Recent developments in the regulatory system in the UK

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Abstract

Regulatory frameworks are the mechanisms to ensure that both genetically modified (GM) crops, which are to be released into the environment, and GM foods and feeds, which need to be approved before consumption, are evaluated from both environmental and human health viewpoints. Regulatory committees, comprising independent experts, carefully examine the detailed dossiers of information that accompany the applications and also review the current relevant scientific background information in coming to their decisions. This paper explains the work of two key GM advisory committees and describes progressive developmental regulatory changes, which have followed incremental increases in science knowledge, and have also been influenced by the needs of the society they serve. The paper does not attempt to detail the specific assessment stages of the processes – these are described adequately elsewhere and for those the reader is referred to committee annual reports or websites.

INTRODUCTION

It is nonsense to judge any new scientific discovery or technology application as just good or bad. Atomic fission and fusion, X-rays and genetic manipulation are all results of scientific endeavour and progress. Each one of these fundamental technologies can lead to a wide range of applications and each of these in turn could in theory, and in practice, be beneficial to the consumer, to the environment or to society. Conversely each could potentially have a negative impact. Hence, regulatory frameworks and processes, followed by robust enforcement regimes, are essential. They must scrutinise the evidence base to allow formulation of recommendations on a case-by-case basis for every new product. This view is expressed clearly and succinctly in the National Council of Women publication 'Deserving of Answers'[1] which looks at food issues and says: 'Regulations must be seen to keep pace with that of research. Consumer confidence is dependent upon transparent and effective application of the rules together with adequate punishment of offenders'.[1]

This paper attempts to outline the regulatory processes for genetically modified (GM) foods and crops and show how they have been adapted to the progression of scientific understanding, which is, in itself, a major challenge to any process enshrined in legal statutes and directives.

THE REGULATORY PROCESS

The processes for regulation of GM foods and GM crops involve highly qualified experts carrying out risk assessments, by detailed expert scrutiny of all available information. The assessed risk must be evaluated before risk management decisions are made and communicated to the competent authorities. Decisions about the most suitable way to manage the risk might well be influenced by commercial, ethical, social, political or personal dimensions and are not within the remit of expert regulatory committees.

In the case of GM foods and crops, the underpinning science is moving very rapidly and advances in analysis are providing new information and finer detail all the time. It is essential that the experts involved are fully up to date, and

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There is no simple correlation between risk and the appropriate management system

the submissions must also be able to be tested objectively against a robust database. Even so, it remains the fact that the risk assessment process cannot be simply predicated on 'good sense' or 'rational logic'. There is no Richter scale of risk nor is there any one-to-one correlation between the estimate of a risk and the most appropriate management regime. Judgment is involved, not least since there is a great deal of public interest in the outcomes of both the risk evaluation and the risk management processes, often springing from different value systems and very strongly held opinions. The GM science review report published in July 2003[2] recognised the issues and concerns, and endeavoured to take an unbiased look at all the science relevant to GM crops and foods, including the scientific basis of regulation. In its second report, which was published in January 2004, it addressed specific areas of concern articulated by respondees to its website and participants in the public debate. The two volumes together probably represent the most comprehensive review of the science of GM crops and foods ever undertaken in the UK.

THE REGULATORY COMMITTEES

Regulatory processes depend on expert interrogation of the peer-reviewed science and the evidence-base

It is essential that the wide-ranging regulatory processes for GM foods, animal feeds and crops are integrated and conducted in a step-by-step and evidence-based manner. The data presented must be robust and complete and all decisions must be made by expert consensus in the context of a detailed knowledge of the relevant peer-reviewed science base.

The UK regulatory process works within European frameworks and statutes

It is vital for the integrity of the overall process that the appropriate expertise resides in the regulatory committees, or that it can be called upon as needed. Regulators must be experts in their own field of science or medicine, they must be truly independent of any commercial or other vested interest and they must be prepared to make and defend their decisions, based solely on evidence presented. Regulators are often subject to criticism and abuse, and are acutely aware of their responsibility: their expertise gives the UK a regulatory system recognition and respect across the world. However, the UK regulatory regime works within a European framework in which the legal basis of the process is determined by the European Commission and within which decisions are implemented across member states, each having their own individual competent authority.

In the UK, a complex network of regulatory committees works together to produce advice to ministers on a whole range of topics. 'Advisors advise and ministers decide' is the ideal; but such boundaries are often not this simple! Each expert committee has its own remit and works to its own regulatory framework. There is a great deal of communication and cross-membership of experts and secretariats across the UK food advisory committees. Each committee advises the relevant competent authority, government department or, in certain cases, the government minister directly. Each produces an annual report,[3,4] holds public meetings and has a website where minutes and often detailed dossiers can be accessed.

