NWRC Chemical Effects Database Glossary of Terms

Last Modified:

ALD (mg/kg) -- Approximate Lethal Dose

Amphibians- The reported ALD is the lowest dose at which mortality occurred in acute oral approximate lethal dose studies. The studies utilized a progressive dosing method (up and down). This method (as conducted in mammals via oral administration) is described in detail in Schafer and Bowles (1985). No published source was located detailing oral administration to amphibians.

Birds - The ALD is the lowest dose at which mortality occurred in acute oral or dermal approximate lethal dose studies. The studies utilized a progressive dosing method (up and down), using 1 or 2 birds per treatment level followed by either 3 or 7 days of observations for mortality. This method (as conducted in mammals via oral administration) is described in detail in Schafer and Bowles (1985). No published source was located detailing either oral or dermal administration to birds.

Mammals - The ALD represents an acute oral approximate lethal dose using the progressive method (up and down), generally using a single mammal per treatment level (occasionally 2 or more mammals were used), followed by either 3 or 7 days or observations for mortality. The ALD is the lowest dose at which mortality occurred. This method is described in detail in Kverno and Hood (1963) and Schafer and Bowles (1985).

FPT (%) -- Foliar Phytotoxicity

Plants - The FPT value was derived from a plant test where the leaves of young plants [6 pinto bean (*Phaseolus vulgaris*), 6 corn (*Zea mays*), 10 common wheat (*Triticum aestivum*) or 4 Douglas fir (*Pseudotsuga menziesii*) seedlings] grown in pots were sprayed with a single concentration of the candidate chemical until the leaves were thoroughly wet. Water, carbopol or acetone were used as carriers and concentrations used were normally 1.0% and 6.0%, but ranged from 0.3% to 10%. Observations for phytotoxic effects were made every other day during a typical 6 to 7 day observation period. Phytotoxic signs observed on 1 or more plants (wilting, yellowing, burning, stunting) constituted a phytotoxic effect at that treatment concentration. Douglas fir seedlings were 1 year old; corn, wheat and pinto bean seedlings were 1 week old when treated; concurrent controls were also used. Presented values, or value ranges (i.e., >1.0%, <6.0%) represent projected phytotoxic concentrations determined by monitoring the appearance of the sprayed leaves/plants for signs of phytotoxicity (Schafer and Bowles 2004).

FR (%) -- Food Reduction

Mammals - The FR value (food reduction) represents the results of a 3-day food aversion test where mammals were offered 25, 2%-treated common wheat (*Triticum aestivum*) seeds each day and an alternate, less preferred food. The total number of treated seeds that were not consumed divided by the total number available is expressed as a percentage reduction from total possible consumption. This method is described in detail in Schafer and Bowles (1985).

FRxx (%) -- Food Reduction -- using seeds other than common wheat

Mammals - The FRdf is similar to the FR test, but the concentration used was 1% and the 50 seeds offered daily were either Douglas fir (*Pseudotsuga menziesii*) (FRdf), or ponderosa pine (*Pinus ponderosa*) (FRpp). Results of additional tests are also reported for other species of conifers. Because the size of the seeds varied in weight among species, these tests used either 25 or 50 seeds. This method is described in detail in Schafer and Bowles (1985). Most commonly, the mammal tested was the deer mouse (*Peromyscus maniculatus*) (Schafer and Bowles 2004).

LC_{50} - (mg/kg/day; ppm) Lethal Concentration 50

Birds - Oral, dermal or inhalation tests were conducted. A 5-day (or longer) oral sub-acute lethal concentration test designed to estimate the concentration in feed at which half of the 4 to 6 animals tested at each concentration would be expected to die during the test and the 3- to 7-day observation period that followed. A similar 3-day test is described under FR and FRdf. The oral LC50 method is described in detail in Heath et al. (1972). Inhalation tests were conducted on individual birds exposed for a maximum of one hour. Typically, 3 to 4 birds were included in each test. A published data citation detailing this inhalation method was not found.

Plants (%) - A 1% solution of the test chemical was used to treat 100 seeds. After 72 hours of incubation, the seed germination rate of treated seeds was corrected by comparison to the untreated (control) seed germination rate. The LC50 is reported as < 1% if the corrected treated seed germination rate was more than 50%. If less that 50% germination of treated seed, than the LC50 is reported as > 1%. A published data citation detailing this method was not found.

LD_{50} (mg/kg) - Lethal Dose 50

Amphibians - An acute oral method that estimates the concentration at which half of the 2 to 7 bull frogs tested at each concentration would be expected to die during the following 7 to 14 day observation period (Tucker et al. 1970).

