COMMITTEE ON TOXICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT

Follow-up paper on the recommendations of the Bystander Risk Assessment Working Group (BRAWG) report concerning skin sensitisation from exposure to pesticides

BACKGROUND AND INTRODUCTION

1. In 2012 the COT and the Advisory Committee on Pesticides (ACP) published the report of a joint Bystander Risk Assessment Working Group (BRAWG) on methods used in regulatory assessment of potential health risks to bystanders and residents from the application of pesticides. The BRAWG noted a concern that some individuals might become sensitised to pesticides, and recommended that, as risk factors for dermal sensitisation were not well understood, further work was needed to justify the default assumptions used when characterising and quantifying the potential of pesticide formulations to induce skin sensitisation in humans. The question of skin sensitisation and the recommendations of BRAWG were discussed by the COT in October 2014 (TOX/2014/30).

2. The COT discussed current methods to determine whether a chemical might be a skin sensitiser. The main test in current use is the mouse local lymph node assay (LLNA). European Union regulations now require that data to support approvals for plant protection products must include information on the potential of active substances and formulations to cause sensitisation, and the LLNA is the test that must be used, if at all possible. An invited expert on skin sensitisation was present at the meeting and explained the advantages of the LLNA, the association between values derived from the LLNA and how they relate to human skin sensitisation potency, and work being done to categorise chemicals according to their human skin sensitising potency. He stated that he would send references to specific papers on these aspects as further information for the Committee.

3. The Committee also asked whether there had been any documented cases of skin sensitisation in operators caused by pesticide products that had not been labelled as sensitisers, and whether there had been any documented cases at all of skin sensitisation in re-entry workers, bystanders, residents or non-professional pesticide users. It was agreed that the Health and Safety Executive (HSE) Chemicals Regulation Directorate (CRD) should be consulted on this question. It was considered that, if there was no evidence that sensitisation occurred in the groups of people described above, then it could be concluded that the current approach to risk assessment was adequate to protect bystanders and residents, and further work or research on this would not be a priority for pesticides.

SPECIFIC PAPERS RECOMMENDED FOR THE ATTENTION OF THE COMMITTEE

4. Four papers have been sent to the Committee by the invited expert, providing further details on the LLNA, its validation, and current work on estimates and categories of human sensitisation potency of chemicals. These are described in detail below, and copies are attached in Appendix 1.

Validation and advantages of the LLNA

5. The paper, Local Lymph Node Assay: validation assessment for regulatory purposes, Gerberick et al, 2000, describes the method for conducting the LLNA, the quantitative results that are obtained, the process of validation and the reasons why it can be used as a stand-alone method for regulatory purposes. There is a standard protocol for conducting the test in mice and, for each concentration of a test chemical, a stimulation index (SI) is derived, relative to a concurrent vehicle control. Chemicals which induce an SI of 3 or more, at one or more test concentrations, are classified as skin sensitisers. The amount of chemical required to induce an SI of 3 is known as the EC3 (Effective Concentration 3) value, and is estimated from the dose-response curve.

6. A key strength of the EC3 value is that it gives a quantitative estimate of the relative potency of a sensitiser. EC3 values are often expressed as a percentage concentration of the test chemical required to elicit a sensitisation response: thus a low EC3 value, such as 0.02%, indicates a strong sensitiser, because a very small amount of substance is needed to induce a sensitisation response, whereas a high EC3 value such as 75% indicates a weak sensitiser. Chemicals can be compared in their ability to induce skin sensitisation, and the EC3 is a measure of relative potency.

7. The paper describes that extensive data are available on the intra-laboratory reproducibility of the LLNA. A number of inter-laboratory validation trials were also conducted by independent UK laboratories during the 1990s, and a further study was done in collaboration with the United States Food and Drug Administration. The results were in good agreement, and even the incorporation of minor procedural modifications did not affect the performance of the LLNA. The authors concluded that the LLNA had good sensitivity and specificity, and was a reliable and robust method for assessment of the contact sensitisation potential of chemicals. They recommended that it should be formally adopted as a stand-alone method for regulatory purposes.

Relationship between EC3 values and human skin sensitisation potency

8. The paper, Predictive identification of human skin sensitisation thresholds, Basketter et al. 2005 describes investigations to consolidate the understanding of the association between LLNA EC3 values and human skin sensitisation potency of chemicals. The aim of the study was to undertake an analysis of human threshold data, and compare it with some of the best-quality LLNA data available.

