APPENDIX 7

ACNFP REPORT ON GERMANIUM

ADVISORY COMMITTEE ON NOVEL FOODS AND PROCESSES

REPORT ON GERMANIUM

INTRODUCTION

1. The Department of Health became aware in 1989 that "health" food supplements containing added germanium compounds had been linked with significant renal toxicity in consumers. As a result, a press notice was issued on 6 October 1989 advising people not to consume germanium-containing products and the Chief Medical Officer wrote to doctors on 10 October 1989 . These actions were taken on the basis of the data then available. However further data have since become available and the ACNFP was asked to review all the relevant information and to give its opinion on the acceptability of germanium-containing "health food" products.

BACKGROUND

2. Germanium was discovered in 1886, but was initially only studied as a rare element. Then, in the 1940s, it became clear that its special electrical conductivity properties could enable the element to find useful applications in rectifiers and amplifiers. However the superiority of silicon soon became apparent, leading to the development of the silicon-based semiconductor market. In parallel with these developments in electronics, the biological effects of germanium had been investigated by Dr Asai in Japan, from the 1950s onwards. His work culminated in the proposal that germanium was a "life-enhancing" or "health-giving" substance, able to cure a wide variety of diseases, including cancers and AIDS.

3. Subsequently, germanium compounds became popular as elixirs or "health" supplements, particularly in Japan, but more recently elsewhere. However, from the mid 1980s reports began to emerge in Japan of severe renal toxicity, with some deaths, in people with a history of using such products. There is some confusion in the literature as to the nature of the germanium compounds responsible for the renal toxicity, and in particular whether the sesquioxide, as well as the dioxide, had caused adverse effects. The available data on the toxicological effects of elemental germanium, inorganic germanium and organic germanium are described briefly below, together with a summary of case reports of renal toxicity in humans.

4. The Committee on Medical Aspects of Food Policy in its Report on Dietary Reference Values, published recently, concluded that germanium had no nutritional value. Data on any potential therapeutic activity of germanium sesquioxide are not relevant to the remit of the ACNFP and any consideration of this aspect would need to be referred to the appropriate body.

TOXICOLOGICAL DATA

5. There are few data available on elemental germanium but in a 30-day inhalation study in the rat with germanium metal powder there was possible renal toxicity, with an increase in plasma urea and creatinine and in urine volume. However, there were no adverse histopathological findings in the kidney. There was a dose-related accumulation of particulate matter in the lungs, together with an accumulation of alveolar macrophages. The no-effect-level was between 9.9 and 65.1 mg/m^3.

6. Inorganic germanium compounds, principally germanium dioxide, have a low acute toxicity. In long-term studies with administration of sodium germanate to rats and mice via the drinking water there was evidence of germanium accumulation in a number of organs (liver, lung, kidney and spleen). Little toxicity was seen in the mouse study, although median lifespan and longevity (defined as mean age at death of oldest 10% of animals) were somewhat shortened. In the rat, median lifespan and longevity were again shortened. However, in this species there was evidence of a mild toxic effect on the kidneys (increased severity of proteinuria and increased incidence of vacuolar changes in the proximal convoluted tubule of the kidney).

7. Following reports of renal toxicity in man linked to consumption of germanium compounds, a number of studies were performed in the rat, to try to elucidate the nature of the nephrotoxicity. In most cases, oral administration of germanium dioxide was associated with increases in serum creatinine and BUN (blood urea nitrogen) and vacuolar degeneration of the epithelial cells in the distal and collecting tubules of the kidney, particularly in the medulla. Using electron microscopy, dense deposits were seen in the mitochondria, which were swollen. Germanium was found to accumulate in the kidney. The study by Sanai and co-workers compared the renal toxicity of germanium dioxide with that of the sesquioxide following oral administration to the rat. However, the numbers of rats used was very small (5 for each germanium group and 7 controls). The rats receiving germanium dioxide showed the symptoms of renal toxicity described previously, but no such effects were seen with

the germanium sesquioxide. Germanium was accumulated in the kidney with the sesquioxide, but not to the degree seen with the dioxide.