REGULATION OF GM CROPS

In the UK, the Advisory Committee on Releases to the Environment (ACRE) reviews all applications to release and market genetically modified organisms (GMOs) and advises ministers of the UK Government and ministers of the devolved authorities on the risks to the environment and to human health caused by the release. ACRE is a statutory advisory committee appointed under section 124 of the Environmental Protection Act 1990 (EPA). The legislative framework set out by Part VI of the EPA and the GMO deliberate release regulations 2002 together implement Directive 2001/18/EC. The release can be for research purposes (part B releases)

Large quantities of data inform the decision-making process

or for the purpose of marketing (part C releases).[5]

The release is controlled by Directive 2001/18/EC[6] which is a European Community-wide regime so that no GMOs may be released or marketed in the Community without consent. Applicants must submit a dossier[7] of prescribed information, often running into hundreds of pages, which includes detailed risk assessments of possible impact on human health and the environment. Crucially, the process (summarised in Figure 1) also ensures that any risk management measures (eg separation distances, control of volunteers) are defined and implemented, and are appropriate for the specific GM plant. Following the process the consent holder has three main responsibilities:

Measures for risk management must be included along with factual technical information

- To ensure that only the GMO for which the risk assessment has been carried out is released.
- To ensure appropriate implementation of risk management measures.
- To monitor for any unexpected consequences of the release and manage any subsequent unexpected risks.

Compliance is monitored by the GM inspection and enforcement regime located at the Central Science Laboratory, York, and the Scottish Agricultural Science Agency, Edinburgh.[8]

THE REGULATION OF GM FOODS

In the UK, the Advisory Committee on Novel Foods and Processes (ACNFP) is a source of independent advice to the Food Standards Agency (FSA) on any matters relating to novel foods processes. The FSA itself is a body that is independent of government. In order to deliver its advice the ACNFP might refer to other expert committees.[9]

The following food committees might have an input into the deliberations relating to a novel food or be consulted on areas where there is the need to seek a wider debate. Their individual remits are defined by their titles below:

- ACAF (Advisory Committee on Animal Feedingstuffs);
- ACMSF (Advisory Committee on Microbial Safety of Food);
- ACNFP (Advisory Committee on Novel Foods and Processes);

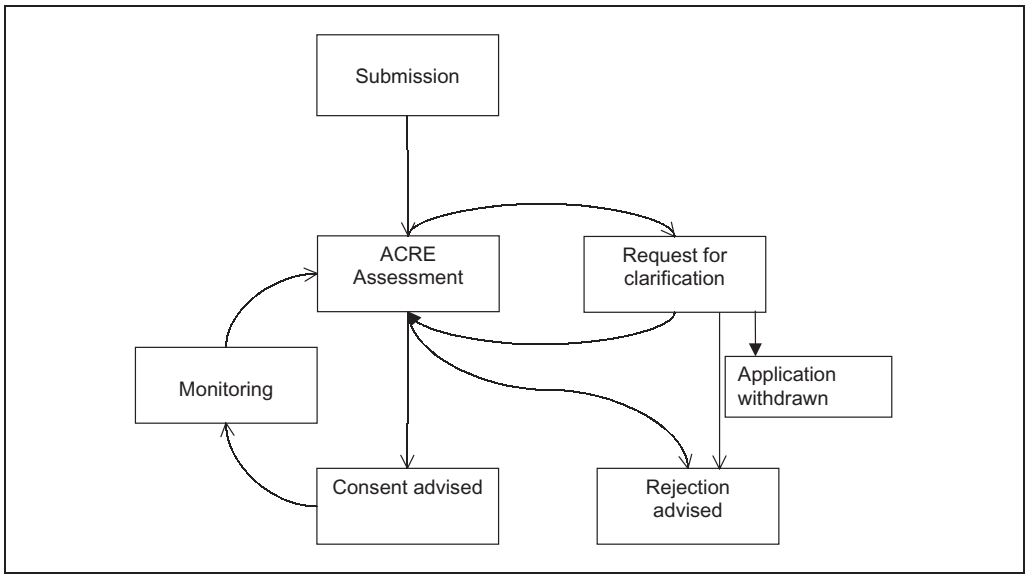

Figure 1: ACRE assessment process

- ACRE (Advisory Committee on Releases to the Environment);
- COM (Committee on Mutagenicity);
- SACN (Scientific Advisory Committee on Nutrition);
- COT (Committee on Toxicity).

