

“Toolbox” for the Sustainable use of glyphosate

Glossary and ACRONYMS

GLOSSARY OF TERMS RELATING TO PESTICIDES

abiotic

Not associated with living organisms

abiotic degradation

Degradation of a pesticide via purely physical or chemical mechanisms. Examples include *hydrolysis* and *photolysis*.

acid equivalent (ae)

1. For those pesticides that are acids, *acid equivalent*, abbreviated as *ae*, is the amount of *active ingredient* expressed in terms of the parent acid.
2. The theoretical yield of parent acid from a pesticide active ingredient which has been formulated as a derivative (e.g., salt or ester)

active ingredient (ai)

1. Component of a pesticide formulation contributing to the direct or indirect *biological activity* against pests and diseases, or in regulating metabolism/growth, etc.
2. The ingredient(s) of a control product to which the effects of the pest control product are attributed, including synergists but not solvents, diluents, emulsifiers, or components that by themselves are not primarily responsible for the effects of the product.

acute toxicity

Adverse effects of finite duration occurring within a short time (up to 14 d) after administration of a single *dose* (or exposure to a given concentration) of a test substance or after multiple doses (exposures), usually within 24 h of a starting point (which may be exposure to the toxicant, or loss of reserve capacity, or developmental change, etc.)

adverse effect

Change in the morphology, physiology, growth, development, reproduction or life span of an organism, system, or subpopulation that results in impairment of the capacity to compensate for additional stress, or an increase in susceptibility to other influences.

agrochemical

Agricultural chemical used in crop and food production including *pesticide*, feed additive, chemical fertilizer, veterinary drug, and related compounds.

application rate

Mass of *pesticide active ingredient* applied over a specific area or per unit volume of an environmental component (air, water, soil).

bioaccumulation

Progressive increase in the amount of a substance in an organism or part of an organism that occurs because the rate of intake exceeds the organism's ability to remove the substance from the body.

bioavailability

Rate and extent to which a pesticide or metabolite can be absorbed by an organism and is available for metabolism or interaction with biologically significant receptors.

Note: It involves both release from a medium (if present) and absorption by an organism.

biodegradation

Conversion or breakdown of the chemical structure of a pesticide catalyzed by enzymes *in vitro* or *in vivo*, often resulting in loss of biological activity.

biological half-life

For a substance, the time required for the amount of that substance in a biological system to be reduced to one-half of its initial value by biological processes, when the rate of removal is approximately exponential

biological indicator

Species or group of species that is representative and typical for a specific status of an ecosystem, which appears frequently enough to serve for monitoring and whose population shows a sensitive response to changes, e.g., the appearance of a pesticide in the ecosystem.

buffer zone

Strip of land of specified minimum width between the edge of an area where pesticide application is permitted and sensitive non-target areas, e.g., watercourses, wetlands, woodlands, sensitive crops,

catchment

Landform that collects precipitation and retains it in an impoundment or drains it through a single outlet.

chelating agent

Organic compounds having the ability to withdraw ions from their water solutions into soluble complexes.

chronic effect

Consequence that develops slowly and/or has a long lasting course: may be applied to an effect that develops rapidly and is long-lasting.

chronic exposure

Continued or intermittent long-term contact between an agent and a target.

chronic toxicity

1. Adverse effects following *chronic exposure*.
2. Effects that persist over a long period of time whether or not they occur immediately upon exposure or are delayed .

colloidal

1. Referring to a state of subdivision, implying that the molecules or polymolecular particles dispersed in a medium have at least in one direction a dimension roughly between 1 nm and 1 μm , or that in a system discontinuities are found at distances of that order.
2. Composed of extremely small-size particles (<1 nm) which are not removed by normal filtration

compartment

Part of an organism or *ecosystem* considered as an independent system for purposes of assessment of uptake, distribution, and *dissipation* of a pesticide.

contaminant

1. Minor impurity in a substance.
2. Extraneous material added to a sample prior to or during chemical or biological analysis.
3. Unintended pesticide residue in an agricultural commodity or environmental compartment (e.g., ground water).

degradation

Process by which a pesticide is broken down to simpler structures through biological or *abiotic* mechanisms.

desiccant

1. Drying agent.
2. In agriculture, a substance used for drying up crop stems and foliage to facilitate their harvest.

dissipation

Loss of pesticide residues from an environmental compartment due to *degradation* and transfer to another environmental compartment.

dissipation time 50 % (DT50)

Time required for one-half the initial quantity or concentration of a pesticide to dissipate from a system. No assumption as to the rate equation is made

dose

Total amount of a pesticide or agent administered to, taken up or absorbed by an organism, system, or (sub-) population.

ecotoxicologically (environmentally) relevant concentration (ERC)

Concentration of a pesticide (*active ingredient, formulations, and/or relevant metabolites*) that is likely to affect a determinable ecological characteristic of an exposed system.

