

Hazard to children:
birth defects;
developmental, immune
and endocrine effects;
later in life: cancer,
Parkinson's disease, male
reproductive problems.



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June 2014**

A PANAP Factsheet Series Highly Hazardous Pesticides

Maneb

Uses: dithiocarbamate fungicide; contains manganese (essential element but neurotoxic in excess); metabolites include ETU.

Residues: drinking water, food.

Acute toxicity: nausea, vomiting, diarrhoea, headache, skin rashes, contact dermatitis, conjunctivitis, breathing problems, renal failure, convulsions, fatigue, nervousness, memory lack, behavioural changes hypothermia.¹⁻³ Children are more sensitive than adults;² can be life-threatening for children.¹

Chronic toxicity: liver, kidney.^{2,4}

Neurological: concern for developmental toxicity, based on neurologic effects on rats;² behavioural changes in mice.⁵ Associated with Parkinson's disease,⁶⁻⁸ especially early developmental exposures.^{9,10} Maneb interacts with paraquat to increase the risk of Parkinson's.⁹

Cancer: US EPA probable human carcinogen; liver, pituitary, thyroid and lung tumours in rodents.² Associated

with leukaemia,¹¹
melanoma.¹²

Genotoxicity: evidence of genotoxicity,^{13,14} including human cells.¹⁵

Endocrine disruption: causes thyroid damage, tumours and altered hormones;² associated with hypothyroidism and hyperthyroidism in women;¹⁶ reduces testosterone.¹⁷

Reproduction: in animals: decreases foetal viability;² birth defects including hydrocephaly, and in urogenital and skeletal systems;² reduced male fertility;¹⁷ damage to testes.¹⁸⁻²⁰ In humans: cleft palate,²¹ increased length of menstrual cycle, missed periods.²²

Immune: alters immune system response.^{23,24}

Environmental effects:
Aquatic: highly toxic to fish and aquatic invertebrates;² fish kills.²

Terrestrial: chronic risks to birds and mammals,² including reproductive and endocrine; toxic to some beneficial insects.³

Environmental fate: found in ground and surface waters.²

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