In reaching its decisions the ACNFP might refer specific technical questions to each of these. For example, when the ACNFP published advice on its interpretation of the work of Dr Pusztai on a GM potato with an added snowdrop (*Galanthus nivalis*) lectin, it also included the statement from the COT deliberations.[10]

Just as the science underpinning GM developments changes so does the regulatory framework

In addition to its main role in scrutinising GM foods to ensure no adverse health effects, the ACNFP carries out other generic tasks: for example, it has issued guidelines on the conduct of taste trials of novel foods (including GM) using human volunteers and updated guidance on the role of human studies in the pre-market safety assessment of novel foods.[11]

In 1997 the Novel Food Regulation (258/97) introduced a statutory pre-market approval system for novel foods throughout the EU. This was directly applicable, and legally binding, in all member states. The regulation covered a range of foodstuffs and all foods, and food ingredients, containing, or consisting of GMOs or produced from GMOs are, by definition, novel. Companies wishing to market a novel food in the EU must submit an application to the competent authority (CA) in the member state where it first wishes to market the food. In the UK the CA is the FSA, which was established on 1st April, 2000.

A decade of experience informed the ACNFP decision tree

The protocols for the safety assessment of GM foods are based upon a decision tree, developed by the ACNFP over almost a decade prior to the introduction of 258/97. The approach has been endorsed by the World Health Organization and the Food and Agriculture Organization of the United Nations[12,13] and it ensures an integrated, stepwise, case-by-case, evidence-based scrutiny.

The Novel Food Regulation stipulated (Art. 14) that it should be reviewed after five years of implementation. Accordingly consultations were held in 2002 and the UK view was forwarded to the Commission. Meanwhile the European Commission published two proposals for new legislation in July 2001. These covered Food and Feed and Traceability and Labelling, respectively.

The GM Food and Feed proposal replaces 258/97 and introduces rules for the approval of GM animal feed and harmonised procedure for the assessment and authorisation of GM food and animal feeds (currently other – non-GM – novel food is still be subject to regulation enshrined in 258/97). Hence, it addresses the previous lack of specific legislative controls on GM animal feed. The proposal puts the European Food Safety Authority (EFSA) at the centre of the approval process rather than individual member states. The EFSA will carry out the scientific safety risk assessment incorporating environmental risk and human and animal health safety assessment, using scientific expertise and input drawn from all member states.

The labelling provision extends the labelling rules and requires labelling of all GM food and feed products derived from GMOs, regardless of presence or absence of GM material in the final food/feed. After the second reading, political agreement was reached on 28th November, 2002, at the EU Agriculture Council, hence a common position was adopted on 17th March, 2003, and all member states had to implement the new Regulations within six months. The agreed proposal includes a threshold of 0.9 per cent for GM food and feed that has an EU authorisation and 0.5 per cent for material not yet authorised, but with a favourable EU risk assessment for accidental/adventitious GM in non-GM products. Below the threshold no labelling is required.

As GM science moves on, so do the regulatory regimes, for example the concept of 'substantial equivalence' is currently established as a useful comparative approach to identify significant differences between a new food and its traditional counterpart. These differences, which are not necessarily a hazard, have recently become the subject of further detailed safety assessment.[14,15]

DYNAMICS OF REGULATION

The process described is dynamic and continuous and is constantly under review. Indeed the advisory committees all have, as a defined part of their remit, the responsibility to evaluate relevant research and to recommend new research programmes. For example, following an open meeting to discuss the monitoring of GM food consumption held in 1999, the ACNFP recommended that the FSA should fund a feasibility study into the difficult problem of long-term monitoring of GM consumption to determine if any adverse effects are manifest. This study was funded by the FSA and the results of the feasibility study were reported to a public meeting in November 2003. Another research area that the ACNFP recognised would be helpful in informing their risk assessment was further specific research into the possible allergenicity of novel foods. Again, appropriate research projects were funded by the FSA, and the Committee met to consider progress and discuss the findings in the context of their potential to predict allergencity and hence to inform the risk assessment. In each case the results of the research projects will be peer reviewed before publication in scientific journals.

Research is commissioned to inform the regulatory process

Clearly, new research must be validated carefully to determine that the results are sufficiently rigorous to incorporate into the risk assessment process. Recent advances in proteomics and metabolomics might, in theory, provide useful tools for regulatory evaluation but our understanding of the science is not yet sufficiently developed for them to be useful tools. When the experts on the committee determine that a new assessment tool is available as a result of new research, they can then recommend if and how the implementation of the new knowledge can help their decision making. New knowledge sometimes helps provide a better understanding of the limitations of the assessment process and, of course, better analytical tools might give us information retrospectively about an application that had been considered previously.

