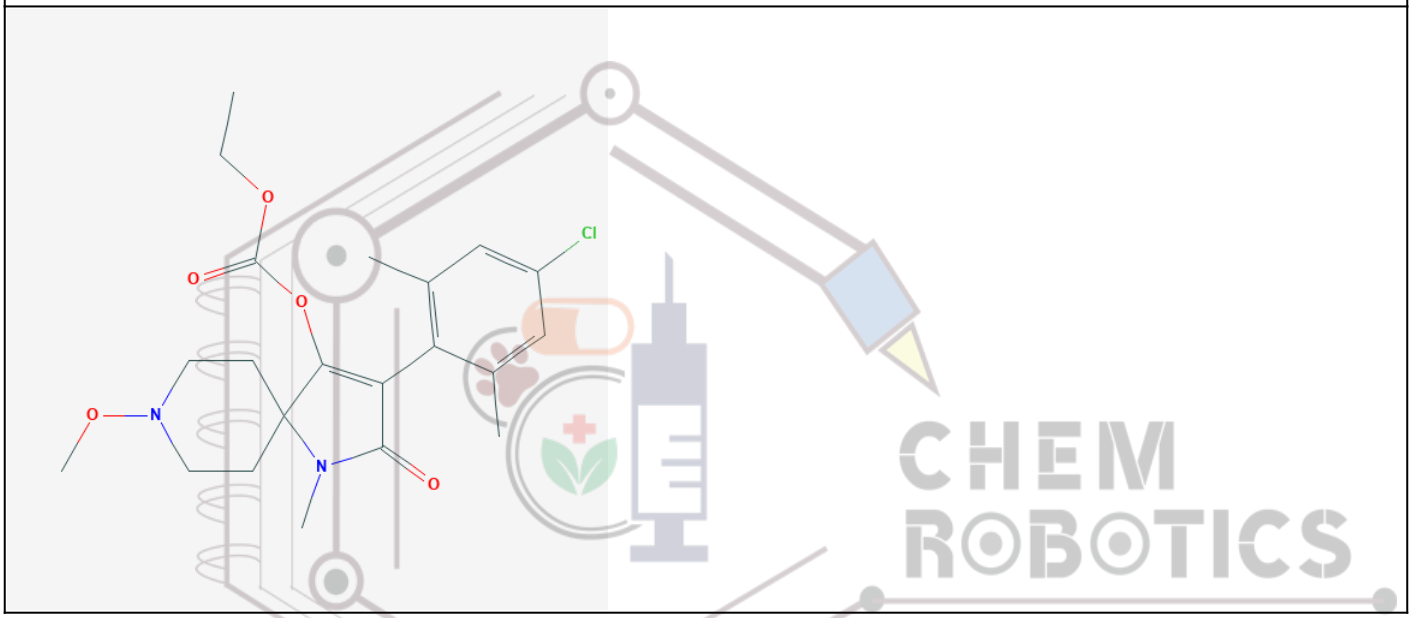
Active Ingredient :	SPIROPIDION
Product Type :	Acitve Ingredient
CAS No. :	1229023-00-0
IUPAC :	[3-(4-chloro-2,6-dimethylphenyl)-8-methoxy-1-methyl-2-oxo-1,8-diazaspiro[4.5]dec-3-en-4-yl] ethyl carbonate
Trade Names / Proprietary Name :	Spiropidion: 1. Syngenta tetramic acid insecticide, 2. SYN 546330 3. A19526