Note: It is related to the toxicity characteristics, generally the *no-observed-effect concentration*, to the most sensitive species or groups of species.

efficacy (pest control)

Ability of a product to fulfil the claims of pest control made on the label.

emergence

The event in seedling establishment when a shoot becomes visible by pushing through the soil surface

endpoint

Measurable ecological or toxicological characteristic or parameter of the test system (usually an organism) that is chosen as the most relevant assessment criterion (e.g., death in an acute test or tumor incidence in a chronic study).

environmental fate

Destiny of a pesticide or chemical after release to the environment involving considerations such as transport through air, soil, or water, bioconcentration, degradation, etc.

estimated environmental concentration (EEC)

Predicted concentration of a pesticide within an environmental *compartment* based on estimates of quantities released, discharge patterns, and inherent disposition of the pesticide (fate and distribution) as well as the nature of the specific receiving ecosystems

exposure

Concentration or amount of a pesticide (or agent) that reaches a target organism, system, or (sub-) population in a specific frequency for a defined duration.

field drainage

Removal of excess water from soil and transport to surface waters in order to improve soil productivity and traffic ability.

formulant

Any added material in a pesticide formulation other than the biologically *active ingredient(s)*. This may include a *carrier* or other substances that enhance the biological activity or physiochemical properties of the formulation.

formulate

Process of combining a *pesticide active ingredient* with various *carriers, adjuvants, solvents*, etc. to develop the end-use product.

formulation

1. Pesticide preparation supplied by a manufacturer for practical use.
2. Process, carried out by manufacturers, of preparing pesticides for practical use

good agricultural practice (GAP)

In the use of pesticides, *GAP* includes the officially recommended or nationally authorized uses of pesticides under actual conditions necessary for effective and reliable pest control. It encompasses a range of levels of pesticide applications up to the highest authorized use applied in a manner which leaves a residue that is the smallest amount practicable.

ground water

Water present in the saturated subsurface zone of the soil profile, where all open spaces/pores in the sediment and rock are filled with water.

herbicide

Pesticide used for the control of unwanted plants or weeds.

integrated pest management (IPM)

Use of pest and environmental information in conjunction with available pest control technologies to prevent unacceptable levels of pest damage by the most economical means and with the least possible hazard to persons, property, and the environment.

label

Legally registered text as part of the registration process which governs the use of the product

leaching

1. Removal of materials in solution from the soil or other substances.
2. Downward movement of pesticides into a soil profile with soil water (the pesticide may or may not be in true solution and may or may not move from the soil).

limit of detection (LOD)

Lowest concentration of a *pesticide residue* in a defined *matrix* where positive identification can be achieved using a specified method.

limit of quantitation (LOQ)

Lowest concentration of a *pesticide residue* in a defined *matrix* where positive identification and quantitative measurement can be achieved using a specified analytical method.

median lethal concentration (LC50)

Statistically derived concentration of a substance in an environmental medium expected to kill 50 % of test organisms in a given population under defined conditions.

median lethal dose (LD50)

Statistically derived *dose* of a chemical or physical agent (radiation) expected to kill 50 % of test organisms in a given population under a defined set of conditions

metabolite

Any intermediate or product resulting from *metabolism*

mineralization

Conversion of an element from an organic form to an inorganic form. Mineralization of pesticides most commonly refers to the microbial degradation to carbon dioxide as a terminal metabolite.

mode of action (pesticide)

Biochemical effect that occurs at the lowest dose or concentration or is the earliest among a number of biochemical effects that could, understandably, lead to the death of the pest

non-target organism

Organism affected by a pesticide or exposed to a pesticide although not an intended object of its use

no-observed-adverse-effect level (NOAEL)

Greatest *concentration* or amount of a substance, found by experiment or observation, which causes no detectable adverse alteration of morphology, functional capacity, growth, development, or life span of the target organism under defined conditions of exposure.

no-observed-effect concentration/level (NOEC/NOEL)

Greatest concentration or amount of a substance, found by experiment or observation, that causes no alterations of morphology, functional capacity, growth, development, or life span of target organisms distinguishable from those observed in normal (control) organisms of the same species and strain under the same defined conditions of exposure

octanol/water partition coefficient (Kow)

Partition coefficient for a pesticide in the two-phase system octan-1-ol/water.

