Höcker
ADVOCATEN

Voorzieningenrechter van de Rechtbank Limburg, locatie Roermond
Zitting van 18 april 2024, 09:30 uur
Zaak/rolnummer: XXXXXXXX

AKTE OVERLEGGING PRODUCTIE

inzake

mevrouw **XXXXXXXXXXX XX XXXXX,** wonende in Sevenum, en 34 andere eisers advocaat: mr. XXXXXX te Amsterdam

tegen

de besloten vennootschap met beperkte aansprakelijkheid **XXXXXXXXXXXXXXXX**, statutair gevestigd en kantoorhoudende te XXXXX
advocaat: mr. XXXXXX te Haarlem

Eisers leggen de volgende aanvullende productie over:

Productie 19: e-mail van dr. Martin van den Berg, Emeritus Professor of Toxicology Universiteit Utrecht met een toxicologische evaluatie op eventuele neurotoxische en neuro-ontwikkelingseffecten van de bestrijdingsmiddelen op het door gedaagde voorgestelde "groenere" spuitschema (zie **Productie 6**, derde bijlage), en een korte biografie.

Waarvan akte!

Van: "Berg, M. van den (Martin)" <XXXXXXXX>
Aan: XXXXXX <XXXXXXXX
Datum: dinsdag, 16 april 2024 15:57
Onderwerp: Toxicologische evaluatie "groene" bestrijdingsmiddelen Sevenum
Bijlagen: Short biography M vd Berg 1-2-2024.pdf;

Geachte mr. XXXX, Beste XXXXX,

Op uw verzoek heb ik de lijst van "groene" bestrijdingsmiddelen bekeken die eventueel gebruikt zouden kunnen worden op de akker bij XXXXX in Limburg.

De voorgestelde bestrijdingsmiddelen zijn door mij geëvalueerd op eventuele neurotoxische en neuro-ontwikkelingseffecten i.v.m. de mogelijk risico's voor de omwonenden van deze akker.

Na uitgebreide zoekopdrachten in de wetenschappelijke literatuur zijn de volgende bestrijdingsmiddelen bewezen of verdacht op neurotoxiciteit en/of neuro-ontwikkelingseffecten:

Sumi alpha, Sumicidin Super (actieve ingredient esfenvalerate)

Karate Zeon (actieve ingredient lambda-cyhalothrin)

Gazelle, Afinto, Antilop (actieve ingredient acetamiprid)

Stomp (actieve ingredient pendimethalin)

Hieronder staat een beknopt overzicht van de risico's verbonden aan neurotoxische en neurologische ontwikkelingseffecten van bovengenoemde bestrijdingsmiddelen incl. enkele sleutelreferenties:

Esfenvaleraat vertoont neurotoxische eigenschappen. Deze kunnen met name relevant zijn tijdens cruciale ontwikkelingsfasen zoals zwangerschap en kindertijd en de neurologische ontwikkeling beïnvloeden.

Ji-Jie, Liu., Ce, Guo., Bo, Wang., Meng-Xing, Shi., Yang, Yang., Zhen, Yu., Xiu-Hong, Meng., De-Xiang, Xu. (2018). Maternal fenvalerate exposure during pregnancy impairs growth and neurobehavioral development in mouse offspring.. PLOS ONE, 13(10) doi: 10.1371/JOURNAL.PONE.0205403

Petra, Varró., Eszter, Szabó., Melinda, Kovács., Ildikó, Világi. (2014). Nervous System and Gastrointestinal Effects of the Insecticide Esfenvalerate on the Rat: An Ex Vivo Study. Agricultural sciences, 5(4):365-375. doi: 10.4236/AS.2014.54038

Lambda-cyhalothrine heeft neurotoxische eigenschappen, waarbij nadelige gezondheids effecten op meerdere typen hersencellen kunnen optreden. Proefdieren met ratten hebben aangetoond dat ratten die zijn blootgesteld aan lambda-cyhalothrine, aantasting van de neurologische en motorische functies kunnen hebben.

