

## BENEFITS SHEET

423g/L Metham present as sodium salt.

### What is Nemasol?

Nemasol is a non-flammable liquid fumigant – suitable for pre-plant treatment for control of certain soil borne pests such as germinating weed seeds, nematodes, fungal diseases and symphylids.

For agricultural use – Nemasol is then formulated as sodium (N-methylthiocarbamate, which is highly soluble in water and rapidly converts to methylisothiocyanate (MITC) upon contacting moist soil. MITC is the active, highly volatile & poisonous gas that fumigates soil borne pests.)

### What does Nemasol do?

The optimal growing conditions required for repeated cropping favours the growth and multiplication of many soil borne pests. If not controlled, these pests will build to a level that results in reduced crop quality and yield. Nemasol is a practical and cost-effective solution for controlling weeds, soil-borne fungi, nematodes and symphylids.



## FOR USE ON TOMATOES

Nemasol is used for the production of fresh tomatoes, in field or greenhouse, and processing tomatoes.

Soil disinfection with Nemasol prior to sowing or planting tomatoes allows controlling the competition from diseases, nematodes and weeds occurring during the crop emergence and the early stages of development. Nemasol is highly effective against:

- soil-borne fungi causing damping-off and root-rots, like *Botrytis cinerea*, *Pythium* spp., *Rhizoctonia solani*, *Alternaria solani*, *Fusarium oxysporum*
- corky root caused by *Pyrenochaeta lycopersici*
- vascular diseases caused by *Fusarium oxysporum*, *Verticillium dahliae*
- root-knot nematodes: *Meloidogyne* spp.
- weeds, and particularly Nightshade (*Solanum nigrum*), Amaranth (*Amaranthus retroflexus*), Purslane (*Portulaca oleracea*)

### Efficacy on weeds

Nemasol controls all kind of weeds, by destroying the seeds present in the soil at the time of the application. It allows reducing or suppressing the application of post-emergence herbicides and controls weeds, which lost their sensitivity to specific herbicides.

The wide spectrum of action of Nemasol not only results in control of specific pests, but also in yield increase and more precocity. Precocity is of utmost importance for the early productions which are better valorised than the later ones.

The influence on the yield of a pre-planting disinfection with Nemasol has been assessed in a two years study conducted in Almería, Spain in 1996 and 1997. In the trials, Nemasol has been compared to methyl-bromide, as reference product.

Nemasol was applied through the drip-irrigation system at 1,200 or 600 L/ha, followed by a plastic sheeting or watering. Methyl-bromide was applied by injection at 750 kg/ha.

### Increase of yield in comparison to the control. <sup>ii, iii</sup>

|                                 | 1996<br>Roquetas | 1997<br>Roquetas | average |
|---------------------------------|------------------|------------------|---------|
| Nemasol 1,200 L + plastic sheet | + 17 %           | + 22 %           | + 19 %  |
| Nemasol 600 L + plastic sheet   | + 14 %           | + 18 %           | + 16 %  |
| Nemasol 1,200 + watering        | + 12 %           | + 16 %           | + 14 %  |
| Methyl bromide 750 kg           | + 15 %           | + 22 %           | + 18 %  |
| Untreated (yield in t/ha)       | 95               | 85               | 90      |

### Efficacy on fungi - Effect of soil fumigation treatments on soilborne fungal populations and viability<sup>i</sup>

| Treatment <sup>a</sup> | Rate /ha | Rhizoctonia solani                  |                 | Pythium spp. |          | Fusarium              |                       | Tomato stand |               |
|------------------------|----------|-------------------------------------|-----------------|--------------|----------|-----------------------|-----------------------|--------------|---------------|
|                        |          | Oat <sup>b</sup> kernels (% viable) | Soil (cfu/100g) | (cfu/g)      | % viable | F. solani (cfu/100 g) | total F. spp. (cfu/g) | # /m         | vigour (1-10) |
| <b>Nemasol</b>         | 349 L    | 7                                   | 5               | nd           | 0        | nd                    | 189                   | 15           | 7.5           |
| <b>Chloropicrin</b>    | 56 L     | 13                                  | 2               | 17           | 16,6     | 2161                  | 3279                  | 11           | 6.7           |
| <b>1,3-D + C-35</b>    | 93 L     | 37                                  | nd              | 0.7          | 0        | 29                    | 363                   | 15           | 7.3           |
| <b>Methyl bromide</b>  | 650 kg   | 10                                  | nd              | nd           | 0        | nd                    | 116                   | 14           | 7.7           |
| <b>Non treated</b>     | -        | 62                                  | 23              | 86           | 100      | 696                   | 3162                  | 11           | 6.7           |

<sup>a</sup> All plots were treated on 31 Oct. 1996, except methyl bromide which was treated on 1 Nov. 1996.

<sup>b</sup> Oats infected with *Rhizoctonia solani* AG-4 were placed in polyethylene bags during soil treatment, removed on 4 Dec and assayed for percentage viability.

References

<sup>i</sup> A.S. Csinos, D.R. Sumner, W.C. Johnson, A.W. Johnson, R.M. McPherson, C.C. Dowler, 1999. Methyl bromide alternatives in tobacco, tomato and pepper transplant production. *Crop Protection*, pp. 39-49.

<sup>ii</sup> Plant Protection Consultores S.L., 1996. Ensayos de metam sodio en hortalizas y fresas - campaña 1995/96. UCB Chemicals, MS-5 AI.