8. Data on the toxicity of the sesquioxide, "Ge-132" (the compound claimed by Asai to have life- and health-enhancing properties) are sparse. Studies conducted by Asai and co-workers are only reported very briefly, but it would appear that the sesquioxide has very low acute toxicity in rats and mice and that no toxic effects were seen in a 6-month rat study in which the sesquioxide was administered orally at doses of 30, 300 or 3000 mg/kg/day, as a suspension in carboxymethylcellulose. Similarly, no toxicity was reported in a 6-month study in the dog in which the sesquioxide (neutralised with $NaHCO_3$ and the pH adjusted to 7) was administered intravenously at doses of 125, 250 or 500 mg/kg/day.

9. Pharmacokinetic studies in the rat with ^{14}C-labelled sesquioxide indicated that approximately 30% of a dose of 100 mg/kg was absorbed from the intestines with peak blood levels 3 hours after dosing. All the absorbed compound was shown to be excreted in the urine within 72 hours. No metabolites were detected. Similar pharmacokinetics were seen in human volunteers.

10. The human case reports indicate marked and prolonged renal toxicity associated with the consumption of germanium compounds. Effects seen included increased serum creatinine and BUN levels, impaired creatinine clearance, germanium accumulation in the kidney and degenerative changes in the tubular epithelium of the kidney, particularly in the distal convoluted tubule and loop of Henlé. Three deaths were reported.

DISCUSSION

11. The Committee considers that there is little doubt that germanium dioxide is nephrotoxic and that it accumulates in the kidney as well as in other organs. Germanium sesquioxide at equivalent doses also accumulates in the kidney, albeit to a lesser degree, but direct evidence of any nephrotoxic potential of this compound is not available. However the possibility that, at higher doses, germanium sesquioxide could exert a nephrotoxic effect cannot be excluded, especially as accumulation in the kidney has been demonstrated. The evidence from man is inconclusive in that the identity of the germanium compounds taken by those patients developing nephrotoxicity is not known unequivocally.

12. The Committee notes the view of the Committee on Medical Aspects of Food Policy that germanium has no nutritional value.

CONCLUSIONS

13. The Committee concludes that:

i) germanium dioxide is toxic, particularly to the kidney, and has been shown to accumulate in a variety of organs following repeated dosage;

ii) although there is no direct evidence to show that germanium sesquioxide is nephrotoxic, it has been shown to accumulate in the kidney, albeit to a lesser degree than the dioxide, and therefore the possibility that it could exert such a nephrotoxic effect, if given at higher doses and/or for longer periods of time, cannot be excluded;

iii) although there is no direct evidence relating to other organic compounds of germanium, the possibility that they too might exert a nephrotoxic effect cannot be excluded;

iv) in view of these conclusions, and bearing in mind the lack of nutritional value, germanium-containing compounds should not be permitted to be added to food (including health foods).

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APPENDIX 8

ACNFP REPORT ON ENZYMICALLY MODIFIED VEGETABLE OILS

ADVISORY COMMITTEE ON NOVEL FOODS AND PROCESSES

REPORT ON ENZYMICALLY MODIFIED VEGETABLE OILS

INTRODUCTION

1. In April 1991, the Committee was asked by Unilever Research, on behalf of Loders-Croklaan bv, Holland, and its sister companies in the UK, USA and Canada, to examine a novel processing technology for the production of enzymically modified vegetable oils and the safety in use of its products.

PROCESS DESCRIPTION

2. The process uses an immobilised lipase enzyme to catalyse the interesterification of glycerides, derived from edible vegetable oils, with fatty acids or triglycerides. Edible vegetable oil, such as palm oil or high oleate sunflower seed oil, is blended with stearic acid then passed over the immobilised enzyme which results in the formation of an interesterified oil. Any free fatty acids remaining are removed by steam distillation. The interesterified oils then may be fractionated or blended with other vegetable oil fractions before neutralisation, bleaching and deodorisation using conventional processes. The composition of the interesterified oil may be controlled in several ways - by altering the amount of stearic acid in the reaction mixture, or the composition of the vegetable oil feedstock, or the degree of fractionation after esterification.