CHEMICAL STRUCTURE



PRPDUCT IDENTIFICATION

Chemical Class :	Insecticides (Tetramic Acid Insecticides)
Pubchem CID :	58537978
MOA :	By Analogy With Spirotetramat: Inhibitor Of Acetyl Coa Carboxylase - Interference With Lipid Synthesis And Growth Regulation.
Generic Constraining Date :	2029-12-09
Product Description :	Spiropidion: Spiropidion is a tetramic acid insecticide from Syngenta Crop Protection AG, development code SYN546330
CAS Name :	3-(4-chloro-2,6-dimethylphenyl)-8-methoxy-1-methyl-2-oxo-1,8-diazaspiro[4.5]dec-3-en-4-yl ethyl carbonate
ISO Status :	ISO 1750 (provisionally approved)
INCHI :	InChI=1S/C21H27ClN2O5/c1-6-28-20(26)29-18-17(16-13(2)11-15(22)12-14(16)3)19(25)23(4)21(18)7-9-24(27-5)10-8-21/h11-12H,6-10H2,1-5H3
INCHI Key :	WOPFPAIGRGHWAQ-UHFFFAOYSA-N
Canonical Smiles :	CCOC(=O)OC1=C(C(=O)N(C12CCN(CC2)OC)C)C3=C(C=C(C=C3C)Cl)C
Molecular Formula :	C21H27ClN2O5

INVENT INFO

1ST DISCLOSURE/ PRODUCT PATENT / EXCLUSIVITY :	1. WO2010066780 (Syngenta Participations AG; Syngenta Limited); Est. Exp. 09 Dec. 2029; Equivalents: EP2369934; JP5662335; IN292378; US9067892; US9771365; IN201818002114; Spiroheterocyclic N-oxypiperidines as pesticides; Product Patent Family 2. WO2011151146 (Syngenta Participations AG; Syngenta Limited); Est. Exp. 12 May, 2031; Equivalents: CN103002741; EP2575468; JP2013527208; IN2012DN09930; US20140018242; Preparation of diazaspirodecenyl compounds for use in crop enhancement; [A method is claimed of enhancing a crop by applying to the crop or a locus thereof a compd. of formula I. Specifically claimed is use of I for improving plant yield, plant vigor, plant quality, and/or plant tolerance to stress factors, and for enabling homogeneous flowering. Some of the exemplified compds. were tested for crop enhancement properties on soybeans, barley, french bean, and spring wheat. In one such test, II increased mean shoot height of soybean plants by 8.5% when applied to the seeds in an aq. soln. at 5 ppm] 3. WO2014191271 (Syngenta Participations AG); Est. Exp. 11 Oct., 2037; Equivalents: IN2015DN10545; EP3003041; US10246459; US9809593; Use of tetramic acid derivatives as nematicides [Use of a tetramic acid compd. according to formula (I) or an agrochem. acceptable salt or an N-oxide thereof; with a second nematicide as a treatment for crop plants to combat and control nematodes in the soil of said crop plants]
INNOVATOR (S) :	SYNGENTA CROP PROTECTION (US)
HISTORY / DEVELOPMENT / LICENCING / COMMERCIALISATION :	Spiropidion : Not Found
PATENTS :	WO2012191271

PHYSICOCHEMICAL(COMPUTED PROPERTIES)

SUMMARY :	Molecular Weight: 422.906 g/mol Hydrogen Bond Donor Count: 0 Hydrogen Bond Acceptor Count: 6 Rotatable Bond Count: 6 Complexity: 662 Topological Polar Surface Area: 68.3 A^2 Monoisotopic Mass: 422.161 g/mol Exact Mass: 422.161 g/mol XLogP3-AA: 3.5 Compound Is Canonicalized: true Formal Charge: 0 Heavy Atom Count: 29 Defined Atom Stereocenter Count: 0 UnDefined Atom Stereocenter Count: 0 Defined Bond Stereocenter Count: 0 UnDefined Bond Stereocenter Count: 0 Isotope Atom Count: 0 Covalently-Bonded Unit Count: 1
MOLECULAR WEIGHT :	422.906 g/mol
HYDROGEN BOND DONOR COUNT :	0
HYDROGEN BOND ACCEPTOR COUNT :	6
ROTATABLE BOND COUNT :	6
COMPLEXITY :	662

