

Organophosphate pesticide poisoning

Date: The issue of organophosphate pesticide (OP) poisoning was raised in 1976 when Levin (currently Ph.D. at Baylor College of Medicine), Rodnitzky (currently MD at University of Chicago) and Mick (Ph.D. at University of Iowa) suggested a possibility of adverse human psychological effects of OP exposure.¹ In the same year, Levin and Rodnitzky published another paper, claiming that “despite of methodological shortcomings”, investigators generally agree on the presence of several behavioral effects of OP poisoning.”² Also in the same year, OP containers were required to be labeled as potentially hazardous for the first time in the U.K.

Forecast of the impending disaster: The paper indicated that that organophosphate compounds may be associated with anxiety and subtle psychological defects.

Forecasting method: Levin, Rodnitzky and Mick assessed psychological effects in 24 commercial pesticide farmers recently exposed to organophosphate agents on personality tests, anxiety scale, structured interview and cholinesterase level. Then, the results were compared to those of 24 controls (with substantially less exposure). The findings from this experiment could not establish a correlation between behavior abnormality and organophosphate exposure, and did not justify the subsequent public alarm.

Actions called for: In 1996, Congress enacted significant changes to the Food Quality Protection Act, directing the Environmental Protection Agency (EPA) to ensure a “reasonable certainty of no harm due to pesticide” by evaluating pesticides against standards. By 2002, 14 out of 49 OP pesticides registered were canceled and 28 others have had considerable risk mitigation measures.³ In Australia, the National Registration Authority, the federal body which governs the registration of agricultural chemicals, called for a ban on organophosphate in all domestic situations and around animals that produce milk for human consumption. In 1999, the Ministry of Agriculture of Britain temporarily withdrew OP sheep dip from the market because the containers allowed the chemical to splash onto farmers’ hands and arms. More recently, in 2006, the agriculture committee of the United Nations Food and Agriculture Organization (FAO) recognized the increasing international and national concern over OP poisoning and set as a priority a ‘progressive ban on highly toxic pesticides’. FAO urges governments to comply with the International Code of Conduct on the Distribution and Use of Pesticides.

Endorsement of and challenges to the forecast: Several active interest groups, such as Pesticide Action Networks (PAN), United Farm Workers (UFW), Total Environment Centre (TEC- Australia), strongly advocate for the removal of toxic pesticides in the market, including OP. In the 1990’s, some Gulf War veterans reported symptoms of chronic fatigue, memory loss and congenital defects and linked them to being sprayed with OP during the conflict.⁴ In Britain, anti-OP cause was led by attractive figures such as Countess of Mar, who was herself poisoned with OP dip in 1989.

Outcome of the forecast: To date, no scientific evidence proves a causal link between organophosphate pesticide exposure and psychological illness in human. In December 2007, Baroness Royall of Blaisdon of Britain said, "My Lords, the government have so far committed £4.1 million to research and development on whether organophosphates cause chronic ill health in humans. None of the research so far has confirmed this suggestion."⁵

This summary was written by Soo Lee in December 2009.

¹ Levin, H. S., Rodnitzky, R. L. & Mick, D. L. (1976). "Anxiety associated with exposure to organophosphate compounds," Arch. Gen. Psych, 33.

² Levin, H. S. & Rodnitzky, R. L. (1976). "Behavioral effects of organophosphate in man," Clinical toxicology, 9(3): 391-403.

³ Food Quality Protection Act Available at:

http://www.epa.gov/pesticides/regulating/laws/fqpa/fqpa_accomplishments.htm.

⁴ Mackness, Bharti, Durrington, Paul N. & Mackness, Michael I. (2000). "Low Paraaxonase in Persian Gulf War Veterans Self-Reporting Gulf War Syndrome," Biochemical and Biophysical Research Communications, 276 (2).

⁵ House of Lords Publication 18 Dec 2007 : Column 571 Available at: <http://www.parliament.the-stationery-office.co.uk/pa/ld200708/ldhansrd/text/71218-0001.htm>.