9. LLNA EC3 values were taken from an LLNA database described in Gerberick 2005, and human repeated insult patch test (HRIPT) data were obtained from

published literature and the RIFM-FEMA[1] database. For the HRIPT data, a maximal no observed effect level (NOEL) was determined for 26 skin-sensitising chemicals by examination of all available sources. Linear regression analysis was then performed of the log HRIPT NOELs versus the log LLNA EC3 values for those chemicals. The results, expressed as dose per unit area in $\mu g/cm^2$, showed a clear linear relationship between the two values. The authors concluded that the data confirmed the potency profile of mice and humans to potential skin sensitisers is broadly equivalent. They stated that LLNA EC3 data allow a prediction of the NOEL in the HRIPT, and thus provide a solid foundation for a quantitative risk assessment for skin sensitisation.

Categorisation of chemicals according to human skin sensitising potency

10. In the paper, Categorisation of chemicals according to their relative human skin sensitising potency, Basketter et al. 2014, the authors used only human data to characterise 6 categories of human sensitising potency. Human NOELs were provided where sufficient data were available. This study marks an attempt to provide a reference standard data set of substances which are categorised according to relative human potency.

11. The authors of Basketter 2014 have analysed data for 131 chemicals, and have established criteria for categorising these chemicals into 6 categories of human skin sensitising potential. Category 1 contains substances with the highest intrinsic skin-sensitising potency. Category 2 contains substances that are a little less sensitising than the first category, but nevertheless possess a strong intrinsic potency. Category 3 contains substances that may be known as contact allergens, but for which a substantial degree of exposure typically is necessary to produce sensitisation, in 0.01%-0.1% of people exposed. Category 4 contains substances that require considerable or prolonged exposure to higher dose levels to produce sensitisation. Category 5 contains substances that have a very low intrinsic ability to cause skin sensitisation, and typically only exceptionally prolonged exposure, along with high use levels, would lead to skin sensitisation. Category 6 contains non-sensitisers.

12. The categories were established by consulting a range of literature sources. The authors state that they used standard textbooks on contact dermatitis, and consulted the extensive dermatological literature available, focussing particularly on the journals *Contact Dermatitis* and the *American Journal of Contact Dermatitis*. They also consulted a review of fragrance allergens by a European independent expert group, the Scientific Committee on Consumer Safety. Where sufficient data were available, a best estimate was made of the NOEL for the induction of skin sensitisation in a HRIPT. However, NOELs could not be estimated for all substances: the authors state that NOEL values could be identified from the literature for only 46 of the 79 substances in Categories 1-4, which would need regulatory classification.

[1] Research Institute of Fragrance Manufacturers-Flavor and Extract Manufacturers Association: the database is the most comprehensive, worldwide source of toxicology data, literature and general information on fragrance and flavour raw materials

13. With regard to future work, the authors state that the criteria and the data set they have generated provide a basis for developing non-animal approaches for the determination of human sensitisation potency. They caution that expert judgement has been relied upon to categorise the 131 chemicals in a number of cases, and that the outcome should be taken as their considered view. However, at present it is not possible to categorise an unknown chemical based on these criteria, and the LLNA remains as the required assay.

Effect of vehicle on relative skin-sensitising potency in the LLNA

14. The paper, The impact of vehicle on the relative potency of skin-sensitising chemicals in the local lymph node assay, Jowsey et al. 2008, examines a factor that has a potentially significant impact on the quantitative values of the EC3 obtained in the LLNA, that of the vehicle used in testing. Furthermore, human exposure to skin-sensitising chemicals often occurs via a vehicle that differs from that used in the LLNA tests. The aim of the study was to evaluate the impact of vehicle differences on LLNA EC3 values, which can be taken into account in identifying acceptable exposure levels, currently done by the application of a sensitisation assessment factor (SAF), scaled between 1 and 10.

15. First, the authors investigated the inherent variability of the LLNA by examining the reproducibility of EC3 values for 14 chemicals that had been tested more than once in the same vehicle, 4:1 acetone:olive oil. The analysis showed that the intra-laboratory variability in EC3 value for these chemicals, when they were tested in the same vehicle on multiple occasions, was around 5-fold.

16. Next, the authors compiled data for 18 chemicals that had been assessed in the LLNA using at least 2 of 15 different vehicles. They found that, in general, the variability in EC3 values observed for a given chemical in different vehicles was no greater than the 5-fold inherent variability when assessing a chemical in the same vehicle on multiple occasions. Nevertheless, there were examples where the EC3 values for a chemical differed by a factor of more than 10 between different vehicles. Predicting which chemicals might be affected in this way was difficult (there was no clear pattern between chemicals or between solvents) , but the authors did observe that careful consideration needs to be given to scenarios where there is extrapolation from aqueous vehicles to organic solvents, as an underestimation of potency is more likely to occur with predominantly aqueous vehicles.

