

Support for HB 4109

My testimony is based on my diverse background both in toxicology, environmental science, and my work with a private agricultural consulting firm that works with conventional farmers across the nation in the transition to certified organic farming practices. My testimony provides a balanced look at the issues related to the use of chlorpyrifos since I have research experience looking at the impacts of insecticides on wildlife, and my consulting work in the agriculture industry showing that the use of these powerful insecticide is not necessary in the economic success of large-scale farms.

Chlorpyrifos

Acute chlorpyrifos poisoning results in tens of thousands of deaths each year worldwideⁱ. Past research looking at the effects of chlorpyrifos on humans and wildlife has shown that the toxic mechanism of action of this powerful insecticide is the same as the nerve agent VX that has been used in chemical warfare. Acute poisoning in humans results because this chemical affects neurological systems shared by both insects and humansⁱ. Chlorpyrifos and related organophosphate insecticides bind to an enzyme in the nervous system found in both humans and insects (acetylcholinesterase). This enzyme is responsible for the control of nerve transmission at the junction between 2 nerve cells. This enzyme is particularly important for nerve transmission that controls basic bodily functions (heart rate, breathing, digestion, etc.). Death in organisms exposed to this chemical is due to the loss of bodily functions that are important to sustain life (e.g. heart rate and breathing).

Most toxicological studies have focused on this effect. However, recent studies have shown that long-term exposure to low levels of chlorpyrifos has deleterious effects on humans^{ii iii}, particularly the developing brain of children^{iv v vi}. These findings led the EPA to restrict the use of chlorpyrifos in homes^{vii}. However it is unfortunate that the EPA did not take the final steps to ban this dangerous pesticide forcing states to take action. To protect the health of farmworkers, to safeguard our food supply, and to protect our environment, we urge Oregon to pass the statewide ban on Chlorpyrifos found in HB 4901.

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ⁱ Jiří Wiesner, Zdeněk Kříž, Kamil Kuča, Daniel Jun & Jaroslav Koča (2007) Acetylcholinesterases – the structural similarities and differences, *Journal of Enzyme Inhibition and Medicinal Chemistry*, 22:4, 417-424, DOI: 10.1080/14756360701421294

ⁱⁱ D. Gunnell, M. Eddleston, M.R. Phillips, F. Konradsen. The global distribution of fatal pesticide self-poisoning: systematic review *BMC Public Health*, 7 (2007), p. 357

ⁱⁱⁱ Bouvier G., Seta N., Vigouroux-Villard A., Blanchard O. and Momas I. (2005) Insecticide urinary metabolites in nonoccupationally exposed populations. *J. Toxicol. Environ. Health* 8, 485–512.

^{iv} Jaga K. and Dharmani C. (2003) Sources of exposure to and public health implications of organophosphate pesticides. *Rev. Panam. Salud Publica* 14, 171–185

^v Eaton D. L., Daroff R. B., Autrup H. et al. (2008) Review of the toxicology of chlorpyrifos with an emphasis on human exposure and neurodevelopment. *Crit. Rev. Toxicol.* 38(Suppl. 2), 1–125.

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- ^{vii} Reiss R., Chang E. T., Richardson R. J. and Goodman M. (2015) A review of epidemiologic studies of low-level exposures to organophosphorus insecticides in non-occupational populations. *Crit. Rev. Toxicol.* 45, 531–641.