

# HERBICIDE

## NICOSULFURON

### Selective systemic herbicide

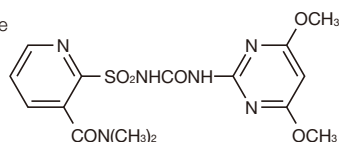
Nicosulfuron is a sulfonylurea herbicide which was originally discovered by ISK. It controls a wide range of weeds covering both annual and perennial species.

Because of its excellent performance, Nicosulfuron has been used by corn growers globally since it was launched in the early 1990's.



#### Physico-Chemical Properties

Chemical structure



Class : sulfonylurea

IUPAC name : 2-(4,6-dimethoxypyrimidin-2-ylcarbamoyl sulfamoyl)-N, N-dimethylnicotinamide

Molecular weight : 410.4

Molecular formula : C<sub>15</sub>H<sub>18</sub>N<sub>6</sub>O<sub>6</sub>S

Vapour pressure : <math>8 \times 10^{-7}</math> mPa (25°C)

Water solubility : 7.5 g/L (20°C, pH 6.5°C)

Form : White solid, no characteristic odour

Development code : SL-950

#### Toxicology & Ecotoxicology

Rat LD<sub>50</sub> (oral) : > 5,000 mg/kg (m/f)

Rat LD<sub>50</sub> (dermal) : > 2,000 mg/kg (m/f)

Rat LC<sub>50</sub> (inhalation) : 5.47 mg/L (4 h)

Skin irritation : non irritant (rabbit)

Eye irritation : non irritant (rabbit)

Skin sensitization : not a sensitizer (guinea pig)

Avian LD<sub>50</sub> (acute oral) : > 2,000 mg/kg (quail, m/f)

Avian LD<sub>50</sub> (acute oral) : > 2,000 mg/kg (mallard duck, m/f)

Fish LC<sub>50</sub> : 65.7 mg/L (trout, 96 h)

Fish LC<sub>50</sub> : > 100 mg/L (bluegill, 96 h)

Bees LD<sub>50</sub> (contact) : 76 µg/bee

Bees LD<sub>50</sub> (oral) : > 22.4 µg/bee

*Daphnia magna* EC<sub>50</sub> : 90 mg/L (48 h)

#### Application

**Uses** Nicosulfuron controls annual grass weeds, broad leaved weeds, and perennial weeds such as *Sorghum halepense* and *Elymus repens* at rates of 30–60 g a.i./ha.

**Phytotoxicity** Nicosulfuron has excellent selectivity to corn. In cases where corn is stressed, nicosulfuron may cause yellowing of corn foliage; however, it is transient and does not affect yield.

#### Mode of Action

**Plant Uptake** Nicosulfuron is rapidly absorbed by leaf tissue and is translocated meristems via the phloem and xylem. Nicosulfuron controls weeds by inhibiting acetolactate synthase (ALS), also called acetohydroxy acid synthase (AHAS). ALS is a necessary enzyme for the production of three branched-chain amino acids, isoleucine, leucine, and valine.

**Symptoms** Weeds treated with nicosulfuron will first begin to develop chlorosis in the new growth and then gradually, as the weed continues to be starved of the vital branched-chain amino acids, the chlorosis symptomology will develop in older growth. Chlorotic symptomology then turns to necrosis and desiccation of the plant tissue occurs. Control typically takes 3-4 weeks, from treatment to plant death.

**Selectivity** Nicosulfuron's excellent selectivity to corn is due to the ability of corn to metabolize nicosulfuron into inactive metabolites.

#### Product

<b>Trade Names</b>	MOTIVEL, NISSHIN, FORNET, SAMSON, SANSON, NICO, 玉农乐, ワンホープ, etc.	
<b>Formulations</b>	6%OD, 4%SC	
<b>Registered Countries</b>	Asia	Japan, China, Korea, Thailand
	Europe	Portugal, Spain, Belgium, Czech, France, Greece, Netherland, Poland, Slovakia, Ukraine, Bulgaria, Romania, Croatia, Germany, Hungary, Serbia, Slovenia, Austria, etc.
	Americas	USA, Brazil, Argentina, etc.



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## Visual Effect of Herbicidal Activity



Untreated



Nicosulfuron Treated Plot  
(30 days after application)

## Characteristics

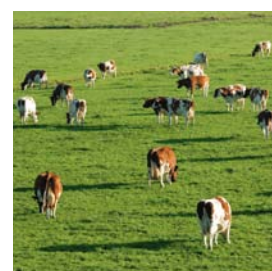
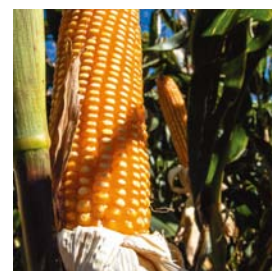
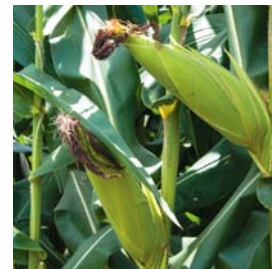
ALS inhibitor

Excellent activity at low dosages  
(30–60 g a.i./ha)

Broad weed spectrum including  
grasses, broadleaf weeds and  
sedges

Safe to corn

Safe to birds, fish, bees and other  
beneficial insects



## Weed Spectrum

	Weed Spectrum			Rate (g a.i./ha)	
	Scientific Name	Common Name	Leaf Stage	30–40	45–60
Grass weeds	<i>Digitaria sanguinalis</i>	Large crabgrass	6	+++	+++
	<i>Setaria viridis</i>	Green foxtail	6	+++	+++
	<i>Eleusine indica</i>	Goosegrass	6	++	+++
	<i>Avena fatua</i>	Wild oat	3	+++	+++
	<i>Echinochloa crus-galli</i>	Barnyard grass	3	+++	+++
	<i>Sorghum halepense</i>	Johnson grass	6	++	+++
	<i>Elymus repens</i>	Quackgrass	4	++	+++
Broadleaved weeds	<i>Galinsoga quadriradiata</i>	Shaggy soldier	4	++	+++
	<i>Stellaria media</i>	Common chickweed	4	++	+++
	<i>Polygonum lapathifolium</i>	Pale smartweed	3	++	+++
	<i>Chenopodium album</i>	Lamb's quarters	2	+	++
	<i>Sida spinosa</i>	Prickly side	2	+	+
	<i>Abutilon theophrasti</i>	Velvetleaf	1	+	+
	<i>Senna tora</i>	Sickle senna	1	+	+
	<i>Amaranthus viridis</i>	Slender amaranth	2	+++	+++
	<i>Solanum nigrum</i>	Black nightshade	4	+	+
	<i>Portulaca oleracea</i>	Common Purslane	3	++	+++
Sedges	<i>Commelina communis</i>	Asiatic dayflower	2	++	+++
	<i>Capsella bursa-pastoris</i>	Shepherd's purse	4	++	+++
	<i>Cynodon dactylon</i>	Asian flatsedge	3	+++	+++
	<i>Cyperus rotundus</i>	Purple nutsedge	5	+	+++

+++ : Excellent control, ++ : Good to fair control, + : Poor control

Application: Post-emergence of weeds (applied at leaf-stage described in the table)