CURE CHEM INDIA
The Chemical People

A-85, IST FLOOR, MASOODPUR MAIN ROAD, VASANT KUNJ, NEW DELHI-110070 (INDIA)
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MATERIAL SAFETY DATA SHEET

CARBARYL 850 WP

1. IDENTIFICATION OF THE SUBSTANCE

Product Name: CARBARYL 850WP
Product Use: Insecticide
Manufacturer: CURE CHEM INDIA
Address: A-85, IST FLOOR, MASOODPUR MAIN ROAD, VASANT KUNJ, NEW DELHI-110070 (INDIA)
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2. COMPOSITION / INFORMATION ON INGREDIENTS

Common name: Carbaryl
Chemical Name: 1-naphthyl methylcarbamate (**IUPAC**)
CAS No.: 63-25-2
Chemical Family: Carbamate 850 g/kg
Chemical Formula: C12H11NO2
Molecular weight: 201.2
Use: A wettable powder insecticide for certain agricultural, public health and household uses. A residual contact and stomach poison for the control of insect pests as listed on the label.
Formulation: Wettable Powder
Symbols: Xn, N
Risk-phrase(s): R22

3. HAZARD IDENTIFICATION

Toxicity class: WHO II, EPA I
ADI: 0.01 mg/kg b.w
NOEL: 200 mg/kg (rats) - 2 year
ACGIH: 5 mg/m3 **Carbaryl** 10 mg/m3 Nuisance dust
STEL: 15 mins 10 mg/m3
TWA: 8 hours 5 mg/m3

Main Hazard: Toxic to fish and bees. **Carbaryl** is a carbamate compound, which inhibits cholinesterase. It is toxic. Contact with skin, inhalation of dust or spray, or swallowing may be fatal.

Fire and explosion hazard: Slight fire hazard when exposed to heat or flame. Dust-air mixtures may ignite or explode.

Biological Hazard: Likely routes of exposure: May be absorbed from the gastrointestinal tract, through the intact skin, and through inhalation of fine spray mist or dust.

Eye contact: Tests indicate the product is minimally toxic; however caution should be practiced when handling the product. The product was found to be non-irritating.

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Skin contact: Tests indicate the product is minimally toxic; however caution should be practiced when handling the product. The product was found to be non-irritating.

Ingestion: Toxic by ingestion. See point 4 for symptoms.

Inhalation: Toxic by inhalation. See point 4 for symptoms.

4. FIRST AID MEASURES AND PRECAUTIONS

Proper care should be taken during occupational use to avoid any inhalation of dust and spray particles, and to prevent accidental contamination of food products and water.
The product is a Cholinesterase inhibitor.

Inhalation:

Acute exposure: When inhaled, the first effects of cholinesterase inhibition are usually, respiratory and may include nasal hyperaemia and watery discharge, chest discomfort, dyspnoea, and wheezing due to increased bronchial secretions and bronchi-constriction. Other systemic effects may begin within a few minutes or several hours of exposure.
Symptoms may include nausea, vomiting, diarrhoea, abdominal cramps, headache, vertigo, ocular pain, ciliary muscle spasm, blurring or dimness of vision, miosis, or in some cases mydriasis, lacrimation, salivation, sweating, and confusion. Other reported central nervous system or neuromuscular effects include ataxia, slurred speech, weakness, fatigue, twitching, fasciculation, tremor, and eventually paralysis of the extremities and possibly of the respiratory muscles. In severe cases, there may also be involuntary defecation and urination, bradycardia, hypotension, pulmonary oedema, convulsions, coma, and death from respiratory failure or cardiac arrest. **Carbaryl** does not accumulate in mammalian tissue and the cholinesterase inhibition reverses rather rapidly. In nonfatal cases, the illness generally lasts less than 24 hours.

Chronic exposure: Prolonged or repeated exposure may cause effects as described in acute exposure.

First aid:
Remove from exposure area to fresh air immediately. If breathing has stopped, give mechanical artificial respiration (not direct mouth-to-mouth). Maintain airway and blood pressure and administer oxygen if available. Affected person must be kept warm and at rest. Treat symptomatically and supportively. Qualified personnel should perform administration of oxygen. Get medical attention immediately.

Skin contact:

Acute exposure: Some compounds may cause irritation. Localized sweating and fasciculation may occur at the site of contact. If sufficient amounts are absorbed through the skin, other effects of cholinesterase inhibition may occur as described in acute inhalation. Symptoms may be delayed for 2-3 hours, usually no more than 8 hours.

Chronic exposure: Repeated or prolonged exposure may cause effects as described in acute exposure.

First aid: Remove contaminated clothing immediately. Wash contaminated areas with soap and water followed by alcohol. Emergency personnel should wear gloves and avoid contamination. Treat respiratory difficulty with mechanical artificial respiration. Get medical attention immediately.