TOPOLOGICAL POLAR SURFACE AREA :	68.3 A^2
TOPOLOGICAL POLAR SURFACE AREA :	68.3 A^2
MONOISOTOPIC MASS :	422.161 g/mol
EXACT MASS :	422.161 g/mol
LOGP (COMPUTED) :	3.5
COMPOUND IS CANONICALIZED :	True
FORMAL CHARGE :	0
HEAVY ATOM COUNT :	29
DEFINED ATOM STEREOCENTER COUNT :	0
UNDEFINED ATOM STEREOCENTER COUNT :	0
DEFINED BOND STEREOCENTER COUNT :	0
UNDEFINED BOND STEREOCENTER COUNT :	0
ISOTOPE ATOM COUNT :	0
COVALENTLY-BONDED UNIT COUNT :	1

PHYSICOCHEMICAL(EXPERIMENTAL PROPERTIES)

SUMMARY :	Physical Description: POLYMORPHISM: MELTING POINT (°C): BOILING POINT (°C): DEGRADATION POINT (°C): FLASHPOINT (°C): FREEZING POINT (°C): SUBLIMATION (°C): AQUEOUS SOLUBILITY (mg/l): SOLUBILITY IN ORGANIC SOLVENTS (mg/l): SOLUBILITY IN N-HEPTANE (mg/l): SOLUBILITY IN METHANOL (mg/l): SOLUBILITY IN ACETONE (mg/l): SOLUBILITY IN ETHYL ACETATE (mg/l): SOLUBILITY IN OTHER ORGANIC SOLVENT (S) (mg/l): DENSITY (g/ml): BULK DENSITY (g/ml) / SPECIFIC GRAVITY: VAPOR PRESSURE: LOGP (OCTANOL-WATER): STABILITY: pH: DISSOCIATION CONSTANTS (pKa): HENRYS LAW CONSTANT AT 25(C) (Pam3 mol-1): GUS LEACHING POTENTIAL INDEX: SCI-GROW GROUNDWATER INDEX (g /l) for a 1Kg/ha or 1l/ha APPLICATION RATE: POTENTIAL FOR PARTICLE BOUND TRANSPORT INDEX: MAXIMUM UV-VIS ABSORPTION l/mol/cm: SURFACE TENSION (mN/m):

PATENT LANDSCAPE

SUMMARY PATENT LANDSCAPE	Combination Patents: WO2011151248; WO2011151249; WO2011151247; WO2013079564; WO2013107795; WO2013107796; WO2013107793 ; WO2013107794; WO2014187846; WO2014187847; US20140336048; US20150005163; US20160081342; EP3202267; (All Assigned to Syngenta Participations AG, Switz.) Process Patents: 1. WO2018114649 (Syngenta Participations AG, Switz.); Crystalline polymorph of N-alkyl amide substituted spiroheterocyclic pyrrolidine dione derivative insecticide. 2. WO2018114648 (Syngenta Participations AG, Switz.); Polymorphs of insecticide solid forms

SPC (SOLO PRODUCT)

SUMMARY SPC	As per present scenario, there is “no SPC Application” found with instant Product
SPC (SOLO PRODUCT)	As per present scenario, there is “no SPC Application” found with instant Product

DATA PROTECTION (Solo Product)

SUMMARY	Annex I Inclusion Date: Data Protection Expiry Date:

KEY STARTING MATERIAL (KSM)