Reyaz, W., Ansari., Rajendra, K., Shukla., Rajesh, Singh, Yadav., Kavita, Seth., Aditya, B., Pant., Dhirendra, Singh., Ashok, K., Agrawal., Fakhrul, Islam., Vinay, K., Khanna. (2012). Cholinergic Dysfunctions and Enhanced Oxidative Stress in the Neurobehavioral Toxicity of Lambda-Cyhalothrin in Developing Rats. Neurotoxicity Research, 22(4):292-309. doi: 10.1007/S12640-012-9313-Z

Anugya, Srivastava., Pankaj, Jagdale., Anjaneya, Ayanur., Vinay, K., Khanna. (2023). Lambda-cyhalothrin Enhances Inflammation in Nigrostriatal Region in Rats:Regulatory Role of NF-κβ and JAK-STAT Signaling.. Neurotoxicology, 96:101-117. doi: 10.1016/j.neuro.2023.04.003

Acetamiprid vertoont neurotoxische effecten, waarbij onderzoek suggereert dat acetamiprid neurotoxiciteit veroorzaakt via verschillende werkingsmechanismen, waaronder hersenceldood. Prenatale blootstelling aan acetamiprid wordt in verband gebracht met neurologische ontwikkelingstoxiciteit en veranderingen in de ontwikkeling van de hersenen.

Mohsen, Shamsi., Maliheh, Soodi., Shirin, Shahbazi., Ameneh, Omidi. (2021). Effect of Acetamiprid on spatial memory and hippocampal glutamatergic system. Environmental Science and Pollution Research, 28(22):27933-27941. doi: 10.1007/S11356-020-12314-6

Nao, Kagawa., Tetsuji, Nagao. (2018). Neurodevelopmental toxicity in the mouse neocortex following prenatal exposure to acetamiprid. Journal of Applied Toxicology, 38(12):1521-1528. doi: 10.1002/JAT.3692

Pendimethaline blootstelling is in verband gebracht met effecten op de neurologische ontwikkeling. Onderzoeksresultaten impliceren dat blootstelling aan pendimethaline nadelige effecten zou kunnen hebben op belangrijke cellulaire functies die een rol spelen bij de ontwikkeling van hersen en zenuwcellen.

Rodrigues, J.A., Narasimhamurthy, R.K., Joshi, M.B. *et al.* Pesticides Exposure-Induced Changes in Brain Metabolome: Implications in the Pathogenesis of Neurodegenerative Disorders. *Neurotox Res* 40, 1539–1552 (2022). https://doi-org.proxy.library.uu.nl/10.1007/s12640-022-00534-2

Miji, Kim., Junho, Park., Garam, An., Whasun, Lim., Gwonhwa, Song. (2023). Pendimethalin exposure disrupts mitochondrial function and impairs processes related to implantation.. Reproduction, doi: 10.1530/REP-22-0397

Seong-Ho, Lee., Hee-Seop, Lee., Yeonhwa, Park., Dmitriy, Smolensky. (2022). Effect of Pendimethalin on Viability and Function of Endothelial Cells. Current developments in nutrition, 6:78-78. doi: 10.1093/cdn/nzac050.008

Naar aanleiding van bovenstaande informatie wil ik opmerken dat voor deze bestrijdingsmiddelen een reëele kans bestaat op neurotoxiciteit en neurotoxicologische ontwikkelingseffecten. Deze is echte *afhankelijk van de mate van blootstelling* bijv. omwonenden. De mate van blootstelling is echter niet bekend, maar er zijn in de recente wetenschappelijke literatuur meerdere studies verschenen, die deze effecten hebben gevonden bij kinderen in de omgeving van landbouw gebieden en deze gerelateerd hebben aan blootstelling aan bestrijdingsmiddelen. Het betreffen hier effecten op omwonenden die vaak op honderden meters afstand van landbouwgebieden woonden. *Een voorzorgsprincipe is op grond van de huidige stand van de wetenschap dan ook alleszins verantwoord*, waarbij met name blootstelling van zwangere vrouwen en kinderen de hoogste prioriteit moet krijgen.