Further questions discussed by the Committee

17. At the meeting in October 2014, the invited expert commented on the use of different vehicles, and said that, in his experience, they had a relatively limited effect on the potency of a substance, sometimes one order of magnitude, though more commonly 3 to 4-fold. However, he was unsure how well the vehicles that had been tested would represent the chemicals in pesticide formulations.

18. The effect of co-formulants on the sensitising potency of a substance was also discussed. It was stated that available data did not indicate how the effects of co-formulants could be predicted from their chemical properties. A substance which

enhances skin penetration might be expected to increase the sensitising potency of a formulation if added as a co-formulant, but it could equally reduce sensitising potency by causing the exposure of the skin to be more transient. Further research could be done by using the same active substance in different vehicles. Whether it is worth conducting this kind of research specifically on pesticides depends on how often any pesticide-related skin sensitisation has been reported on products that are not currently classed as sensitisers.

19. The question of assuming that once substances classed as sensitisers were diluted 1 in ≥ 100 they would no longer cause sensitisation was also discussed. There is a current understanding that if a pesticide active substance is classed as a sensitiser, but diluted to 1% or less in a product, then the product is not considered to be a sensitiser. On the other hand, if the concentration in the product is more than 1%, then the product is also classified as a sensitiser. The Bystander Risk Assessment Working Group had concluded that it was unable to identify sufficient empirical data to support this approach. However, the Committee concluded that research into this area would only be justified if there was evidence of sensitisation in re-entry workers, bystanders, residents or other non-professional pesticide users to products not classed as sensitisers. If there is no evidence that such sensitisation has occurred, then it might be concluded that the current approach to risk assessment is adequate to protect bystanders and residents. The 1% trigger for classification of formulations as sensitisers is thought to be reasonable by several experts.

RECENT DISCUSSIONS BY THE ADVISORY COMMITTEE ON PESTICIDES (ACP) RELATING TO SKIN SENSITISATION

Assessment of risk to bystanders of developing skin sensitisation to pesticides

20. In 2013 the ACP discussed methods of assessing the risk to bystanders of developing skin sensitisation to pesticides (Item 6, 361/2013). At present, an in-use dilution of a skin sensitiser of 1:100 or more dilute, means that the substance is no longer classified as a skin sensitiser. If it is more concentrated, CRD have to seek further information to determine whether such a concentration would be a skin sensitiser. A risk assessment approach was proposed by one company, and a representative of the company attended the ACP meeting to introduce the proposal. The company suggested an approach based on the dose per unit area of skin for plant protection products, as already used for cosmetics and other consumer products.

21. The company representative explained that the method of using dose per unit area of skin had been in use for cosmetics for more than 10 years, and had also been included in REACH guidance. He confirmed that the predictivity of the LLNA assay was well understood and known to be protective for humans, and the company suggested that an additional assessment factor of 30 would “in most cases” be appropriate in considering risk from pesticides. The calculations and details of how this figure was arrived at are not presented in the ACP summary of the discussion.

22. The ACP agreed that there was a good scientific argument to move to an assessment based on dose per surface area. Members' concerns were over the differences in mode of exposure between consumer products and pesticides. Exposures to pesticides would be to droplets, and, as water tends to evaporate at body temperatures, higher concentrations of sensitiser would result on small localised areas of skin. The company representative said that the company would assess the worst case, reduced volume, scenario, and their labelling would specify a minimum dilution. CRD confirmed that, for products classified as skin sensitisers, personal protective equipment would be required for operators, and the code of practice for operators would prevent reduced volume spraying. No mention is made at this point of potential effects on residents or bystanders.

23. Overall, ACP members stated that they were happy to use the proposed approach. However, they considered it was necessary to consider further the appropriate assessment factor, the key issue being the potency of the sensitiser and the margin of exposure needed to account for exposure to dispersed droplets, with water evaporation changing the concentration. These considerations are ongoing.

Report by the Institute of Occupational Medicine (IOM) on biological monitoring of pesticides exposures in residents living near agricultural land

24. At the ACP meeting in September 2014 members heard an account of the draft report being prepared by IOM on biological monitoring of pesticide exposure in residents, and the completed report was presented to the committee in January 2015. The project had been commissioned by DEFRA (Project PS2620). The aim of the project was to assess exposure to pesticides for adults and children (4-12 years old) living within 100m of agricultural land and to investigate if exposures were elevated following pesticide spray events. It also considered whether current methods used in the UK pesticides approval process are appropriate for assessing exposure of residents living near fields.

