

Analysis? ...What for? ...Who by?

Presented by Paul Lenartowicz to the 1999 EFLA autumn seminar *Food Law Enforcement - Have We Got It Right?*

The Purpose of Food Analysis

Analysis is a critical part of the scientific evaluation of food in order to ensure that:

- It is safe
- It is compositionally correct
- It contains no harmful contaminants
- It contains only permitted additives
- It is correctly described
- It bears all necessary markings, accurately

Sixteen Stages of Scientific Evaluation

In considering how best to fulfil the need for 'analysis' it is first necessary to consider what is meant by the term, because in practice it means far more than the word alone may imply. In the context of food law enforcement the requirements are as follows:

1. Examine the sample, label, claims and any other information relating to the sample - including background knowledge - to determine the precise analytical requirements.
2. Decide on appropriate analytical parameters to achieve the analytical objective having regard for the known or anticipated composition of the food.
3. Choose analytical methods, where necessary adapting existing methods or developing new methods (with validation of the resultant method).
4. Determine appropriate QA for the analysis.
5. Prepare the sample for analysis (homogenising etc).
6. Carry out the analysis itself.
7. Assess the derived QA data to confirm that the analytical methods performed as expected.
8. Check that the results on the sample tie up and make sense in the context of the sample.
9. Check and interpret relevant law.
10. Interpret analysis in the light of the law, label, declarations, etc.
11. Check any queries arising from any of the above.
12. Decide whether the sample is satisfactory.
13. If so, report - if not, repeat critical analysis.
14. Assess new data.
15. Initiate extra investigations if required.
16. Write Certificate and check before issue.

For comparative purposes it is relevant to note that a simple accredited laboratory offering contract analysis may do nothing more than the first part of step 3 (adapting or developing methods normally being outside the scope of accreditation) and steps 4,5,6 and 7, and thence report the results, it not necessarily being within their technical competence to do any more. It is also relevant to note that the term 'Certificate' in the last step means a certificate issued under section 30 of the Food Safety Act 1990, being a legal document with higher status even than a Statement

of Witness in that the statutory signatory may certify matters carried out under his or her direction not just on matters directly witnessed. This type of document is quite distinct from an ordinary laboratory report which lacks such status even if called a 'certificate of analysis'.

Part of the first stage identified above includes considering what could be wrong with a food, whether accidentally or otherwise, requiring a deep understanding of food, its processes and even marketing tactics.

Getting it Right

In order to ensure that the analysis is fit for the purpose of enforcement of food law the following needs are identifiable:

1: Accreditation (to EN 45000)

- Accreditation ensures that laboratories have quality systems which meet a minimum standard.

But

- Because the standard to which a laboratory works is set by the laboratory, for example in terms of the accuracy or robustness of analytical methods used, and only verified against that standard by the accreditation process, it does not guarantee a result on which enforcement can be based.
- Laboratory accreditation to EN45000 does not cover interpretation, neither of sample requirements nor of the analysis.

2: Proficiency Testing

- Proficiency testing is an interlaboratory comparison of analytical accuracy. If this is carried out on a sufficiently wide scope of food analysis so as to encompass all major techniques in use, and on samples that mimic reality, participation in proficiency testing schemes can provide reassurance that a laboratory does have the necessary analytical competence to achieve the right analytical result.

But

- Proficiency testing schemes do not cover interpretation, neither of sample requirements nor of the analysis.

3: Qualifications

A qualification that attests a person's

- detailed knowledge and understanding of food and its analysis
- detailed knowledge and understanding of relevant law
- investigational skills - of faults with food and of problems with analysis
- ability to interpret analytical results in the light of the law and present legal evidence in writing or in person

can ensure that the person overseeing the analysis and undertaking interpretation - both before the actual analytical stage and after - is competent to do so, thus effectively accrediting these aspects of the process as a complement to laboratory accreditation.

4: Additional Requirements

In addition, laboratories **must**

- have the tools necessary to undertake the required analysis, or have ready access to such facilities without penalty (including financial penalty) in other laboratories complying with all necessary criteria for enforcement laboratories.
- have a sufficient number of adequately skilled staff to undertake the required analysis.
- be scientifically and professionally independent.
- operate in an efficient manner which is competitive with other laboratories providing a similar enforcement service.
- be locally accessible.

And laboratories **must not**

- have any conflict of interest that could affect, or be thought to affect, their conclusions.
- put staff under undue pressure that could affect the quality of analysis or its interpretation.
- be in direct competition with other enforcement laboratories with which they must co-operate and maintain the professional links necessary to ensure that there is ready availability of professional assistance, consistency of standards and interpretation, efficient development of methods and effective training for specialist qualifications.