Note: The *Kow* indicates the relative *lipophilicity* of a pesticide and its potential for *bioconcentration* or *bioaccumulation*

partition coefficient

Ratio of the concentrations of a substance in solution in two phases which are in equilibrium

persistence

Residence time of a chemical species (pesticide and/or metabolites) subjected to degradation or physical removal in a soil, crop, animal, or other defined environmental *compartment*.

pesticide

Strictly, a substance intended to kill pests: in common usage, any substance used for controlling, preventing, or destroying animal, microbiological, or plant pests.

pesticide formulation

Pesticide product offered for sale. It generally comprises *active ingredient(s)*, *adjuvant(s)*, and other *formulants* combined to render the product useful and effective for the purpose claimed.

pesticide residue

Substance which remains in or on a feed or food commodity, soil, air, or water following use of a pesticide. For regulatory purposes, it includes the parent compound and any specified derivatives such as degradation and conversion products, metabolites, and impurities considered to be of toxicological significance.

plant protection product

Active substances and preparations containing one or more active substances, put up in the form in which they are supplied to the user, intended to (a) protect plants or plant products against all harmful organisms or prevent the action of such organisms, (b) influence the life processes of plants, other than as nutrients (e.g., plant growth regulators), preserve plant products, destroy undesired plants (e.g., herbicides), or destroy parts of plants, check or prevent undesired growth of plants.

pollutant

Undesirable substance introduced into a solid, liquid, or gaseous environmental medium totally or partially by human activities.

predicted no-effect concentration (PNEC)

Estimated *no-observed-effect concentration* for an aquatic species of ecosystem based on extrapolated experimental exposure/response data

product stewardship

Responsible and ethical proactive management of a product during manufacturing, storage, distribution, use, and disposal

registration

Process whereby the responsible national or regional government authority approves the sale and use of a pesticide following the evaluation of comprehensive scientific data demonstrating that the pesticide is effective for the purposes intended and not unduly hazardous to human or animal health or the environment.

resistance

Inheritable ability of some pest biotypes within a given population to survive a pesticide treatment that should, under normal use conditions, effectively control populations of that pest.

riparian zone

Area adjacent to a river or stream with a high density, diversity, and productivity of plant and animal species.

risk assessment

Process intended to calculate or estimate the risk to a given target organism, system, or (sub-) population, including the identification of attendant uncertainties, following exposure to a particular pesticide or agent of concern as well as the characteristics of the specific target system. It is the first component in a risk analysis process.

route of exposure

Means by which a chemical enters an organism after contact (e.g., ingestion, inhalation, or dermal absorption).

run-off

1. Transport of water and sediment from the surface of an agricultural field to a non-target area such as a stream due to a precipitation event.
2. Loss of a pesticide formulation off the plant foliage during spray application, particularly at high volume.

soil partition coefficient (*K_d*)

1. Experimental ratio of a pesticide's concentration in the soil to that in the aqueous (dissolved) phase at equilibrium.
2. Distribution coefficient reflecting the relative affinity of a pesticide for adsorption by soil solids and its potential for *leaching* through soil.

spray drift

Downwind movement of airborne spray droplets beyond the intended area of application originating from aerial or ground-based spraying operations.

surface water

All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors which are directly influenced by surface water

ABBREVIATIONS AND ACRONYMS RELATED TO PESTICIDES

ADI acceptable daily intake

ae acid equivalent

ai active ingredient

BCF bioconcentration factor

CDA controlled droplet applicator

CEC cation exchange capacity

COPR Control of Pesticides Regulations 1986

COSHH Control of Substances Hazardous to Health Regulations

DT50 dissipation time 50 %

EC50 median effective concentration

EMRL extraneous maximum residue limit

EP end-use product

ERC ecotoxicologically (environmentally) relevant concentration

HI harvest interval

HPLC high-performance liquid chromatography

ICM integrated crop management

IPM integrated pest management

K_d soil partition coefficient

K_{oc} soil organic partition coefficient

K_{ow} octanol–water partition coefficient

LC50 median lethal concentration

LD50 median lethal dose

LER lowest-effect use rate

LERAP local environmental risk assessment for pesticides

LOAEL lowest-observed-adverse-effect level

LOD limit of detection

LOQ limit of quantitation

MEL maximum exposure limit

MRL maximum residue limit

MSDS material safety data sheet

MTD maximum tolerated dose

NOAEL no-observed-adverse-effect level

NOEC/NOEL no-observed-effect concentration/level

OLA off-label approval
OP organophosphorous pesticide
PEC predicted environmental concentration
PNEC predicted no effect concentration
POST post-emergence treatment
ppb parts per billion
PPI pre-plant incorporated treatment
ppm parts per million
PRE pre-emergence treatment
ROC residue of concern
T_{1/2} half-life
TDI tolerable daily intake
TEF toxic equivalency factor
TER toxicity exposure ratio
ULV ultra-low-volume