SKEY STARTING MATERIAL (KSM)	Spiropidion Key Starting Material Used in Given Process: I N-methoxy-4-piperidone C6H11NO2 II ammonium chloride 12125-02-9 ClH4N III sodium cyanide 143-33-9 NaCN IV 4-amino-1-methoxy-piperidine-4-carbonitrile C7H13N3O V 4-amino-1-methoxypiperidine-4-carboxylic acid C7H14N2O3 VI methanol 67-56-1 CH4O VII 4-amino-1-methoxypiperidine-4-carboxylic acid methyl ester C8H16N2O3 VIII (4-chloro-2,6-dimethylphenyl)acetyl chloride C10H10Cl2O IX 4-[2-(4-chloro-2,6-dimethylphenyl)acetylamino]-1-methoxypiperidine-4-carboxylic acid methyl ester C18H25ClN2O4 X methyl iodide 74-88-4 CH3I XI 4-hydroxy-8-methoxy-1-methyl-3-(4-chloro-2,6-dimethylphenyl)-1,8-diazaspiro[4.5]dec-3-en-2-one C18H23ClN2O3 XII chloroformic acid ethyl ester 541-41-3 C3H5ClO2 XIII 4-chloro-2,6-dimethylaniline

BIOLOGY

SUMMARY :	Ecotoxicology Summary of Spiropidion : Mammalian Tox Summary of Spiropidion: Oral LD50 Rat->2000 mg/kg bw Acute Inhalation (rat): LC50> 1.12 mg/l skin irritation: rabbit: no irritant Acute eye irritation- Rabbit: minimal irritant.
PEST / PATHOGEN / SPECTRUM :	It Is Effective At Controlling A Wide Range Of Insects Pests.
CROP :	Soybeans,Pome Fruit,Cotton,Citrus,Vegetables,Cucurbits

REGULATORY DATA

APPROVAL STATUS SUMMARY :	Spiropidion is Syngentas take on BCS spirotetramat. SYN546330 has been imported into Chile (experimental quantities) 2012-2014, and into India (as tetramic acid derivative) since 2014 in increasing quantities, and is under consideration by various regulatory bodies (2016/2017). ISO name spiropidion provisionally approved in May 2017.
REGULATORY INFO SUMMARY :	Spiropidion:

RESISTANCE ACTION COMMITTEE (RAC) / CLASSES

COMBINATION

LITIGATION / OPPOSITION / INTER PARTES REVIEW / MARKMAN HEARING / REEXAMINATION

ACTIVE INGREDIENT BASIC INFORMATION DISCLOSED BY INNOVATOR (AI-BIDI)

ACTIVE INGREDIENT (AI) PROCESS DETAIL(S)

MANUFACTURER (S)

FORMULATION(S)

FORMULATIONS TYPE SUMMARY	Spiropidion:

PRODUCT PACKAGING

ANALYTICAL DATA

TOXICITY DATA

TOXICITY (EPA CLASS) :	
TOXICOLOGICAL & ENVIRONMENTAL REVIEWS :	

MAMMALIAN TOXICOLOGY

ECOTOXICOLOGY/ ECOLOGICAL INFORMATION

MAMMALIAN - NON-HUMAN ANIMALS TOX

SUMMARY	Mammalian Tox Summary of Spiropidion:

MAMMALIAN - HUMAN TOX

ENVIRONMENTAL FATE

DEGRADATION STUDIES

SUMMARY	Efate Summary of Spiropidion :

