Use and Management of Endocrine Disrupting Suspected Pesticides in Korea

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For some years, a number of ecologists, epidemiologists, endocrinologists, and toxicologists have called attention to the potential hazardous effects that estrogen-like and anti-androgenic chemicals and certain other environmental chemicals have on human health and ecological well-being. A hypothesis has been proposed that certain chemicals may disrupt the endocrine system. These chemicals have been called endocrine distuptors because they are thought to mimic natural hormones, inhibit the action of hormones, or alter the normal regulatory function of the immune, nervous, and endocrine systems. Possible human health end points affected by these agents include breast cancer and endometriosis in women, testicular and prostate cancers in men, abnormal sexual development, reduced male fertility, alteration in pituitary and thyroid gland functions, immune suppression, and neurobehavioral effects.

Although many pesticides, and some industrial chemicals, may have already undergone extensive toxicological testing, conventional toxicity tests may be inadequate to determine whether these substances interact with specific components of the endocrine system and whether additional testing is needed to assess and characterize more fully their impact on both human and ecological health. Scientific knowledge related to endocrine disruptors is still evolving; however, there is widespread scientific agreement that a screening and testing program would be useful in elucidating the scope of the problem.

OECD's Work on Endocrine Disruptors

A special activity on Endocrine disruptors was established by the 25th OECD Joint Meeting of the Chemicals Group and Management Committee The objectives of the activity are to : Provide information and co-ordinate activities; Develop new and revise existing Test Guidelines to detect endocrine disruptors; and Harmonize hazard and risk characterization approaches for endocrine disruptors. This work was launched at the request of Member countries and the Business and Advisory Committee to the OECD (BIAC) to ensure that testing and assessment approaches would not substantially differ among countries.

In December 1996, a questionnaire was sent to Member countries to identify to what extent the

possible risk of endocrine disruptors should be a priority issue for the OECD and to obtain a snapshot of views on endocrine disruption as they were emerging in early 1997. The Report of the Questionnaire Analysis showed a high level of activity in Member countries. To provide a focal point for this OECD activity a Task Force on Endocrine Disrupter Testing and Assessment was established in December 1997. This Task Force reports principally to the National Co-ordinators of the Test Guidelines Programme.

The highlights of recent OECD work on the testing and assessment of endocrine disruptors have included the : establishment of a Validation Management Group to oversee the practical work on the validation of those mammalian tests agreed by Member countries to be priorities for international validation efforts; and completion of work on the first stage of validation of the rodent uterotrophic assay.

The OECD Task Force on Endocrine Disruptor Testing and Assessment (EDTA) met for the third time in May 1999 and confirmed the approach suggested by the Validation Management Group, thereby enabling the international validation work on short term tests or screens to get underway. The work is proceeding in steps, the first focusing on pre-validation or test optimization.

The revision of OECD Test Guideline 416 (Two Generation Reproductive Toxicity) and OECD TG 414 (Teratogenicity) are currently being considered for final adoption by OECD Member countries. While the object of the revisions was not specifically to address endocrine disruption, the revisions include many useful additions relevant to the detection of sex hormones disruption. This means that while there is still a need in the future to consider additional endpoints, particularly those relating to the central nervous system and thyroid hormone system, the current proposed revisions will immediately improve the current guidelines by ensuring that additional endocrine relevant parameters are included.

On the broader issue of endocrine disruptor testing and assessment, particularly in non-mammalian species further dialogue has taken place among experts on the subject of potential fish tests for endocrine disruptors following on from the Expert Consultation on Testing in Fish in London, UK (28th to 29th October 1999). A follow-up expert consultation was held in Tokyo, Japan in March 2000 and the results were reported to the 4th meeting of the EDTA.

The meeting of the OECD Expert Group on Test Guidelines for Avian Reproductive Toxicity Testing (Leipzig, Germany 23rd to 24th May 1999) among other things, met to identify, discuss and make proposals for the detection of endocrine disruption in birds. The meeting noted that some parameters indicative of endocrine modulating/disruptive activity are already part of the relevant OECD Avian Reproduction Test Guideline and that additional proposals could be considered separately. Further proposals from the expert consultation were considered at the meetings of the EDTA and the National Co-ordinators of the Test Guidelines Programme (May 2000).

US/EPA's Work on Endocrine Disruptors

Because of the potentially serious consequences of human exposure to endocrine disrupting chemicals, Congress included specific language on endocrine disruption in the Food Quality Protection Act and amended Safe Drinking Water Act in 1996. The former mandated that EPA develop an endocrine disruptor screening program, whereas the latter authorizes EPA to screen endocrine disruptors found in drinking water sources.

EPA formed an advisory committee, the Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), to develop recommendations for a screening program. EPA then used EDSTAC's recommendations to design the EPA Endocrine Disruptor Screening Program, and have begun to implement elements of it. The Endocrine Disruptor Screening Program focuses on providing methods and procedures to detect and characterize endocrine activity of pesticides, commercial chemicals, and environmental contaminants.

EPA's Endocrine Disruptor Screening Program uses a tiered approach for determining whether a substance may have an effect in humans that is similar to an effect produced by naturally occurring estrogen, androgen, or thyroid hormones. The core elements of the tiered approach include Initial Sorting, Priority-Setting, Tier One Screening, and Tier Two Testing.

EPA is involving the public and coordinating with international organizations in the implementation of the Screening Program. After the Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC) completed its work and disbanded in 1998, the EPA organized a Standardization and Validation Task Force consisting of representation from a broad range of sectors, including federal agencies, agrochemical companies, commodity chemical companies, and environmental and public health organizations, to coordinate and conduct the scientific and technical work necessary to validate the screens and tests recommended by the EDSTAC. This Task Force has been replaced by the Endocrine Disruptor Methods Validation Subcommittee (EDMVS), a subcommittee of an Advisory Council (NACEPT) established under the Federal Advisory Committee Act. In addition, EPA is working with the Organization for Economic Cooperation and Development's Endocrine Testing and Assessment Task Force to validate and harmonize endocrine screening tests of international interest.

RDA's Work on Endocrine Disruptors

RDA formed a task force to protect the risk from endocrine disrupting suspected pesticides and establish the basement of safety control of endocrine disrupting suspected pesticides. The research goals of task force are to: Residue evaluation of endocrine disrupting suspected pesticides through monitoring; Risk assessment and reproductive effect to mammals and wildlife; Establishment of

residue analysis and standard operating procedure of endocrine disrupting suspected pesticides. RDA has cooperated and harmonized with Ministry of Environment, Korean Food and Drug Administration, and OECD.