<sup>iii</sup> Plant Protection Consultores S.L., 1997. Ensayos metam sodio campaña 1996/97 –Informe final. UCB Chemicals, pp. 2-5.

## FOR USE ON CUCURBITS



Nemasol is used for the production of melons and other Cucurbits, in greenhouse and open fields.

Soil disinfection with Nemasol prior to sowing or planting Cucurbits allows controlling the competition from diseases, nematodes and weeds occurring during the crop emergence and the early stages of development.

### Application

Nemasol is soluble in water, what enables an application through watering system.

The preferred technique of application of Nemasol is drip fumigation since it enables locating the product close to the pest to be destroyed by entering into contact with every particles of soil. Drip fumigation allows saving water, while reducing severely the exposure of workers and environment to the chemical. For more information, refers to the technical sheet "Nemasol Drip fumigation".

### Spectrum of action

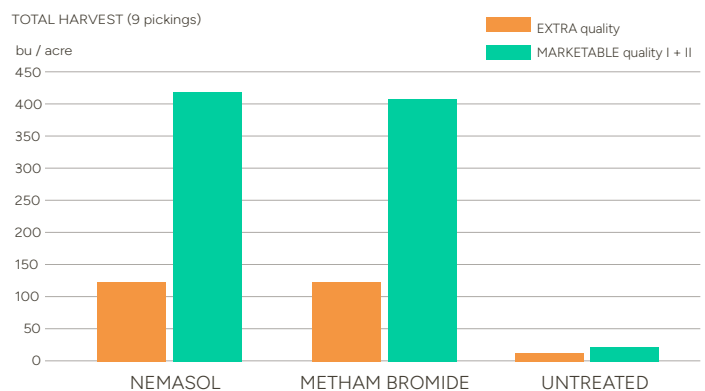
Nemasol is highly effective against:

- soil fungi causing plant decay and root rots, like : *Fusarium* spp., *Pythium* spp., *Rhizoctonia solani*, *Sclerotinia sclerotinium*, *Botrytis cinerea*, *Phytophthora* spp., *Didymella bryoniae*, *Sclerotium rolfsii*, *Phomopsis sclerotiodes*.
- corky root caused by *Pyrenochaeta lycopersici*.
- vascular diseases: *Fusarium oxysporum*, *Verticillium dahliae*.
- Root knot nematodes: *Meloidogyne javanica* et *incognita*.
- Stem nematodes: *Pratylenchus* spp. et *Ditylenchus* spp.
- All type of weeds, among them: Nutsedge (*Cyperus* spp.), Nightshade (*Solanum nigrum*), Amaranth (*Amaranthus retroflexus*), Purslane (*Portulaca oleracea*), Oxalis (*Oxalis* spp.)

### Efficacy of Nemasol on soil pests and weeds on Cucurbit Commercial trial conducted in spring 1999 by the University of Florida.

| Treatment                  | Application                         | Nematode control<br>% of galls (Meloidogyne) on the roots, 4 weeks after planting | Control of soil fungi<br>% of wilt | Weed control<br>Nbr of Nutsedges - <i>Cyperus tuberosus</i> - (main problem in Florida) per 30 metres line. |
|----------------------------|-------------------------------------|---|------------------------------------|---|
| NEMASOL                    | 570 L/ha applied through drip lines | 0,9%  | 0,8%                               | 20  |
| Methyl bromide (+ opicrin) | 300 kg/ha, soil injection           | 0,3%  | 0,1%                               | 12  |
| Non treated check          |                                     | 98%   | 72%                                | 2052  |

### Effect of a pre-planting disinfection with Nemasol on the yield of Cucumbers, University of Florida, 1999.



## FOR USE ON STRAWBERRIES



Nemasol is a reference product for the soil desinfection in intensive cropping. It is one of the main alternative to methyl-bromide.

A soil desinfection with Nemasol before planting strawberry allow to control soil fungi, nematodes and seeds of weeds which are competing with the young plant. A soil free of pests allows the young plant to start growing quickly, and to achieve the best yield.

A soil desinfection with Nemasol well performed may benefit two successive crop cycles.

Nemasol on Strawberry is specifically recommended to control :

- Fungi involved in root-rot diseases and plant withering : *Fusarium* spp., *Rhizoctonia fragariae*, *Botrytis cinerea*, *Phytophthora cactorum* et *Ph. fragariae*, *Colletotricum acutatum*.
- *Verticillium* wilt
- Root-knot nematodes: *Meloidogyne javanica*, *M. incognita*.
- Root-lesion and dagger nematodes: *Pratylenchus penetrans* et *P. crenatus*, *Xiphimena*.

### Effect on yield

The sanitation of soil provided by Nemasol increases the marketable yield and the precocity of the first harvest.

Hereafter, results of two studies performed in Spain (Huelva) in 1997-98-99 and in France (Douville) in 2000.

Nemasol was applied by drip-fumigation or direct injection in the soil (see Technical Sheet "Techniques of Application") and compared to methyl-bromide.

Two rate of Nemasol were tested (1,200 and 600 L/ha), 3 to 6 weeks before plantation.

Methyl bromide was applied at 400-500 kg/ha and covered with a plastic mulch VIF (Virtually Impermeable Film).

### Yield increase after disinfection with Nemasol in comparison with untreated plots.