Transparency and response to public comment is crucial

Critical challenge is welcomed, encouraged and the committees operate in a transparent manner; over the past six years the ACNFP has been recognised for being at the forefront of the development of transparency procedures. The committee has a website and the forthcoming agenda is published before the meeting. Detailed dossiers on the applications are also available on the website. Commercial confidentiality must be respected so some restricted data will not be widely available to the public. However, the amount of such information that is not in the public domain is consistently only a very small part of the complete dossier. Public comment is invited on the agenda items prior to the meeting, together with a guarantee that comments lodged will be discussed by the committee. The draft minutes are published within a week of the meeting and, again, comments on committee decisions are welcomed. There is at least one open meeting every year, which covers a prearranged topic; this meeting is held outside London. Other occasional public meetings are held to discuss relevant topics. An Annual Report is produced and this always contains a cumulative index of all the committee decisions and copies of formal letters sent to the Commission. In addition, the ACNFP produces a corporate brochure with regular updated information, which is written in a style that is very accessible to the non-scientific reader.[16] For example, there are pages

giving simple explanations of substantial equivalence, a page discussing the problems of predicting possible allergenicity, as well as a page introducing committee members and explaining the ACNFP remit.

The ACNFP has been at the forefront of transparency and public dissemination of information

Much of this best practice is being extended to many other scientific advisory committees and the transparent approach has been well received by a very wide range of stakeholders. Many public comments have been received, expressing surprise at the rigour of the deliberations of members and recognising the robust decision-making process. Meantime the committee members and the secretariat are constantly exploring further mechanisms to increase transparency and spread wide understanding of the rigour of the regulatory process and of the issues the regulators face. To date the EU system has not shown this degree of transparency but it is hoped that the EFSA will follow this best practice. The industry has been very cooperative in agreeing to the confidential content of dossiers being minimal, recognising that it is in their interest to be as open as possible.

Members are all independent and appointed for their expertise

Non-scientific members actively participate in discussions and decisions

The Committee must have the correct balance of experts and members are appointed solely for that expertise. The positions are all advertised openly and appointments are made, after application and interview, under the Nolan rules for public appointments. A very high-level appointment panel, chaired by a neutral and distinguished independent member, recommends appointment of Committee Chairs. The appointments are usually for a period of three years, which might be renewed once. In the UK, committee members are all independent of the civil service and are usually academics from universities, research institutes or medical schools. Members of the Committee are active in delivering public lectures and presentations to a range of scientific conferences and events. They are all required to declare any personal or non-personal interests on an annual basis and these are published in the Annual Report. For example, if a member has held a commercial research grant connected in any way to an application, they will declare this and leave the room when any application from this company is under discussion. Occasionally a member might be an industrialist, for example from a biotechnology company. He/she will have been appointed solely for their expertise and again full interests will be declared. The Chair is responsible for ensuring that no conflicts of interest arise. The ACNFP is also unique in that it includes two consumer representatives and an ethicist, all of whom are active participants in the decision-making process.

Approvals are based solely on safety and they adopt the precautionary approach, always ensuring that there is no added risk to human health. Often here is a great deal of discussion following requests for further data or clarification of facts, or for extension of the tests conducted on the new food. Thus a submission may be discussed in detail in several meetings as more data are presented. It is essential when assessing the data that the future intended use and likely consumption of the new food are thoroughly specified as well as all the scientific test results. The risk assessment is science-based and does not consider economic costs and benefits. The terms of consents are also published. These are rarely a simple positive recommendation to allow marketing but often specify fixed duration for the approval, or mandatory monitoring, labelling or follow-up data such as information about the level of consumption.

One thing is certain: as the GM science base moves on, so will the challenges presented to the regulatory process by applications of increasing complexity. In the future we will have to regulate more complex foods; for example, those with multiple genetic modifications. The science used to inform the regulatory process will, in turn, constantly evolve and the regulatory procedure must utilise this new knowledge to improve our understanding of the assessment of

potential risk. The current regulatory processes have been described by various non-governmental organisations as too lax and by others as too slow and onerous. These facts suggest that we have probably got the regulatory assessment about right!

Information is necessary for decision making

Never before has there been such detailed scrutiny of any of our conventional foods, neither has any harm ever been recorded as a result of consumption of any GM food that has been given a positive risk assessment by the ACNFP. By providing clear information to members of the public, they will be in a position to make their food choices based upon a rational decision and complete clarity of understanding of the facts.

Consumers need to know about the food they eat to make their choices

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