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Eye contact:
Acute exposure: Direct contact may cause pain, hyperaemia, and lacrimation, twitching of the eyelids, miosis, and ciliary muscle spasm with loss of accommodation, blurred or dimmed vision and brow ache. Sometimes mydriasis may occur instead of miosis. With sufficient exposure, other symptoms of cholinesterase inhibition may occur as described in acute inhalation.

Chronic exposure:
Prolonged exposure may cause effects as described in acute exposure. Some compounds have caused toxic effects on the crystalline lens, conjunctival thickening and obstruction of nasolacrimal canals when used as miotic eye drops.

First aid:
Irrigate eyes with water or saline solution. If symptoms of poisoning occur, treat respiratory difficulty with mechanical artificial respiration and oxygen. Observe patient for at least 24-36 hours. Get medical attention immediately. Qualified medical personnel should administer oxygen.

Ingestion:
Acute exposure:
When ingested, the first effects may be nausea, vomiting, anorexia, abdominal cramps, and diarrhoea. With absorption from the gastrointestinal tract, the other effects of cholinesterase inhibition as described in acute inhalation may occur. Symptoms may begin within minutes or be delayed several hours.
Chronic exposure:
Repeated ingestion may cause effects as described in acute exposure.
First aid:
If person is alert and respiration is not depressed, give syrup of Ipecac followed by water (if vomiting occurs, keep head below hips to prevent aspiration). If consciousness level declines or vomiting has not occurred in 15 minutes empty stomach by gastric lavage with the aid of cuffed endotracheal tube using isotonic saline or 5 % sodium bicarbonate follow with activated charcoal.
Establish and maintain airway. Treat respiratory difficulty with artificial respiration and oxygen.

Do not give morphine, aminophylline, Phenothiazines, reserpine, furosemide, or ethacrynic acid. Drugs like 2 PAM are not effective in poisoning with Carbaryl AND SHOULD NOT BE USED.
Treat symptomatically and supportively. Qualified medical personnel must perform administration of oxygen and gastric lavage. Get medical attention immediately.

Advice to physician:
Antidote: The following antidote has been recommended. However, the decision as to whether the severity of poisoning requires administration of any antidote and actual dose required should be made by qualified medical personnel.
For cholinesterase inhibitors: Establish clear airway and tissue oxygenation by aspiration of secretions, and if necessary, by assisted pulmonary ventilation with oxygen.
Improve tissue oxygenation as much as possible before administrating atropine to minimise the risk of ventricular fibrillation. Administer atropine sulphate intravenously or intramuscularly if i. v. injection is not possible. In moderately severe poisoning administer atropine sulphate, 0.4-2.0 mg repeated every 15 minutes, until atropinization is achieved (tachycardia, flushing, dry mouth and mydriasis). Maintain atropinization by repeated doses for 2-12 hours, or longer, depending on the severity of

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poisoning. The appearance of rales in the lung bases, miosis, salivation, nausea, bradycardia, are all indications of inadequate atropinization. Severely poisoned individuals may exhibit remarkable tolerance to atropine. Two or more times the dosages suggested above may be needed. Persons not poisoned or only slightly poisoned, however, may develop signs of atropine toxicity from such large dosages: fever, muscle fibrillations, and delirium are main signs of atropine toxicity. If these signs appear while the patient is fully atropinized, atropine administration should be discontinued, at least temporarily. Observe treated patients closely at least 24 hours to ensure that symptoms (possibly pulmonary oedema) do not recur as atropinization wears off. In very severe poisonings, metabolic disposition of toxicant may require several hours or days during which atropinization must be maintained.
Markedly lower levels of urinary metabolites indicate that atropine dosage can be tapered off. As dosage is reduced, check the lung bases frequently for rales. If rales are heard or other symptoms return, re-establish atropinization promptly.

5. FIRE FIGHTING MEASURES

Fire and explosion hazard:
Slight fire hazard when exposed to heat or flame. Dust-air mixtures may ignite or explode.

Extinguishing agents:
Extinguish small fires with carbon dioxide, dry powder, Halon, water spray, or alcohol-resistant foam. Water spray can be used for cooling of unaffected stock, but avoid water coming in contact with the product. Contain water used for fire fighting for later disposal

Fire fighting:
Move containers from fire area if possible. Fight fire from maximum distance. Stay away from storage tank ends.
Contain fire control water for later disposal. Do not scatter material, extinguish only if flow can be stopped. Use flooding amounts of water as a fog as solid streams may be ineffective. Cool containers with flooding amounts of water as far a distance as possible. Use water spray to absorb toxic vapours. Avoid breathing toxic vapours.
Keep upwind. Consider evacuation of downwind area if material is leaking.