25. The project is a biomonitoring study, and it analysed urinary metabolite levels in participants to 4 pesticides commonly sprayed in the areas from which participants were recruited, which were farms in East Lothian, Kent and Norfolk. The pesticides concerned were captan, cypermethrin, penconazole and chlormequat.

26. The study found that, for captan, cypermethrin and penconazole, over 80% of urinary metabolite measurements were below detectable levels, whether or not samples were collected following spray events. Levels of metabolites detected were generally comparable to those in other population studies: the authors make comparisons with US NHANES (National Health and Nutrition Examination Survey) studies reporting on farm families, as well as general population studies. For chlormequat, there was only one other relevant study of a sub-set of the Swedish population for comparison, and the levels detected in the UK study were generally higher than those found in the Swedish study. However, levels could be different due to different farming practices between the two countries, and differences in consumption of food and drink containing cereal crops, to which chlormequat is typically applied as a growth regulator. For example, consumption of cereal is higher in the UK than in Sweden, with a mean daily per capita consumption reported in 2006 of 36g in the UK compared to 25g in Sweden.

27. While the IOM study does not specifically address skin sensitisation, it does provide evidence of exposures experienced by residents living near agricultural land, and the results suggest that exposures are generally low, and comparable between times when spraying of pesticides does or does not occur. The study also concludes that regulatory exposure assessment methods currently used generally provide sufficiently conservative estimates of residents' exposures. In line with these findings, it might be expected that skin sensitisation events, if any, would likely be a rare occurrence in the scenario described.

INFORMATION FROM THE CHEMICAL REGULATIONS DIRECTORATE (CRD) RELATING TO REPORTED INCIDENTS OF SENSITISATION BY THE PUBLIC

28. Following the discussion at the COT meeting in October 2014, the CRD was consulted about how information on individuals' reactions regarding skin sensitisation is collected and documented, and whether there was information available on any persons who had experienced contact dermatitis from exposure to a pesticide. CRD confirmed that some information is contained on the TOXBASE database. In the UK there are surveillance schemes for picking up adverse reactions to pesticides, which would include skin reactions. The point was made, however, that the UK is perhaps better organised than other countries in documenting such adverse reactions.

Information from the National Poisons Information Service (NPIS), the Pesticides Incident Appraisal Panel (PIAP), and the Human Health Enquiry and Incident Survey (HHEIS)

29. Two major reporting schemes on pesticide exposure monitoring in the UK are those of the NPIS, the National Poisons Information Service, and PIAP, the Pesticides Incident Appraisal Panel. The latest reports of both organisations were presented at the ACP meeting of March 2015.

30. The Edinborough NPIS, under a contract to Defra/CRD, analyses cases referred to the UK NPIS system from medical professionals, such as GPs and hospital staff, where a pesticide or biocide has been reported to be involved. Incident information is collected in two different ways: (1) TOXBASE enquiries by either on-line questionnaire or follow-up postal questionnaire; and (2) enquiries to the NPIS telephone enquiry service. Cases are summarised and reported quarterly, with an overall annual report. The latest annual report covers 1093 cases from April 2013 to March 2014. The most recent report, for April 2014 to June 2014, covers 378 cases. The annual and interim reports from NPIS are usually presented to the ACP (since April 2015 re-named the Expert Committee on Pesticides, ECP) at one of their meetings.

31. One incident in the NPIS annual report involved a large number of individuals, and the active substance pinoxaden. The reported incident related to 45 cadets crawling through a field that had been treated previously with pinoxaden. Seven of the cadets reported wheeze, facial swelling and swelling of the throat, although no skin reactions were reported. Pinoxaden is known to be a potent skin sensitiser. It

is a relatively new active substance (further information in paragraph 34), and there is limited information on human exposures. HSE proposes to monitor future NPIS reports specifically for cases related to this active.

32. PIAP, the Pesticides Incident Appraisal Panel, also produces an annual report, which covers cases reported to the Health and Safety Executive (HSE). There were 40 incidents reported during 2013-2014, with 11 of these related to ill health. There is one report from November 2013 resulting from spray drift on a windy day that relates to a skin rash – the complainant and grandson had suffered from a rash, and the grandson also had blisters on his body. The Panel decided that there was insufficient information in the case to ascribe the symptoms to the pesticides sprayed, and there was no corroborating medical evidence.

