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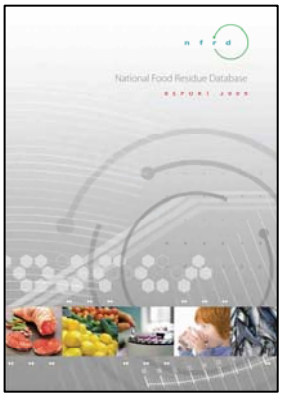
National Food Residue Database



Key external stakeholders:

Food industry; state agencies: DAFF, Pesticide Control Service, FSAI, RPII, EPA, Marine Institute, State Laboratory; scientific community; general public

Practical implications for stakeholders:

This funding has ensured the continued development and enhancement of the NFRD, leading it to becoming the 'one stop shop' for chemical residue information in food in Ireland.

The project resulted in 49 new datasets being published on the NFRD website, along with 2 NFRD annual reports. An exposure assessment to pesticide contamination in food showed that the exposure to pesticides was well below the ADI and the risk to the consumer from pesticides was low

Consumer and industry confidence in food production and processing is key to the sustainability of the food industry in this country. The information contained on the NFRD can be used to promote the safety and quality of Irish food, through its use by the food industry and policy/regulatory agencies. In addition, 'country of origin' for pesticide results can aid importers of fruit and vegetable products to identify countries with safer produce. The NFRD needs to be continuously developed and maintained to help ensure that food safety is at the heart of the development of the food industry in Ireland.

Main results:

- 49 new datasets were uploaded and published on the NFRD website over the duration of the project.
- Two issues of the NFRD Report (2007/2008 and 2009) were published.
- Exposure analyses were conducted for 10 most of the most commonly found pesticides (captan, carbendazim, chlorpyrifos, diphenylamine, fenahexamid, imazalil, iprodione, malathion, prochloraz and thiabendazole).
- Results from this study showed that exposure to pesticides was well below the ADI and the risk to the consumer (both adult and child) from pesticides was low.
- Extensive dissemination was been carried out during the project through publication on the NFRD website, NRFD annual reports and through a workshop.

Opportunity / Benefit:

The National Food Residue Database can be used as a reference tool by the exporters, when queried about the safety of Irish food. It can also be used by importers and processors when buying products from outside of Ireland.

Collaborating Institutions:

UCD

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Teagasc project team: Dr. Martin Danaher (PI)
Dr. Michael O'Keeffe
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External collaborators: Prof. Michael Gibney, UCD.
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Ms Aine Hearty, UCD.
Ms Aileen Connolly, UCD.

1. Project background:

This project is a continuation of the development of the National Food Residue Database (NFRD), established under FIRM project ref. no. 01/R&D/TN/163, extending the application of the NFRD as a primary resource for assessing and improving food safety in Ireland. The NFRD is a key tool towards the objective of assuring consumer protection through providing a comprehensive database on food safety in the area of chemical contaminants in food. The NFRD, through its use by the food industry and policy/regulatory agencies, will help ensure that the development of the food industry is underpinned by attention to food safety.

The food industry needs to have access to data on the occurrence of residues of chemical contaminants in food for a number of reasons: to guide its decisions on sourcing raw ingredients for manufacturing, to inform its approach to developing appropriate control measures to ensure the safety of its food products, and to support its marketing strategies and claims regarding the safety of Irish food products. The food industry is highly vulnerable to adverse publicity on chemical contaminants in food products, as shown by recent events such as contamination of German eggs with dioxins, Irish pork with dioxins, European pork with Nitrofurans, of baby food with isopropyl thioxanthone in Italy, of processed foods with Sudan Red in the UK and Ireland, and of poultry with the feed additive Nicarbazin. In each of these cases, there are actual, or potential, severe losses to the food industry due to product recall, destruction of stock and negative consumer views of the branded products and/or the commodity. The food industry needs access to data on contaminants in food that allows it to be familiar with issues that may threaten its business, to be proactive in developing systems to safeguard its food products and, in particular, to identify the positive attributes of Irish food products in terms of food purity. The NFRD is an important resource providing the food industry, policy/regulatory agencies and the consumer with data that are comprehensive, accessible and in context.

2. Questions addressed by the project:

- What is the exposure to pesticides in the diet of the general population?

3. The experimental studies:

The project was divided into 3 sub projects, the development of the NFRD website and database, an exposure assessment to pesticides and a risk assessment to human health as a consequence of exposure to specific pesticides. The tasks were divided amongst the project partners with Teagasc, AFRC leading the development of the NFRD website and database as well as the risk assessment, while UCD completed the exposure assessment to pesticides.

As part of the development of the NFRD website and database, Anne Marie Sherry a contract researcher was recruited to administer the website and database. This role required the ability to source and upload large datasets form the relevant state agencies. Anne Marie established good relationships with the stakeholders which allowed for successful uploading and publication of a large number of these datasets. In total 49 new studies were published on the NFRD website over the duration of the project and these are listed below:

- Trace Metals in Fish and Shellfish, 2003 to 2006 (Marine Institute)
- Radioactivity Surveillance of Drinking Water, Milk, Foodstuffs and Marine, 2001 to 2007 (RPII).
- Nitrate levels in Leafy Vegetables, 2001 to 2006 (DAFF and State Laboratory).
- Monitoring Programme for Aquaculture, 2005 and 2008 (Marine Institute)
- Monitoring Programme for Pesticides, 2004 to 2007 (DAFF)
- Monitoring Programme for Foods of Animal Origin, 2005 to 2008 (DAFF)
- Nitrate levels in Root and Leafy Vegetables, 2005 to 2006 (Public Analyst laboratories)
- Marine Biotoxin Monitoring Programme, 2007 and 2008 (Marine Institute)
- Mycotoxins in nut products 2007 (Public Analyst laboratories)