3. The Company's submission included details of a specific application of the process for the production of an enzymically modified vegetable oil with physical characteristics similar to those of cocoa butter, an oil which has a trigyceride component containing about 80% symmetrical triglycerides. This involves the use of a lipase from *Mucor meihei* which incorporates stearic acid into the 1- and 3- positions of triglycerides but which leaves the unsaturated fatty acid in the 2- position unaltered. The interesterified oil produced using this catalyst is rich in symmetrical triglycerides.

USE

4. The enzymically modified vegetable oils produced by the process described in the submission are intended for use in chocolate and confectionery fat. In addition, certain fractions
of the oil rich in 1-stearoyl-2-oleoyl-3-oleoyl triglyceride can be blended with frying fats for both domestic and industrial applications.

SAFETY EVALUATION

5. In its assessment of safety, the Committee noted that the lipase enzymes to be used in the process have yet to be cleared by the FAC and COT but will be evaluated by these Committees in the near future. The ACNFP examined information on the reaction mechanism of the enzyme, the immobilisation procedure and the processing of the product, together with specification and purity data. The results of a 90 day study in rats receiving a diet containing 14.8% of the modified vegetable oil were also considered.

CONCLUSIONS

6. The Committee considered that there were no food safety reasons why the use of the enzymically modified vegetable oils produced through this process should not be acceptable in food provided that:

(a) the lipase enzymes have been cleared by the FAC and COT for use in food;
(b) the raw materials used are of food grade quality;
(c) permitted extraction solvents only are used in the processing;
(d) the oils are initially restricted to use:

- as an ingredient in chocolate and confectionery fat which together do not constitute major sources of fat in the average diet; and
- as an ingredient at levels of up to 20% in frying fats as a replacement for saturated fats provided that such a use does not increase saturated fat intake.

Before the use of the oils can be extended beyond those described above, further nutritional information will be necessary.

7. The Committee has no reason to suppose that oils produced by this process would be unsafe if consumed by infants but it considers that it would be prudent not to use such oils in foods intended for infants until more clinical and nutritional data are available.

APPENDIX 9

REPORT OF THE WORKSHOP TO DISCUSS SAFETY ISSUES RELATED TO THE PRESENCE IN HONEY OF POLLEN FROM GENETICALLY MODIFIED PLANTS

ADVISORY COMMITTEE ON NOVEL FOODS AND PROCESSES

NOTE OF A WORKSHOP TO DISCUSS SAFETY ISSUES RELATED TO THE PRESENCE IN HONEY OF POLLEN FROM GENETICALLY MODIFIED PLANTS 15 OCTOBER 1991

INTRODUCTION

1. The Chairman, Professor Burke, welcomed participants to the workshop. The meeting had been convened by the Advisory Committee on Novel Foods and Processes (ACNFP) to discuss if the presence in honey of pollen from genetically modified (gm) plants might have implications for consumer health and safety. The Committee felt that it would be useful to have guidance on this issue from experts working in the relevant areas of research and it was hoped to identify any potential problems and suggest how these could be managed. The ACNFP had initiated other workshops on topics outside its immediate area of expertise raised by particular submissions and had found them useful.

2. A brief description was given of the background to the ACNFP's interest. The Committee advises Agriculture and Health Ministers on the safety of novel foods, including those which are obtained from gm organisms, and its guidance may be sought by other government advisory committees. The Advisory Committee on Releases to the Environment (ACRE) had asked the ACNFP whether the inclusion in honey of pollen from gm plants might raise problems of consumer health and safety. The ACNFP had concluded that pollen from gm plants currently undergoing small-scale field trials did not raise concerns but felt that as there is a lack of data, it would be appropriate to hold a workshop to discuss this matter further. The ACNFP had also noted that cross-pollination between non-gm and gm food plants and honey production from the nectar of gm plants might also have implications for consumer health and safety.