33. The CRD also undertakes a survey within all companies holding approvals during the survey year, asking them to report on any enquiries or reports of incidents they may have received. The latest of the reports, known as the Human Health Enquiry and Incident Survey, that was presented to the ACP in 2014 (ACP 6, 366/2014), dates from 2012. The report details the products with which incidents have occurred, provides information on what actions were taken in the cases reported (for example, contact with a GP or admission to hospital), and indicates how the exposure happened. However, individual symptoms and responses are not described, and it is not known if any skin symptoms occurred in the survey year.

Further information relating to pinoxaden

34. Pinoxaden is a relatively new active substance, and is used as a herbicide on winter and spring cereals.It is a potent sensitiser in the LLNA, with an EC3 of <1%. However, different responses are seen with different formulations in apparently similar assays (personal communication from CRD, November 2014). The original DAR, Draft Assessment Report (Pinoxaden DAR 08, November 2005), classed pinoxaden as not being a skin irritant in rabbits, although an irritant to the rabbit eye. It was not a skin sensitiser using the guinea pig maximisation test of Magnusson and Kligman (1969). It was also of low dermal acute toxicity in the rat.

35. However, new information submitted since the completion of the original DAR (Pinoxaden Annex B, Addendum 2, January 2012), provides evidence that it is an irritant in humans. Since the commencement of large scale production of pinoxaden in 2005, incidents of skin irritancy (redness, itchiness and rashes) have been observed among the workforce at manufacturing sites. It is suggested in Annex B that pinoxaden could be classified as: “May cause an allergic skin reaction”, under CLP (Classification, Labelling and Packaging of chemicals) regulations, but it is not clear whether the skin symptoms observed in the workforce are due to irritation or sensitisation. In the absence of conclusive evidence, pinoxaden is currently classed as a skin irritant.

36. Overall, there is very little information on any skin sensitisation responses to pinoxaden. The published literature (Toxnet database searched), has no reports of human effects. There is one report of the response of a group of cadets in a field that had been sprayed with pinoxaden (paragraph 31 above). HSE is monitoring

NPIS reports for any further information that may help to clarify the relative potency of pinoxaden as a skin sensitiser.

Skin sensitisation reactions to the active mancozeb

37. With reference to skin sensitisation and pesticides, the CRD also indicated that the active mancozeb is worth considering. Using the database Toxnet, the information on skin sensitisation shown in Tables 1 and 2 below was found.

Reference for reported case/s	**Number of cases**	**Occupational/other exposure**	**Pesticide/s involved**	**Sensitisation confirmed by patch testing**
Assini et al,, Med Lav 85(4): 321-6 (1994). (article in Italian)	One	Occupational, subject suffering from urticaria	Cynoxamil, mancozeb, thiophanate	Presumably yes – there is reference to "allergy testing"
Crippa et al., Contact Dermatitis 23(3): 203-4 (1990)	One	Occupational exposure in florist, dishydrotic eczema, dermatitis	Dithiocarbamate pesticides, and maneb, mancozeb, zineb, carba mix specifically	Yes – patch tested with European standard allergen series, and maneb, mancozeb, zineb, carba mix
Guo et al., Occup Environ Med, 53(6): 427-431 (1996)	37 out of cohort of 122	Occupational exposure, fruit farmers in Taiwan, 37 had hand dermatitis	Methamidophos, dimethoate, mancozeb, glyphosate	Yes
Hayes and Laws (eds.), Handbook of Pesticide Toxicology, NY Academic Press Inc. (1991)	One	Occupational exposure in vineyard worker, rash on forearm	Mancozeb on treated seedlings	Not known
Koch, Contact Dermatitis 34(5): 324-9 (1996).	One	Occupational contact dermatitis in vineyard worker	Mancozeb, metiram	Yes – patient had strong reaction to mancozeb tests, weak reaction to metiram, and reaction to 4 other dithiocarbamate fungicides not used in the vineyard, maneb, nabam, propineb and zineb
USEPA/Office of Pesticide Programs: Mancozeb, Human Health Risk Assessment p.66, EPA-HQ-2005-0176-0002 Incident Data System reports from 1992-	Eleven	Not specified; incidents involved skin	Mancozeb	Not known