Special Hazards:
Fire may produce irritating or poisonous vapours (sulphoxides), mists or other products of combustion.

Personal protective equipment:
Carbaryl dust may be transported in the smoke from a fire. Fire fighters and others that may be exposed should wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Avoid contact with skin and eyes. Do not breathe in dust or fumes. For personal protection see Section 8.
Environmental precautions:
Do not allow entering drains or watercourses. When the product contaminates public waters, inform appropriate authorities immediately in accordance with local regulations.

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Occupational spill:

Do not touch spilled material. Stop leak if you can do so without risk. Use water spray to reduce vapours (contain any water used). For **small spills**, sweep up with sand or other suitable absorbent material, such as sawdust, and place into containers for later disposal. Move containers from spill area. For **larger spills**, contain material far ahead of spill for later disposal. Keep spectators away. Isolate hazard area and deny entry. Ventilate closed spaces before entering.

7. HANDLING AND STORAGE REQUIREMENTS

Handling: Toxic by inhalation or if swallowed. Avoid contact with eyes, prolonged contact with skin, and inhalation of dust and vapour. Use with adequate ventilation. Wash hands before eating, drinking, chewing gum, smoking, or using the toilet. Remove clothing immediately if this product gets inside. Then wash skin thoroughly using a non-abrasive soap and put on clean clothing. Do not apply directly to areas where surface water is present, or to intertidal areas below the mean high water mark. Water used to clean equipment must be disposed of correctly to avoid contamination.

Storage:
The product must be kept under lock and key. Keep out of reach of unauthorized persons, children and animals. Keep Carbaryl 85% WP in its original labelled container in shaded, well ventilated area, away from heat, sparks and other sources of ignition. Not to be stored next to foodstuffs and water supplies. Local regulations should be complied with.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Occupational exposure limits:
No occupational limits established by OSHA, ACGIH or
NIOSH

Engineering control measures:
It is essential to provide adequate ventilation. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure.
Ensure that control systems are properly designed and maintained. Comply with occupational safety, environmental, fire, and other applicable regulations.

PERSONAL PROTECTIVE EQUIPMENT:
If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection.

Respirator: An approved respirator suitable for protection from dusts and mists of pesticides is adequate. Limitations of respirator use specified by the approving agency and the manufacturer must be observed.

Clothing:
Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with the substance.

Gloves: Employee must wear appropriate synthetic protective gloves to prevent contact with this substance.

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Eye protection:
The use of full-face protection is recommended. *Emergency eyewash*: Where there is any possibility that an employee's eyes may be exposed to this substance; the employer should provide an eye wash fountain or appropriate alternative within the immediate work area for emergency use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White to off-white powder.
Odour: Odourless.
Flammability: Not flammable.
Explosive properties: Like most organic powders, this product could form explosive mixture in air, under severe dust conditions.
Flash point: 193^{0}C (data for technical material).
Oxidising properties: Not oxidative.
pH: No data available.
Stability: Stable in neutral and acidic media, but hydrolyzed in alkaline media to 1-naphthol and is rapidly converted by oxidizing agents. Carbaryl 85% WP is stable in light and heat.
Persistent foaming: Not available.
Solubility in water: The product is a wettable powder.

10. STABILITY AND REACTIVITY

Stability: Stable up to 2 years under normal storage conditions. Stable in neutral and acidic media, but hydrolyzed by concentrated alkalis to form 1-naphthol. Half-life is 12 days (pH 7) and 3.2 days (pH 9). The rate of decomposition increases at higher temperatures. **Carbaryl** is stable to light and heat.
Incompatibility: Compatible with most insecticides, fungicides and acaricides. Alkaline substances such as lime and Bordeaux mixture may reduce the activity of the product.
The product should therefore not be used if the soil or water has high pH values.
Hazardous decomposition:
Toxic oxides of nitrogen are released when the product decomposes on heating.

11. TOXICOLOGICAL INFORMATION

All data is for technical material.
Acute oral LD50: 264 mg/kg in male rats, 500 mg/kg in female rats and 710 mg/kg in rabbits
Acute dermal LD50: > 4000 mg/kg in rats, > 2000 mg/kg in rabbits.
Although tests indicate high LD50 values, caution should be practiced when handling the product.
Acute inhalation LC50: > 206.1 mg/l of air over 4 hours (rats).
Acute skin irritation: The product was found to be non-irritating to skin (rabbit).
Acute eye irritation: The product was found to be non-irritating to eyes (rabbit).
Dermal sensitization: No data available.
Carcinogenicity: Evidence indicates that **Carbaryl** is unlikely to be carcinogenic in humans.
Teratogenicity:
Evidence for teratogenic effects due to chronic exposure is minimal in test animals.
Mutagenicity: Carbaryl has been shown to affect cell division and chromosomes in rates. However, evidence suggests that **Carbaryl** is unlikely to be mutagenic to humans.

