



TECHNICAL DATA BULLETIN

PRODUCT TECHNICAL INFORMATION AND APPLICATIONS

MONTSAN® 200ULV

*A world of Effectiveness:
an effective solution to Pest problems worldwide*

1. INTRODUCTION:

Montsan 200ULV is an Ultra Low Volume concentrate formulation of insecticide / carbamate compound. It contains 200 g/L of the active ingredient 'Carbosulfan'. is used to Control of a wide range of soil-dwelling and foliar insect pests. This product is specially formulated for locust and grasshoppers control through ULV applications.

Finding the most appropriate solutions to pest problems is critical to maximizing crop efficiency and realizing the most benefit in any corner of the globe. The key to insecticide value is not only how well a product works against a particular pest, but how well it fits into the growing situation. Ease in handling application, return on investment and relative risks to man and the environment are all important in selecting the right product to realize the best value.

That's why throughout the world, those who depend on crop production depend on **Montsan** insecticide/miticide

Montsan, containing the active ingredient carbosulfan, was first synthesized in 1974. It is a well proven insecticide with broad spectrum activity including acaricidal and nematicidal properties, has registered more than 80 countries worldwide for the control of both foliar and soil pests.

With its effectiveness on a wide variety of pests, for so many crops in so many growing situations, Montsan is becoming the insecticide of choice for growers around the world.

Like any chemical product, Montsan should always be used in strict accordance with generally established and recommended procedures for handling and use of products of its kind. Specially, the product should be always be used under the guide of, and in strict accordance with, published product data and local product label information for each formulation regarding mixing and application methods, rates and times, as well as disposal information.



Resistance management is one reason to carefully adhere to label instructions. Practices that don't conform to specific label instructions, such as under dosing, may allow the pests to begin developing resistance to the insecticide class. The problem can also occur when higher than recommended doses of a chemical class are used for an extended period of time. In trying to prevent resistance, it is also suggested to rotate or tank-mix.

Montsan with a different class of product such as organophosphates, pyrethroids or insect growth regulators when possible.

Distributors and users of the product should always maintain a detailed and comprehensive understanding of the proper procedures involved in every phase of distribution, application and use. In addition, users should be fully aware of safety information and procedures in the event of environmental accidents, spills, accidental human contact or ingestion or other emergency situations.

Astrachem is dedicated to assuring the safe distribution and use of its products. For this reason, we constantly provide assistance and information regarding the proper, responsible use of our products. Astrachem encourages users of its products to take advantage of this valuable information resource. This way each and every user can maintain the proper knowledge necessary to use Montsan to its utmost potential and reap the best, most valuable rewards.

2. ACTIVE INGREDIENT:

Carbamate insecticide containing Carbosulfan

Broad spectrum insecticide combining excellent activity on aphids and in addition, with nematicidal and acaricidal properties.

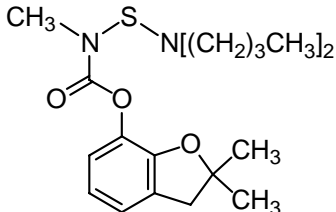
Controls a wide range of soil and foliar pests through systemic and contact activity.

Moderate acute mammalian toxicity

Widely registered – multi-crop and non-crop use.

Formulations: ULV liquid concentrate



Common name	Carbosulfan
Chemical Group	Carbamate
CAS Registry No.	55285-14-8
Molecular Formula	$C_{20}H_{32}N_2O_3S$
Structural Formula	
Molecular weight	380.6
Chemical Name (IUPAC)	2,3-dihydro-2,2-dimethylbenzofuran-7-yl (dibutylaminothio)methylcarbamate
Physical Appearance	Orange to brown clear viscous Liquid
Density	1.056 at 20°C
Vapour Pressure	0.041 mPa (25 °C)
Partition Co-efficients:	Log Pow 3.3
Solubility:	Water – 0.3 ppm at 25°C, Soluble in organic solvents
Stability:	Stable under neutral or mildly, Alkaline Conditions
Flash Point:	95 °C (closed cup)
Acute oral LD ₅₀ , Male rat	250 mg/kg

3. PRODUCT PROFILE

Montsan[®] Insecticide/miticide is a systemic, broad-spectrum carbamate registered for use in more than 80 countries. Montsan offers growers the highly effective control they need to combat a wide array of soil and foliar pests.