POINTS RAISED IN DISCUSSION

Pollen consumption in the UK

3. In the UK, pollen is consumed in honey - which may contain up to 2% pollen - as tablets and as trapped corbicular pollen (bees collect and store pollen as a protein source). Pollen grains have a resistant outer coat, distinguishable to family and, often, species level, and may be found intact in honey, tablets and corbicular pollen, providing an established method of verifying both floral and geographical origin. A significant proportion of

UK-produced honey is derived from oilseed rape, clover and heather. The pollen found in honey may come from several sources including nectar that has been contaminated in the flower by pollen shed from the anthers, from the bee's honey stomach and from accidental contamination by the beekeeper during honey extraction from pollen bearing combs. Less commonly, airborne pollen may become incorporated into honey or trapped corbicular pollen, released from foraging bees on their return to the hive, may be added by beekeepers to enhance their product. Post-harvest processing may affect both the amount and type of pollen contained in the honey and the proteins present in the pollen. Most amateur beekeepers carry out very little processing - normally extraction, warming and filtration - before bottling. Commercial packers reliquify and pasteurise honey at 80C to destroy yeasts before bottling.

4. Much of the pollen consumed as tablets is imported from France, Spain, Germany and possibly Australia, as loaves of dried, sieved pollen derived from a number of different species. The quality of the tablets produced varies according to the country of origin. There is also a small but increasing market in trapped corbicular pollen which is sold in an unprocessed form.

Pollen viability and germination

5. There is considerable interspecies variation in the persistence of pollen viability. The reason for this difference has not been established, but it is known that grass pollens, which are viable for less than 24 hours in the natural environment, have three nuclei and have higher respiration rates and a higher water content than pollens from other species which have two nuclei, and which may, in apples and pears, for example, be viable for 2 to 3 days. Rehydration of the dehydrated, mature pollen grain, other than on the stigma, is known to lead to a rapid loss of viability.

6. Water is sufficient stimulus for the germination of pollen from some species, and pollen from most species germinates readily in simple media at an optimum pH of 5-7. Pollen germination is known to occur in the gut of certain mammals and birds at pH 6 but in humans, in comparison, conditions are unfavourable - the human stomach is more acid, and the human gut more alkaline - and there is no evidence for germination in the human gut. In addition, bile in the human gut is a detergent and will disrupt the lipid structures of the pollen tube and plasma membrane within the pollen grain.

Transfer of DNA

7. DNA in pollen is contained in the generative and vegetative cells. Since it has been shown under experimental conditions that DNA extracted from non-viable bacteria is functional *in vitro* and that microbial DNA which has been fragmented can be taken up by other microorganisms, it is possible that pollen DNA could also be taken up in this way. Although this has not been

investigated, it is unlikely that under natural conditions, DNA from viable or non-viable pollen would be any more likely to be replicated if taken up by microorganisms than any of the eukaryotic DNA to which microorganisms are constantly exposed.

8. The possibility of gene transfer from pollen to microorganisms, in particular to gut microflora, has not been investigated. Gene transfer, most notably involving antibiotic resistance genes carried on plasmids, is known to occur between microorganisms. If the spread of such genes is to be common, some advantage must be conferred to the recipient microorganism through their expression. This expression will only be likely if appropriate promoter regions are present and if eukaryotic genes inherited by prokaryotes do not contain introns.

9. Research currently being carried out under an EC contract is investigating the possibility of transfer of a cloned bacterial gene from a plant to a microorganism. A prokaryotic gene with a prokaryotic promoter which has been inserted into a plant is more likely to be inherited and expressed than an inserted eukaryotic gene or prokaryotic gene with an eukaryotic promoter. Preliminary results from the work will be available next year.

10. However, since all pollens contain mitochondria, which have genetic similarities to free-living prokaryotes, and some mitochondria contain plasmids, the possibility of gene transfer of plasmid-type DNA to microorganisms, although unlikely, cannot be dismissed. Methods of investigating gene transfer from pollen to microorganisms, including gut microflora were discussed. It was considered that small fragments of DNA were more likely to be transferred than whole functional genes.

11. If genes could be transferred from pollen to gut microflora, some level of expression of gene products might occur, although this would be low unless the transformed microflora were able to survive, replicate and colonise the gut. It seems very unlikely that a gene could be transferred to human gut cells either directly from pollen or indirectly following transfer to gut microflora. The cells which line the gut are constantly renewed and any cell that takes up such a gene would need to have acquired a considerable selective advantage, in terms of survival, replication and colonisation, for the altered cell type to become established. Should this unlikely event occur, such cells would not enter the germ line and would not therefore be maintained or spread in populations of animals or humans.