Birds - An acute oral, dermal, inhalation, or intramuscular method that estimates the concentration at which half of the 2 to 6 birds tested at each concentration would be expected to die during the following 7-day observation period. Dermal application was made to the skin on an unfeathered area of the breast or to the pad of the foot, intramuscular injections were made into the breast muscle, and inhalation toxicity was determined in a flow-through inhalation chamber for a period of 1 hour. The oral method is described in detail in Schafer et al. (1983) and the dermal method is described in detail in Schafer et al. (1969 and 1973).

Mammals - An acute oral, dermal, intraperitoneal, or intraocular method that estimates the concentration at which half of the 2 to 6 mammals tested at each concentration would be expected to die during the following 7 to 14-day observation period. The gavage method is described in detail in Schafer and Bowles (1985).

Dermal, intraperitoneal, or intraocular applications were made to a few mammals, but no published source was located detailing these 3 methods.

LDad (mg/kg/18 hr) - Lethal Dose-acute dietary

Birds - A subacute oral toxicity value derived from the R50 test that presents the average amount of chemical ingested by each test bird over the 18-hour test period at the test concentration (normally 2%). If greater than 50% mortality occurred in the test, the LDad value is preceded by a < sign; if less than 50% mortality occurred, the value is preceded by a > sign (Schafer and Bowles 2004).

LDfr (mg/kg/day) - Lethal Dose/food reduction

Mammals - The LDfr represents a subacute toxicity value derived from the FR test that represents the estimated daily amount of chemical ingested by test mammals over the 3-day test period when food was treated at a 2% concentration. If greater than a 50% mortality occurred in the test, the LDfr value is preceded by a < sign; if less than 50% mortality occurred, the value is preceded by a > sign (Schafer and Bowles 2004).

R_{50} (%) - Repellency

Birds - The R50 (%) value is the estimated concentration at which half of the birds tested would consume 12 or less de-hulled white rice (*Oryza sativa*) or grain sorghum (*Sorghum vulgare*) seeds per day out of 25 seeds offered over an 18-hour period. This no-choice test was developed by Starr et al. (1964), was modified by Schafer and Brunton (1971), and represents severe test conditions for birds.

Mammals - The R50 represents the estimated concentration at which half of the mammals tested would consume less than 50% of the 25 treated common wheat (*Triticum aestivum*) seeds offered each day over a 5-day test period. This choice test (a less preferred alternate food was provided) was developed by Kverno (1954) and was modified by Kverno et al. (1967).

REP (%) - Repellency

Mammals - The REP value was generated from a repellency test that was similar to the FR test but it was conducted for 5 days, usually with 10 animals given 25 common wheat seeds daily. The presented value is the percentage of animals tested that consumed a daily average of 12 or less seeds treated with 2% of the test chemical. The method is described in Schafer and Bowles (1985).

RI_{50} (mg/kg) - Reproductive Inhibition 50; [a few mg/kg/day]

Birds - The acute, single oral dosage level that resulted in reproductive inhibition in an estimated 50% of male or female birds. From 5 to 7 animals were used at each dosage level and the observation period was 25 to 35 days. Egg production/fertility was the measured parameter. Methods are described in Schafer et al. (1976) and Schafer et al. (1977).

SGR (%) - Seed Germination

Plants - The SGR value was derived from a plant test where 100 to 500 seeds of the test species were rolled into germination towels or placed in vermiculite, wetted, and incubated in a bench-top seed germinator of 7 days at 100?F. Concurrent controls were also used. Conifer seeds were scarified before treatment. From 10g to 100g of the test seed were treated with 2% (w/w) of the candidate chemical using a suitable carrier, such as acetone or water. Values presented represent the percent germination of treated seeds (generally counted 3 and 7 days post-treatment) compared to controls at the end of the test period. Conifer seeds were evaluated over a 14-day test period, with observations made 7 and 14 days post-treatment. The development of germinating seedlings was recorded but was not used to establish phytotoxicity values for these evaluations (Schafer and Bowles 2004).

TI_{50} (mg/kg) - Temporary Immobilization

Birds - The estimated acute oral dose of a test substance that produces some observable incapacitation or temporary immobilization of 50% of test birds for a measurable period of time. The duration of immobilizing effects for each chemical are typically published in the data reference, but are recorded in the NWRC Tox Database. The temporary effects ranged from loss of flight ability to paralysis. From

2 to 4 birds were used per level and the observation period was 7 days. Methods are described in Schafer et al. (1967) and Schafer et al. (1972).

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