Protection provided by Montsan helps growers fight off the pests that decrease yields and crop quality, including mites, aphids, wireworms, Colorado potato beetles, rice water weevils and the hundreds of other detrimental pests. And when it comes to economically important crops like cotton, sugar beets, maize, rice, citrus, potatoes, deciduous fruits, vegetables and the many others for which Montsan is well suited, effective pest control can spell the difference between profit and disaster.



Versatility in use:

- Applied as a granule or as spray directly to the soil for soil pest control
- Applied as a spray or as a dust for foliar pest control
- Applied as a powder or liquid for seed treatment
- Effective on a wide variety of pests in non crop applications, e.g. locust control, public health and home/garden.

4. PHYSIOCHEMICAL PROPERTIES OF THE PRODUCT:

Assay:	<i>Carbosulfan 200 ± 12 g/L</i>
Appearance:	Clear Yellow liquid free of visible impurities
Odour:	Aromatic solvent
Acidity as H ₂ SO ₄	<1.0 g/Kg
Water Contents:	<2.0 g/Kg
Density:	0.7927 – 0.9127

5. MODE OF ACTION:

Montsan 200ULV is a systemic insecticide with contact and stomach action. It contains the active ingredient carbosulfan which belongs to the carbamate group, a cholinesterase inhibitor.

Montsan 200ULV controls pests in two ways - through direct pest contact or by systemic action through stomach ingestion.

Pests are controlled when they come in contact with Montsan and absorb the product. In addition, when applied to the soil, or as a seed treatment, Montsan acts systemically to control foliar pests feeding on the plant.

Systemic action means that as the plant absorbs water, Montsan is transported into the plant, where it kills feeding pests before they can do severe damage to the plant. Because its effectiveness takes place inside the plant, rainfall and other environmental factors that reduce the activity of non-systemic pesticides have very little adverse effect on pest control in crops treated with **Montsan**.

Systemic activity means that Montsan applied to the soil or to seeds is absorbed by the root system and carried throughout the plant. This protects the plant against foliar and soil pests with a single application. Because only



those pests which attack the plant are affected by this systemic activity, Montsan does not harm beneficial insects.

In addition to this systemic activity, Montsan can be applied to the soil or foliage to control pests on contact and by residual action.

6. USES:

Montsan 200ULV is specially formulated to control locust and grasshoppers through ULV applications. However, Carbosulfan is also used for the control of a wide range of soil-dwelling and foliar insect pests. Examples of uses include control of millipedes, springtails, symphylids, wireworms, pygmy mangold beetles, frit flies, white grubs, aphids, caterpillars, flea beetles, Colorado beetles, stem borers, leafhoppers, planthoppers, codling moth, scales and free-living nematodes. It is used in a wide range of crops, e.g. cotton, sugar beet, potatoes, rice, top fruit, citrus, maize, vegetables, sugar cane and coffee.

7. APPLICATIONS / USE PATTERN

For effective control, always apply the rate recommended on the local label.

Carbosulfan acts through the inhibition of the enzyme acetyl cholinesterase (Cholinesterase inhibitor).

Carbosulfan enters the insect by absorption through the integument - contact action, or by eating treated tissue – oral ingestion.

Carbofuran is the first and principal metabolite of carbosulfan enhancing the biological activity of the compound.

Montsan 200ULV used for ground and aerial application.

Soil applied: Liquid at planting or during cultivation (insecticide/ acaricide)

Non crop applications for locust and public health control

Broad spectrum pest control on a wide variety of crops.

Locust Control: Aerial application – 100 g a.i./ha.

Insect Spectrum:

Aphids:	Good control of aphids in general and particularly effective against difficult to control species, eg. <i>Aphis gossypii</i> in cotton and <i>Phorodon humuli</i> in hops e.g.
Beetles/weevils:	Good control of Colorado potato beetle
Mites:	Effective control of citrus rust mite.
Scales and Mealy bugs:	control of hard and soft scales and mealy bugs in citrus.
Wireworms:	Effective control of <i>Agriotes spp.</i> And other soil pests in field crops. E.g maize, sugar beet and in vegetables.