12. Cloned genes which are integrated into chromosomes are not conceptually different from other chromosomal genes and so there is no reason to believe that microorganisms, or animals, are more likely to inherit and express cloned genes than any other genes that are already present in the environment and to which all organisms are exposed.

Proteins in pollen

13. All pollens contain high levels of protein. It is estimated that 60% of the mRNA molecules in the pollen grain are also found in the mature plant. This indicates that certain genes are expressed in both the pollen grain and in the mature plant and consequently, some proteins may be present in both the mature plant and the pollen grain. Should these proteins be toxins, ACRE could take action to limit the use of promoter sequences that control the relevant genes if it were found that the levels of the proteins in pollen in honey were sufficient to affect human health and safety. This action could involve putting the gene under the control of a promoter that is known not to be expressed in pollen.

14. Allergies to specific types of honey from non-gm plants have been recorded but no studies have been carried out to discover whether there is any link between allergy and the consumption of pollen tablets. Symptoms attributable to the inhalation of pollen have been studied and recent work in Dundee has reported an increase in "allergic-type" symptoms commensurate with an increased acreage of oilseed rape. The workshop suggested that toxin proteins produced by genes inserted to increase pest or disease resistance, could cause problems to consumers if found in the pollen from gm plants. Certain groups in the population could develop an allergic response if they were to consume honey containing this pollen. Honey used to treat wounds, or otherwise applied to the body, could cause similar problems of allergenicity.

15. For the majority of the population, proteins in honey, derived from pollen from gm plants, may be of little significance to consumer health and safety because most proteins will be present at very low levels and will be degraded in the gut. Indeed, honey may often contain pollen from toxic, non-gm plants. However, genetic modification work on crop plants could involve the introduction of toxin proteins into the whole plant that are highly resistant to degradation in the human gut.

16. As some proteins in honey are derived from nectar and other proteins from the outside of the pollen grain (deposited from the tapetum during maturation in the anther), it would be necessary, for certain gene products, to ask those making release applications if the inserted regulatory sequences, which control the secretion of the toxin proteins, are active in pollen, in the tapetum and in the nectaries of the gm plants. The levels of risk to the consumer from the introduced toxin proteins in nectar, in plants which are not eaten and in plants which might be eaten are currently unknown. Quantification of such risk could be aided by a decision tree listing the questions that the ACRE and the ACNFP would need to address.

Cross-pollination

17. Bees scouting for suitable forage have been known to travel up to 13 km, but the usual foraging range is within a 3 km radius of the hive. Up to 15 different species of plant may be visited and for this reason, there is a need to assess the potential for cross-pollination between gm plants and related wild species or non-gm varieties. There is a slight chance that under some circumstances, breeding barriers between plant species and incompatibility mechanisms within species could be affected by genetic modification. For food crops, disruption of these mechanisms would be undesirable if it allowed cross pollination with related ornamental or non-edible species. This could have implications for consumer safety if there was an increased production of any toxins or allergens normally found only at low levels in the food crop.

18. In the UK, the incidence of cross-pollination in a field planted with oilseed rape is being studied using a genetic marker. A focus of plants containing the marker was surrounded by plants which did not contain the marker. The seed harvested from the plants without the marker is now being analysed to look for hybrids with the marker. Preliminary results demonstrated, as expected, a decline in the number of hybrids with distance from the focus - researchers in France have demonstrated that for oilseed rape there is no hybridisation beyond 12m from the focus. Work carried out under the PROSAMO initiative in the UK, and in collaboration with INRA, France and PGS, Belgium has investigated the effect of plot layouts and isolation distances on the incidence of cross-pollination. Results from these experiments will be published in 1992. A forthcoming document from an OECD workshop will include case studies on pollen dispersal and a database is currently under development.

CONCLUSIONS

19. The workshop concluded that although it could not disregard the possibility that the presence of pollen from gm plants in honey might raise problems of consumer health and safety, there was at present no need to limit releases of gm plants as the current procedure involving case-by-case evaluation of all releases of gm organisms by ACRE (with, if necessary, advice from other expert bodies) provided adequate safeguards.