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- Dioxin levels in the Irish Environment Fifth Assessment (Summer 2007) Based on levels in Cows' Milk - (Environmental Protection Agency)
- Investigation into levels of dioxins, furans, polychlorinated biphenyls and brominated flame retardants in fishery produce in Ireland - (Food Safety Authority of Ireland)

Two issues of the NFRD Report (2008 and 2009) were published in hard copy as well as electronic copy, available for download on the NFRD website. The 2009 NFRD report contained several new datasets:

1. PCS Data (2006 and 2007)
2. DAFF residues (2008)
3. Marine institute aquaculture residues (2008)
4. Marine institute biotoxins (2008)
5. RPII (2007
6. PALs (mycotoxins in nuts)
7. PALs (nitrates in vegetables)

An extensive review of the information sections in the NFRD was undertaken and revisions and updating were completed. These included links to external sites including regulations both EU and national pertaining to contaminants, pesticides, mycotoxins, heavy metals and marine biotoxins. Information in relation to EPA dioxin studies was updated. While the information on veterinary drugs and prohibited substances was updated and extended with new datasets. Further IT work on the development of the NFRD was prevented due to a restriction by DAFF and The Dept. of Finance on IT infrastructure work.

In sub-project No. 2 the UCD Centre for Food and Health prepared food groups from the food intake data collected during 'The National Children's Food Survey', 'The North/South Ireland Food Consumption Survey' and 'The National Teenagers Dietary Survey'. This data was then converted into Raw Agricultural Commodities, which allowed for exposure analysis to be completed for 10 pesticides (captan, carbendazim, chlorpyrifos, diphenylamine, fenahexamid, imazalil, iprodione, malathion, prochloraz and thiabendazole). Based on the pesticide concentration data from the years 2005 to 2008, deterministic and probabilistic exposure analyses were conducted on all 10 pesticides and acute exposure analyses was conducted on 8 of the pesticides. Results produced by all 3 scenarios were well below the levels of concern. This was true for both children and adults. Results from this study showed that exposure to pesticides was well below the ADI and the risk to the consumer from pesticides was low. As a result, of this exercise it was found to be unnecessary to carry out the risk assessment (sub-project 3). A final report documenting methods and a complete breakdown of all results has been completed.

To disseminate the findings from the project a workshop entitled 'Pesticides and contaminants in food - the safety issue' was held on 11th June 2008 in UCD. This was well attended with 45 attendees from 21 companies.

4. Main results:

- 49 new studies were uploaded and published on the NFRD website over the duration of the project.
- Two issues of the NFRD Report (2007/2008 and 2009) were published in hard copy as well as electronic copy, available for download on the NFRD website.
- An extensive review of the information sections in the NFRD was undertaken and revisions and updating were completed.
- Deterministic and probabilistic exposure analyses were conducted on all 10 pesticides (captan, carbendazim, chlorpyrifos, diphenylamine, fenahexamid, imazalil, iprodione, malathion, prochloraz and thiabendazole).
- Acute exposure analyses were conducted on 8 of the pesticides.
- Results from this study showed that exposure to pesticides was well below the ADI and the risk to the consumer (both adult and child) from pesticides was low.

Extensive dissemination was been carried out during the project through publication on the NFRD website, NRFD annual reports and through a workshop.

5. Opportunity/Benefit:

The probabilistic, deterministic and acute exposure assessments of Irish adults and children to pesticides, will allow this approach to be used in future exposure assessment projects.
The publication of the NFRD reports provides a useful summary of the data contained on the NFRD website,

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allowing industry to quickly review residue data while the NFRD can be then consulted for more detailed information. Publication of NFRD reports also provides scientists with a useful reference point for all research activities.

6. Dissemination:

Main publications:

1. O'Keeffe. M. 2007. Residues of Chemical Contaminants in Food – Issues and Analyses. Plenary lecture to *3rd International Conference on Quality and Safety in the Food Production Chain*, 13-15 June 2007, Wrocklaw, Poland.
2. O'Keeffe. M. 2007. National Food Residue Database. Invited lecture to Environmental and Food Quality Forum, International Dairy Federation *World Dairy Summit 2007*, 29th September – 4th October 2007, Dublin.
3. Sherry, A.M., O'Keeffe, M., and Danaher. M. 2008. National Food Residue Database – Database/Website for Contaminant Residues in Food. Proceedings *EuroResidue VI*, 19-21 May 2008, Egmond aan Zee, The Netherlands

Popular publications:

1. Sherry, A.M. Teagasc AFRC. National Food Residue Database - chemical contaminants in food in Ireland (Oral Presentation) Relay Workshop No. 56, UCD, 11th June 2008.
2. Gibney, M.J. UCD: Introduction to Food Chemical Exposure: overview of methodologies and applications, (Oral Presentation), Relay Workshop No. 56, UCD, 11th June 2008
3. Connolly, A and Hearty, A UCD: What's in your food? - Human Exposure to Pesticides, (Oral Presentation), Relay Workshop No. 56, UCD, 11th June 2008.

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