Crops Include: Citrus, Cotton, deciduous fruit, maize, potatoes, rice, sugar beet, sunflower, vegetables, hazelnuts

Typical Application:

Due to differences in pest problems, rates and timing of application, and methods of application in different countries of the world, the individual Montsan labels should be consulted for specific directions for use. The following lists of crops, pests and rates of application are typical for most growing situations.

8. APPLICATION:

The following table can be used as a guide for the application of **Montsan 200 ULV**

Recommendations for Use

Pest	Application Rate	PHI
Locusta migratoria, Schistocerca gregaria)	0.5 L / Ha	25 days

9. PHYTOTOXICITY:

Montsan 200ULV is not phytotoxic. No signs of phytotoxicity have been seen in any development trials.

10. TOXICOLOGICAL INFORMATION

Acute Toxicity- Technical:

Study	Species	Acute Toxicity	
		Technical	
Oral LD ₅₀ (mg/Kg)	Rat	250 (M)	
		185 (F)	
Dermal LD ₅₀ (mg/kg)	Rat	>2000	
Inhalation LC (mg/l)	Rat	1.53 (M)	
		0.61 (F)	
Skin irritation	Rabbit	Moderate	
Eye irritation	Rabbit	Slight	

Carbamates have reversible cholinesterase inhibition plus a readily available, known antidote.

Chronic Toxicity:

Study	Carbosulfan
Carcinogenicity	Non carcinogenic
Teratogenicity	Non Teratogenic
Reproduction	No effect
Mutagenicity	Non mutagenic
Delayed neurotoxicity	No effect

No Observable Effect Level (NOEL) = 20 ppm

Acceptable Daily Intake (ADI) = 0.01 mg/kg/day (JMPR evaluation 1986)

11. ECOLOGICAL INFORMATION

Avian Toxicity

	Mallard Duck	Bobwhite Quail	Pheasant
Acute Oral Toxicity –LD ₅₀	8 mg/kg	82 mg/kg	20 mg/kg
8-day dietary toxicity –LC ₅₀	304 ppm	1100 ppm	1275 ppm
NOEL (Reproduction study)		150 ppm	



Aquatic toxicity

Fish	96 hour LC ₅₀
Salmo gairdneri (Rainbow trout)	0.045 µg/L
Lepomis macrochirus (Blungill sunfish)	0.015 µg/L
	48 hour EC ₅₀
Daphnia magna	0.0015 µg/L
Toxic to fish and aquatic invertbrates	

12. ENVIRONMENTAL FATE

Soil dissipation:

Carbosulfan degrades in the soil by microbial and chemical processes to no-toxic compounds.

The rate of degradation is affected by water, pH and temperature.

No potential for bio-accumulation and bio-magnification

Soil Mobility:

Not mobile: After field application of 1.1 kg ai/ha for 2 consecutive years in sandy soil with annual rainfall >800 mm, no carbamate moiety was detected in the leachate of lysimeter study.

No contamination of ground water.

Soil micro organisms:

No significant effect on major biochemical functions.

Earthworms: No significant hazard at normal rates of use.

13. WITHHOLDING PERIOD:

Maize, Sugar beet and Sunflower: According to the application time of Montsan 200ULV (at sowing), it is more appropriate to define the PHI by the growth stage when the crops are harvested since treatment occurred at sowing.



Potatoes: According to the above studies, PHI of 21 days is proposed for the application of Montsan 200ULV on potatoes.

14. CONCLUSIONS

Broad spectrum carbamate insecticide combining excellent aphicidal properties with acaricide and nematicide activity.

Marketed in a number of different formulations in > 80 countries for the control of many soil and foliar pests on a variety of crops.

Used for locust and public health control

Moderate mammalian toxicity

Low impact on the environment

Well established and proven product still finding new markets.

15. HANDLING, STORAGE AND TRANSPORTATION:

Personnel handling **Montsan** 200 ULV should wear clean rubber gloves, protective clothing and goggles. The product should be stored in its original container in a cool dry ventilated store away from sparkler heat devices. It must be kept under lock and key away from foodstuffs and animal feed.