2001		rashes or contact dermatitis		
As above, California Pesticide Illness Surveillance Program, 1982-1999	Forty-four	Maybe both; workers who developed skin rashes were tending grapes	Mancozeb	Not known
Reference for reported case/s	**Number of cases**	**Occupational/other exposure**	**Pesticide/s involved**	**Sensitisation confirmed by patch testing**
WHO/FAO Data Sheets on Pesticides, No.94 Dithiocarbamates (1996), at http://www.inchem.org/pages/pds.html	One	Worker handled and sprayed maneb without gloves, hospitalised, widespread rash	maneb	Not reported
As above	Not specified	Incidences of dermatitis in general public	Exposure to plants previously treated with maneb or mancozeb	No
As above	Three	Volunteers reporting adverse effects from handling treated plants	Maneb or mancozeb	Yes – indicated maneb was a dermal sensitiser
As above	One	Woman's back soaked in accident, rash and renal failure	Maneb	Not reported
As above	One	Woman stored mancozeb powder in garage, widespread dermatitis	Mancozeb	Not reported
As above	Not specified	Field workers with contact dermatitis	Zineb	Not reported

TABLE 1, TOXNET data on skin sensitisation reactions to mancozeb and dithiocarbamate pesticides, accessed December 2014 – July 2015

Reference for reported case/s	Number of cases	Occupational/other exposure	Pesticide/s involved	Tests performed
Colosio et al, Arch Environ Health 51(6): 445-51 (1996) (only abstract available)	Number not available in abstract	Occupational, mancozeb-exposed manufacturers	Mancozeb	Lymphocyte proliferative responses increased; T-cell functional response increased
Colosio et al, Biomarkers 12(6): 574-88 (2007)	48	Occupational, vine growers	Mancozeb	At end of application period, no differences in T-lymphocytes, CD4, or natural killer cells

TABLE 2, Immunotoxicity data from Toxnet, accessed December 2014 – July 2015

38. As can be seen from the data retrieved above, the number of cases reported overall is very small. In Table 1, the majority of incidents are reports of small numbers of workers affected; there are few reports of incidents involving the general public. The US EPA Incident reports refer to 11 incidents involved skin rashes or contact dermatitis and mancozeb, and the California Pesticide Illness Surveillance Program from the 1990s reports 44 cases, some of whom may have been occupationally exposed as there is reference to workers who developed skin rashes when tending grapes. The WHO data sheets from 1996 refer to incidents of dermatitis in the general public from exposure to plants previously treated with maneb or mancozeb, and then refer to 3 reports which relate to members of the general public: three volunteers reported adverse effects from handling plants treated with maneb or mancozeb; one woman had her back soaked in an accident with maneb, resulting in a rash and renal failure; and one woman who stored mancozeb powder in a garage developed widespread dermatitis. The information in Table 2 refers to two Italian studies involving mancozeb, but both are related to occupational exposure.

Scarcity of information on incidents relating to skin sensitisation

39. As can be seen from the examples above, information relating to skin reactions from pesticides is patchy, it is not collected consistently in different countries, and there are few reports of incidents available. Even fewer of those reports are available in the published literature. In order to obtain further information, it might be necessary to conduct a research project, with an in-depth review of data held by HSE, and possibly other organisations.

SUMMARY

40. The COT has discussed current methods to determine whether a chemical might be a skin sensitiser, and the use of the local lymph node assay (LLNA). Four specific papers recommended by an invited expert at the October 2014 meeting have been summarised in this discussion paper. Discussions by the Advisory Committee on Pesticides (now the Expert Committee on Pesticides) are described on a risk assessment approach based on dose per unit area of skin, which is already in use for cosmetics and other consumer products; it has been proposed that the same approach be applied to plant protection products. Recent information from two

UK reporting schemes is described, and a brief survey of data relating to two substances, suggested as being of interest by CRD, pinoxaden and mancozeb, is presented. The overall picture is one of a rarity of reported incidents relating to skin reactions, especially in non-occupationally exposed individuals.

Questions for the Committee

1. Do Members have any observations or comments on the published papers forwarded to the Committee by the invited expert?

2. Do Members have any comments on the discussions held by the ACP, and the findings of the IOM (Institute of Occupational Medicine) relating to exposures of residents living near agricultural land?

3. What are Members' comments on the information provided by CRD, and on the adequacy of the reporting schemes in the UK to pick up incidents relating to skin reactions to pesticides?

4. What are Members' views on the use of the 1:100 dilution of skin sensitisers? Is there sufficient information available to justify the safe use of such dilutions in the final product?

5. Do Members have any other comments or suggestions relating to the potential for skin sensitisation of residents and bystanders exposed to pesticides?

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