Op grond van bovenstaande informatie is het mijns inziens onverantwoord om de woonafstand van omwonenden rond de betreffende akker op slechts 50 meter te stellen, omdat bovengenoemde "groene" bestrijdingsmiddelen wel degelijk bij een bepaalde blootstelling neurotoxiciteit en neuro-ontwikkelingseffecten kunnen veroorzaken.

Hiermee hoop ik u voldoende op de hoogte gebracht te hebben over de potentiële risico's van een aantal van deze "groene" bestrijdingsmiddelen voor omwonenden van deze akker.

Met vriendelijke groet,

Martin van den Berg

Dr. Martin van den Berg, ERT

Emeritus Professor of Toxicology,

Utrecht University, Utrecht, The Netherlands

Visiting Professor,

Chulabhorn Research Institute, Bangkok, Thailand

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https://scholar.google.nl/citations?user=B5WcNxkAAAAJ

Short biography M. van den Berg (1-2-24)

Prof. Dr. Martin van den Berg holds the distinguished position of Emeritus Professor in Toxicology as of November 2019. Prior to this, he served as the deputy director of the Institute of Risk Assessment Sciences (formerly known as RITOX) at the University of Utrecht in The Netherlands. Additionally, he served as the head of the Toxicology and Pharmacology Division of IRAS. Furthermore, he was bestowed the title of honorary professor in environmental toxicology at the University of Queensland in Brisbane. He also holds the designation of visiting professor at the esteemed Royal Chulabhorn Research Institute and Graduate School in Bangkok.

In the autumn of 2006, Prof. van den Berg was bestowed an honorary doctorate from the University of Umea in Sweden in recognition of his research on the mixture toxicity of dioxin-like compounds, PCBs, and brominated flame retardants. During the years 2010-2012, he had the honor of serving as the president of the Dutch Society of Toxicology. For a comprehensive overview of his scientific impact, one may refer to his scientific output (H-indexes 73, 24000 citations as of 2024), available on Google Scholar and Research Gate. (https://scholar.google.nl/citations?user=B5WcNxkAAAAJ ; https://researchgate.net/profile/Martin_Berg).

Prof. van den Berg obtained his Master of Science and Doctorate degrees in Environmental and Toxicological Chemistry from the University of Amsterdam in 1986. His diverse areas of research encompass toxicokinetics, metabolism, reproductive effects, mixture and interactive effects of persistent halogenated organic pollutants Moreover, he investigated the interactions between xenobiotics and phytochemicals on steroid hormone synthesis, metabolism, and their correlation with hormone-dependent tumors. Another significant aspect of his research involves the development of in vitro assays to detect effects of endocrine disruptors e.g. on aromatase.

These comprehensive studies were conducted on a wide range of subjects, including mammals, birds, fish, as well as (human) in vitro systems. The outcomes of his scientific endeavors, along with those of his research group, have been disseminated through the publication of over 400 scientific articles, short papers, and conference proceedings.

From 2004 to 2007, Prof. van den Berg served as the sole European representative on the program committee of the Society of Toxicology in the United States. In 2008, he was appointed to the Dutch Committee of Appeal from the Board of Authorization of Plant Protection Products and Biocidal Products. In recognition of his contributions to the general public, he was honored with the Media Award from the University of Utrecht in 2016 for his regular appearances on various television and radio programs, as well as his noteworthy scientific quotes in newspapers.

Prof. van den Berg is a European registered toxicologist and a member of the Society of Toxicology in the United States and the Dutch Society of Toxicology. Within the Dutch Society of Toxicology, he has served as a member of the Registration Committee for toxicologists for a span of seven years. In 2010, he was elected as the president of this society. He has also held the positions of chair of the Supervision Board of the Dutch Postdoctoral Education in Toxicology and chair of the Education Committee of the European Society of Toxicology.