DISSIPATION STUDIES

PHOTOLYTIC DECOMPOSITION

SOIL ADSORPTION AND MOBILITY STUDIES

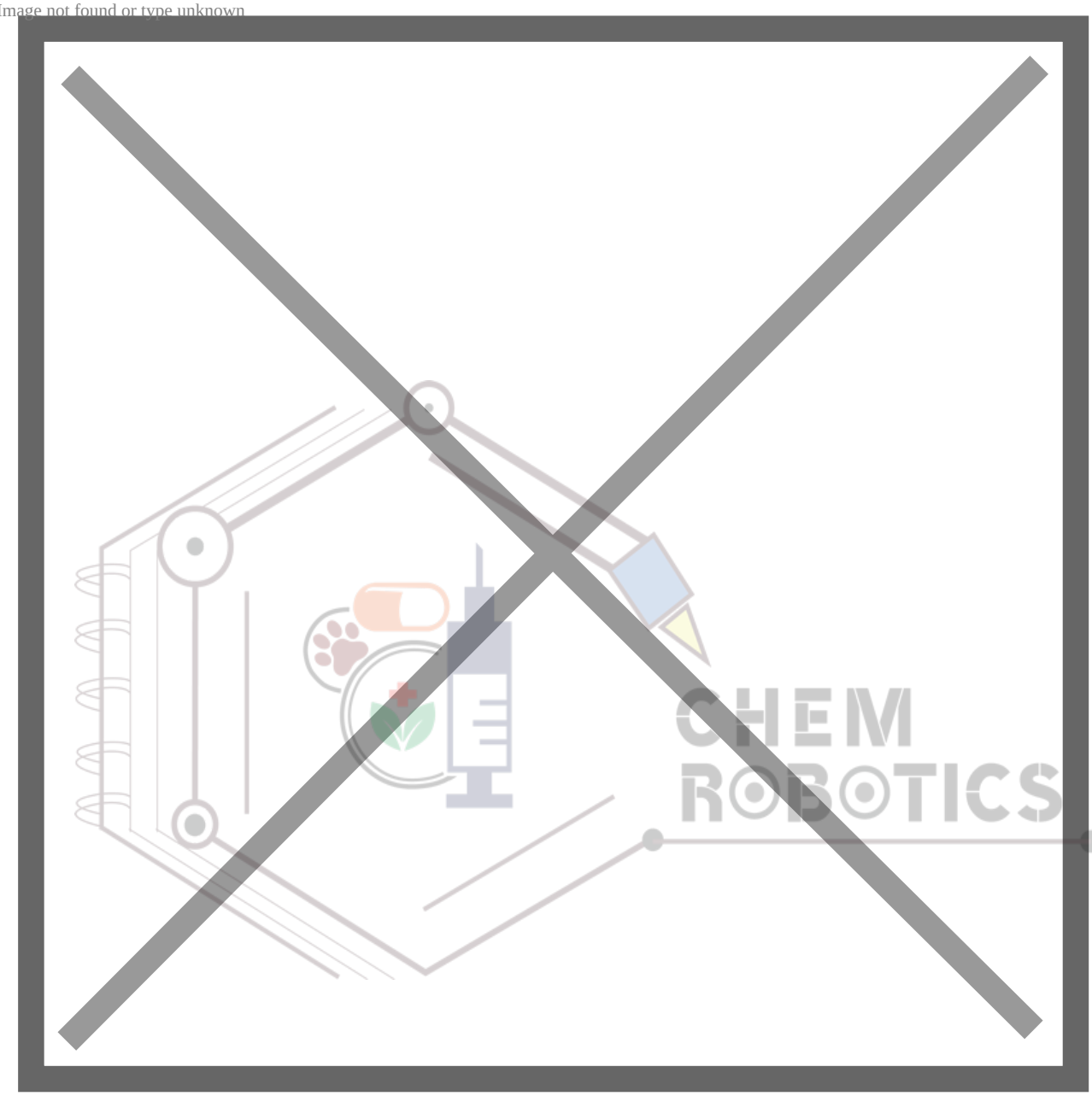
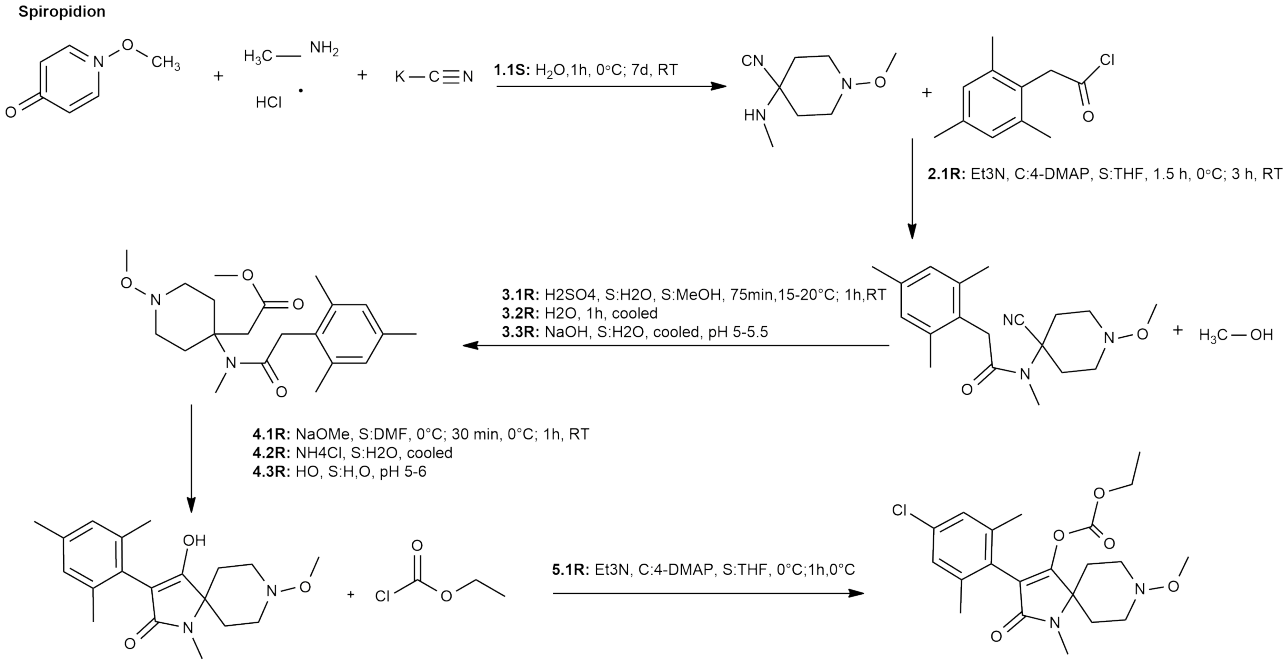
METABOLITES

