated water from the entire process, we were able to work with blank samples free of BACs or DDACs (untreated bergamot) contamination and achieve low levels of quantification limits for each analyte.

All the most interesting aspects of the work carried out in these two years, have been discussed and shared with the operators of the sector (IIZZSS and ARPA) during the

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and will be followed by publications in national and international scientific journals with appropriate impact factor.