Present Arrangements

At present the arrangements for analytical support for enforcement in the UK is based on the provision of a Public Analyst service first established in the infancy of food law and developed ever since, now incorporating requirements specified in the EC 'Additional Measures Directive'. The main features of the current system include:

Recognition as an Official Laboratory, notified to Brussels

Council Directive 93/99/EEC *Additional Measures concerning the Official Control of Foodstuffs* requires member states to identify Official Laboratories for food control, and places certain requirements on such laboratories, including mandatory accreditation and mandatory proficiency testing.

In the UK, an agreement between MAFF, DoH and UKAS (the United Kingdom Accreditation Service) specifies a minimum scope of accredited capability and of proficiency tested performance in order to achieve such recognition. All Public Analysts' laboratories have met the requirements and have been notified to Brussels as Official Laboratories.

Appointment of Public Analysts

Every food authority must appoint a Public Analyst holding the Mastership in Chemical Analysis qualification (which, uniquely, satisfies all the criteria outlined under 'qualifications'), a requirement that was endorsed by the independent Review of the Public Analyst service, and which builds valuable safeguards into the system.

The official appointment of Public Analysts creates a unique transparency and accountability in the enforcement system, which facilitates public scrutiny.

Such is the recognition given to their special rôle founded on a specialist qualification and associated knowledge and experience that case law has accepted the competence of Public Analysts to determine standards for food where none exist.

Avoidance of Conflict of Interest

Both the Food Safety Act 1990 and the Food Safety (Sampling and Qualifications) Regulations 1990 prohibit a person who is engaged directly or indirectly in a food business from acting as a Public Analyst for the same area.

In addition to the statutory limitations, as dedicated professional scientists all Public Analysts are aware of the potential for conflicts of interest to arise beyond these specific constraints and take appropriate steps to avoid such situations arising,

Funding of Laboratories

Over the past two decades Public Analysts' laboratories generally have been increasingly starved of resources for food law enforcement, with consequential reductions in:

- their ability to keep abreast of developing technology just when developments in the food industry have moved faster than ever before.
- their capacity to cope with demand in times of crisis.
- the number of both appointed Public Analysts and other M.Chem.A holders available to scrutinise samples.
- the analytical effort which can be put into finding faults with food.

So, Have We Got it Right ?

Yes and No!

- **Yes** - because officially appointed specially qualified, independent, expert public protection scientists working within accredited, proficiency tested, officially notified laboratories have an exceedingly good chance of detecting the majority of problems with food, provided that they are properly funded and that samples are taken on a proper scientific basis.
- **No** - because although we have officially appointed specially qualified, independent, expert public protection scientists working within accredited, proficiency tested, officially notified laboratories, they are not properly funded and samples are not taken on a proper scientific basis.

The Way Forward

So, the question is, what must be done to correct the deficiencies in the current system? The two main thrusts are as follows:-

- Proper Funding of Laboratories

As they have indicated to Government in responding to the recent Review of Public Analyst arrangements in England and Wales, Public Analysts seriously question the ability of locally controlled funding to provide an effective, sustainable analytical service for food law enforcement.

An alternative would be for central funding channelled direct to enforcement laboratories (still locally based), with food authorities effectively having a free service so that there is no local impediment to sampling nor any risk of local diversion of funding to other areas of local authority work, however needy.

- Risk-Based Food Sampling

This paper has not up to this point considered the process of sampling. The analysis of food can only achieve its intended objectives as outlined at the start of this paper if samples are taken and submitted for analysis which adequately represent the food as it sold to the consumer and which adequately cover the range of foods on sale.

Sampling should be scientifically based on the risk of faults occurring in terms of both safety and 'consumer protection', having regard for all potential problems (contaminants, deterioration, adequacy and accuracy of declarations, etc). The rate of sampling should be based on the risk to the consumer rather not just the size of the population.

The sampling of food should be co-ordinated nationally and should ensure that every food - brand as well as category - is sampled over a period of time, without duplication except where indicated by the risk of faults occurring, the frequency depending on the likelihood of faults and size of population affected

And a final Thought for the Day

Successive governments have seen the wisdom of improving education, law and order and even the environment, and through local authorities billions of pounds are spent on safeguarding and improving these and other worthy services.

Is not the safety of food a more fundamental requirement even than any of these?