In the past, he has taken on the role of editor for esteemed journals such as Chemosphere in the Environmental Toxicology and Risk Assessment Section, Associate Editor of Toxicological Sciences, and Environmental Health Perspectives. He also serves as an editorial board member for journals including Toxicology Letters, Toxicology Reports, and Current Research in Toxicology. Currently, he holds the position of (co)Editor-in-Chief for Current Opinion in Toxicology (Elsevier) and (co)Editor in Chief for Regulatory Toxicology and Pharmacology (Elsevier).

Prof. van den Berg has been engaged as a participant and chair in numerous national and international organizations that are involved in the assessment of toxicological risks associated with environmental and food contaminants, as well as pesticides. In this capacity, he was also a member of the Health Council of The Netherlands and chaired and served on various of its (permanent) committees until 2015. Furthermore, he held the position of director at the WHO Collaborating Centre for Research on Environmental Health Risk Assessment, which was situated at IRAS (Utrecht University) until 2015.

Over the past decade, he has acted as a participant and chair at multiple WHO, IARC, and JECFA meetings that focused among others on the health effects of persistent halogenated pollutants and endocrine disruptors, particularly those of an environmental nature. At IARC, he fulfilled the roles of both plenary chair and working group chair, specifically in relation to the mechanism of action of carcinogenic compounds. Notably, he has been (co)responsible for organizing several WHO meetings that established TEF values for dioxin-like compounds and PCBs, with these meetings being published with him as the primary author in Environmental Health Perspectives and Toxicological Sciences.

Most recently, he served as the plenary chair of the WHO meeting on updates to the TEF values in Lisbon 2022, the proceedings of which have been published in Regulatory Toxicology and Pharmacology in 2023. In this capacity, he played a key role in supporting the World Health Organization in the development of the meeting design, which significantly contributed to the structural and mechanistic derivation of the 2022 WHO TEFs. Given his well-known expertise in the field of mixture toxicity of persistent organic pollutants, he has also played an active role in the recent risk assessment and risk communication processes of PFAS compounds due to several instances of high human and environmental exposure that have occurred in The Netherlands.

Ten most highly cited publications (February 2024):

Van den Berg, M., et al., 1994. The toxicokinetics and metabolism of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) and their relevance for toxicity. Critical reviews in toxicology. 24, 1-74. *(468 citations)*

Van den Berg, M., et al., 2006. The 2005 World Health Organization reevaluation of human and mammalian toxic equivalency factors for dioxins and dioxin-like compounds. Toxicological sciences. 93, 223-241. *(3940 citations)*

Van den Berg, M., et al., 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environmental Health Perspectives. 106, 775-792. *(4118 citations)*

Sanderson, J. T., et al., 2000. 2-Chloro-s-triazine herbicides induce aromatase (CYP19) activity in H295R human adrenocortical carcinoma cells: a novel mechanism for estrogenicity? Toxicological Sciences. 54, 121-127. *(460 citations)*

Sanderson, J. T., et al., 2001. Effects of chloro-s-triazine herbicides and metabolites on aromatase activity in various human cell lines and on vitellogenin production in male carp hepatocytes. Environmental Health Perspectives. 109, 1027-1031. *(329 citations)*

Sanderson, J. T., et al., 2002. Induction and inhibition of aromatase (CYP19) activity by various classes of pesticides in H295R human adrenocortical carcinoma cells. Toxicology and Applied Pharmacology. 182, 44-54. *(414 citations)*

Heacock, M., et al., 2016. E-waste and harm to vulnerable populations: a growing global problem. Environmental Health Perspectives. 124, 550-555. *(412 citations)*

Grant, K., et al., 2013. Health consequences of exposure to e-waste: a systematic review. The Lancet Global health. 1, e350-e361. *(697 citations)*

Dingemans, M. M., et al., 2011. Neurotoxicity of brominated flame retardants:(in) direct effects of parent and hydroxylated polybrominated diphenyl ethers on the (developing) nervous system. Environmental Health Perspectives. 119, 900-907. *(326 citations)*

Brouwer, A., et al., 1995. Functional aspects of developmental toxicity of polyhalogenated aromatic hydrocarbons in experimental animals and human infants. European Journal of Pharmacology: Environmental Toxicology and Pharmacology. 293, 1-40. *(371 citations)*