20. The potential problems identified from the presence in honey of pollen from gm plants were:

i) the introduction of genes coding for toxin proteins - to bestow insect resistance for example - into the mature plant and the expression of these genes in pollen, or in the anthers or in the nectaries, which could lead to the presence of the toxin protein in honey; and

ii) the transfer of genes from pollen from gm plants contained in honey to gut microflora or to the human gut.

21. Problems were thought to be more likely to arise from the introduction of genes coding for toxin production than from gene transfer itself.

GLOSSARY

allergen	a substance, usually a biopolymer, to which the body has become sensitised and which may trigger an immune response
anther	the pollen-producing part of the male reproductive organ (stamen) of a flowering plant
breeding barrier	physiological mechanism in plants that prevents fertilisation by another species from taking place
chromosome	a self-replicating structure consisting of DNA complexed with various proteins, which is involved in the storage and transmission of genetic information; it is the physical structure that contains the genes
cloning	genetic modification techniques used to make identical copies of DNA sequences
corbicular	from the pollen basket (corbicula) found on the hind leg of many bees
DNA	deoxyribonucleic acid, is found in living cells and contains the information for cellular structure, organisation and function
eukaryote	organism which has defined specialised cell structures (organelles), including a nucleus enclosed in a membrane eg animals, plants, fungi
gene	unit of heredity composed of DNA, which forms part of a chromosome. The genetic code in each gene holds instructions for the manufacture of one polypeptide (small protein) chain
gene expression	manufacture of a protein in a specific cell from the instructions contained in a gene

gene transfer	introduction of foreign or additional genes into an organism
generative cell	cell in the pollen grain which gives rise to the male reproductive cells
genetic marker	gene(s) coding for an easily identified character linked to gene(s) transferred into an organism. Successful genetic modification is indicated by expression of the marker gene
genome	sum total of the genes of an organism
germ line	cells which give rise to the reproductive cells
gut microflora	microorganisms living in the gut
hybrid	offspring of two genetically different parents
hybridisation	the production of hybrids
honey stomach	collecting chamber in the bee's foregut in which nectar is carried back to the hive
in vitro	"in glass": the reproduction of biological processes under artificial conditions
incompatibility mechanism	physiological mechanism in plants which prevents self-fertilisation or fertilisation by certain strains of the same species from taking place
INRA	Institut National de Recherche Agronomique
intron	found in genes of eukaryotes, sequence of DNA which may not be involved in gene expression
lipid	wax, oil or fat found in living tissues
mitochondrion (-a)	a self-replicating cell organelle which is the site of energy generation for the cell

mRNA	the "messenger" form of ribonucleic acid, involved in the manufacture of polypeptides from the instructions contained in the **gene**
nectary (-ies)	site of nectar secretion in a flower
nucleus (-ei)	cell organelle, enclosed in a membrane, containing the **genome DNA**
PGS	Plant Genetic Systems
pH	measure of acidity or alkalinity
plasma membrane	outer membrane of a cell which forms a boundary between the cell and its surroundings
plasmid	loop of **DNA** found in bacteria and certain other organisms that exists and replicates independently of the **chromosomes**
pollen tube	tube produced by the pollen grain at germination to convey the male reproductive cells to the site of the female reproductive cells
prokaryote	organism which does not have a defined **nucleus** nor other cell organelles eg most bacteria, blue-green algae
promoter	region of **DNA** that controls **gene expression**
PROSAMO	Planned Release of Selected and Modified Organisms
protein profile	proteins characteristic of a specific organism
respiration	the breakdown of sugar in a cell to produce energy
stigma	tip of the carpel (female reproductive structure of a flower) adapted for the reception and subsequent germination of pollen
tapetum	layer of cells in the **anther** surrounding the cells from which the pollen grains are formed

toxin	substance of biological origin which is poisonous
vegetative cell	cell in the pollen grain which may control the growth and development of the pollen tube

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APPENDIX 10

MINISTERIAL RESPONSE TO THE RECOMMENDATIONS OF THE WORKSHOP ON CONSUMER CONCERNS

MINISTERIAL RESPONSE TO THE PROPOSALS OF THE ACNFP WORKSHOP ON CONSUMER CONCERNS

PROPOSAL I. "Membership of the ACNFP should be broadened to increase transparency."