SAFETY DATA

LITERATURE

INFORMATION SOURCE (S)	ChemIDplus Spiropidion [ISO] https://chem.nlm.nih.gov/chemidplus/sid/1229023000 ChemIDplus Chemical Information Classification https://chem.sis.nlm.nih.gov/chemidplus/chemidheavy.jsp European Chemicals Agency (ECHA) [2-(4-chloro-2,6-dimethyl-phenyl)-8-methoxy-4-methyl-3 oxo-4,8-diazaspiro[4,5]dec-1-en-1-yl] ethyl carbonate https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/257587 PubChem Data deposited in or computed by PubChem https://pubchem.ncbi.nlm.nih.gov WIPO International Patent Classification http://www.wipo.int/classifications/ipc/
TEXT WRITING	

ROUTE OF SYNTHESIS

ROS-1	Image not found or type unknown 
ROS-2	**Spiropidion**  **1.1S:** H_2O,1h, 0°C; 7d, RT **2.1R:** Et3N, C:4-DMAP, S:THF, 1.5 h, 0°C; 3 h, RT **3.1R:** H2SO4, S:H2O, S:MeOH, 75min,15-20°C; 1h,RT **3.2R:** H2O, 1h, cooled **3.3R:** NaOH, S:H2O, cooled, pH 5-5.5 **4.1R:** NaOMe, S:DMF, 0°C; 30 min, 0°C; 1h, RT **4.2R:** NH4Cl, S:H2O, cooled **4.3R:** HO, S:H,O, pH 5-6 **5.1R:** Et3N, C:4-DMAP, S:THF, 0°C;1h,0°C **Source:** WO 2010066780 Assignee: Syngenta 3-(4-chloro-2,6-dimethylphenyl)-8-methoxy-1-methyl-2-oxo-1,8-diazaspiro[4.5]dec-3-en-4-yl ethyl carbonate **(Spiropidion)**