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12. ECOLOGICAL INFORMATION

Degradability:
In soil, the active ingredient is metabolized to form 1- naphthol. The half-life of the product is 7-14 days in sandy loam soils and 14-28 days in clay loam. Soils with high organic matter content retain residues for longer periods than do mineral soils.
Mobility:
The product is adsorbed on soil and is unlikely to leach into water sources.
Accumulation:
The product adsorbs to soil but shows little or no tendency to bio-accumulate. **Carbaryl** has very limited persistence in the environment.
ECOTOXICOLOGY:
Birds: Minimally toxic to birds. Acute oral LD50: > 2179 mg/kg (young mallard ducks), > 2230 mg/kg (Japanese quail), > 2000 mg/kg (young pheasants) and 1000 - 3000 mg/kg (pigeons).
Fish: Toxic to fish. LC50 (96 hr): 1.3 mg/l (rainbow trout), 10 mg/l (bluegill sunfish), and 2.2 mg/l (sheepshead minnow).
Bees: Toxic to bees. LD50 (topical): 1 µg/bee.
Daphnia: Very toxic to Daphnia, *Daphnia magna*: EC50 (48 hours): 0,006 mg /l.
Earthworms: Toxic for earthworms.
Beneficial insects: Toxic to beneficial insects.
Soil micro-organisms: Various soil fungi are able to metabolize **Carbaryl** and in soils previously treated with carbamates and cloethocarb, 80% of **Carbaryl** was completely mineralized to carbon dioxide during a four-week incubation period.

13. DISPOSAL CONSIDERATION

Pesticide disposal:
Contaminated absorbents, surplus product, etc., should be burned at 1000^0C in a high-temperature incinerator with effluent gas scrubbing. Where no incinerator is available, hydrolysis under alkaline conditions (pH 12 or above) is a suitable method to dispose of small quantities of the product. Before disposal of the resultant waste, the material must be analyzed to ensure that the active ingredient has been degraded to a safe level. Never pour untreated waste or surplus products into public sewers or where there is any danger of run-off or seepage into water systems. Comply with local legislation applying to waste disposal.

Package product wastes:
If container is broken, handle with rubber gloves. Emptied containers retain vapour and product residues. Observe all labelled safeguards until container is destroyed.
Combustible containers should be disposed of in pesticide incinerators. Non-combustible containers must be punctured and transported to a scrap metal facility for recycling or disposal.

14. TRANSPORT INFORMATION

UN NUMBER 2757
ADR/IRD: Substance name: Carbamate pesticide, solid, toxic (**Carbaryl** 850 g/kg) Label: 6.1
IMDG/IMO Packaging group: III Label of class: 6.1
Marine pollutant
Shipping name: Carbamate pesticide, solid, toxic (**Carbaryl** 850 g/kg).

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AIR/IATA Shipping name: Carbamate pesticide, solid, toxic (**Carbaryl** 850 g/kg).
Class: 6.1
Hazard Label: Toxic
Packaging Group: III
Passenger Aircraft: Y 619 (10kg), 619 (max 100 kg)
Cargo Aircraft: 619 (max 200 kg).

15. REGULATORY INFORMATION

Symbol: Xn, N
Indication of danger: Harmful, Environmentally
Hazardous Substance
Risk phrases:
R 22 Harmful if swallowed
Safety phrases:
S 2 Keep out of reach of children.
S 22 Avoid breathe dust.
S 24 Avoid skin contact.
S 36/37 Wear suitable protective clothing and gloves.
S 46 If swallowed seek medical advice immediately and show label or MSDS.
S 61 Avoid release to the environment. Refer to special instructions on the label and MSDS.
National legislation: Zimbabwe-Statutory Instrument 144 of 2012, Pesticides Regulations, 2012 (CAP. 18: 12) and Pesticides (Amendment) Regulations 2013 (No.1)

16. OTHER INFORMATION:

Packing and Labelling: Packed in 200g, 500 g and 1 kg plasticised aluminium 3 ply foil bags Labelled according to Zimbabwe Pesticides Registration Label layout under national legislation listed in 15 above.

Declaration:
All information and instructions provided in this Material Safety Data Sheet (MSDS) are based on the current state of scientific and technical knowledge at the date indicated on the present MSDS and is presented in good faith believed to be correct. This information applies to the PRODUCT AS SUCH. In case of formulations or mixes, it is necessary to ascertain that a new danger will not appear. It is the responsibility of persons in receipt of this MSDS to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produces formulation(s) containing this product, it is the recipient's sole responsibility to ensure the transfer of all relevant information from this MSDS to their own MSDS. We recommend that matters which are to do with application rates and pests' controlled careful and thorough reading of the product label must be done.