As you know, Ministers have been in favour of consumer representation of some kind on the ACNFP for some time now. We remain committed to consumer representation and have asked officials to consider candidates for this position. We hope to be in a position to make an appointment soon.

PROPOSAL 2. "Consideration should be given to allowing observers at meetings."

Ministers see some disadvantages in such an arrangement but will give careful consideration to the possibility if the Committee wishes to set out detailed proposals as to how this would operate in practice. It would be important to avoid any impression that it was necessary to provide for observers to oversee the Committee. This could only reduce the standing of the Committee both with the interests concerned with its remit and, indeed, with the public generally. It might also prove difficult in practice to restrict observer status just to consumers. There could equally be a case for industry or research observers to attend meetings. Such an arrangement could become unwieldy and it would be difficult to preserve the necessary confidentiality of proposals under discussion. The Committee may wish to give further consideration to this matter in the light of the difficulties which it raises and bearing in mind also the contribution to increased transparency that should be achieved by a broadening of membership.

PROPOSAL 3. "A register of applications to the ACNFP should be published."

I accept the need for your Committee to be open in its dealings with individual proposals. Indeed, the current arrangements for the publication of ACNFP agendas and the production of an Annual Report, already promote openness. However, I feel it would be difficult to introduce a public register under the current voluntary arrangements but will ask officials to reconsider the matter in the context of the Commission proposal for a Council Regulation on novel foods.

PROPOSAL 4. "The ACNFP should continue to hold press briefings."

I welcome this proposal.

PROPOSAL 5. "More information on the ACNFP should be available, e.g. how it reaches decisions; how it reacts vith other advisory committees, especially with the FAC."

I am aware that there is already a great deal of information published about the ACNFP through press releases and the Committee's annual reports. Officials are however also drawing up a background note explaining what the ACNFP is and how it fits into the advisory committee and decision making structure. This note will be made available to members of the public on request.

PROPOSAL 6. Should the ACNFP's advice differ from that of equivalent bodies in other countries, the Government should make a particular effort to explain why."

I accept this proposal and would ask you to ensure that where the advice of your Committee does differ from that of equivalent bodies in other countries, the reasons for this difference in opinion is explained in the Committee's report.

PROPOSAL 7. "There should be greater consultation particularly on "first of a kind proposals"; ACNFP advice to Ministers could include a recommendation on the need for wider consultation."

I agree that it is important that issues beyond the scientific issues of safety and nutrition in which your Committee provides notable expertise are not overlooked. Where wider issues are raised, we shall consider on a case by case basis how they might be tackled. I expect to be able to form a view with Ministers in MAFF shortly on the specific questions you have raised on animals from transgenic breeding programmes.

PROPOSAL 8. "The opportunity for public representations should be built into any statutory scheme for control of novel foods."

I acknowledge the importance of involving consumers in the difficult area of novel foods; e.g. on "first of a kind cases" as mentioned in proposal 7 above. The future statutory scheme for the control of novel foods will be developed when the proposal for an EC Regulation on novel foods moves forward. The questions of whether and how to involve public representations in the statutory clearance scheme will be addressed as part of the negotiations on the Regulation.

PROPOSAL 9. "Government should produce educational material on biotechnology."

I recognise the importance of public education in this area. Officials are currently reviewing existing educational material and will consider with other Government Departments (e.g. Department of Education and Science and the Department of Trade and Industry) whether and how further material can be made available.

PROPOSAL 10. "Government should commission research into consumer perceptions and food choice."

MAFF have recently agreed to fund a research project in this area by the Reading Laboratory of the AFRC Institute for Food Research.

PROPOSAL II. "A guidance note defining the extent of commercial confidentiality should be prepared."

This has been taken forward in the forum of the Consumer Panel. A recent paper put to the Panel, entitled "Food Safety and Consumer Protection: Access to information" included an explanation of how and why material is treated as "commercial in confidence". I enclose a copy of this paper and further ones will be supplied to ACNFP members. As with all Consumer Panel papers, this is freely available to interested parties, on request.

PROPOSAL 12. "The FAC guidelines for the labelling of genetically modified foods should be published."

As you will know, this proposal has been met. The guidelines were issued on 17 January 1991 and also appear in the ACNFP Guidelines.