FORM 2

THE PATENTS ACT, 1970

(39 OF 1970)

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The Patents Rules, 2003

COMPLETE SPECIFICATION

(See section 10; rule 13)

1. Title of the invention –

NOVEL SYNERGISTIC SUSPENSION CONCENTRATE COMPOSITION CONTAINING TOLFENPYRAD AND INSECTICIDE

2. Applicant(s)

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3. PREAMBLE TO THE DESCRIPTION

The following specification particularly describes the invention and the manner in which it is to be performed:

FIELD OF INVENTION:

The present invention relates to a novel synergistic Suspension Concentrate (SC) composition comprising bioactive amount of component (A) Tolfenpyrad present in an amount of 5% - 25% w/w; and component (B) an insecticide selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w. The present invention further relates to selection of suitable formulation excipients, process of preparation of the said Suspension Concentrate formulation/composition and its application in the field of agriculture.

BACKGROUND OF THE INVENTION:

These days cultivation of crops and agriculture in general is cost intensive. Receiving a high yield from the cultivated crops is a key. Hence, to achieve higher yield, protecting crops from insect-pests is vital. Hence, the most effective way to control crop insect-pests is the application of pesticides in accordance with the appropriate management practices with proper formulation thereof.

Treating plants with such a pesticides and plant health additives or combination thereof in appropriate formulation helps to reduce the crops/plants damage. Another advantage of treating the plants with the said combination is the improvement in plant growth overall plant health and increase in the crop yield.

Various kinds of agrochemical formulations are developed based upon active ingredients and scope of application thereof. Pesticides for agriculture purpose are available both in the pure form and as well as incorporated into agrochemical formulations, which typically comprise one or more active ingredients (AIs) and additional excipients substances that enhance the effects and facilitate the application thereof, such as carriers, adjuvants or additives. These formulations can be directly applied onto the crops or, more commonly, are applied after being diluted and the spray mixture formed. The formulation type to be used is primarily defined on the basis of physicochemical characteristics of the AI(s) and can be: soluble concentrate (SL),

emulsifiable concentrate (EC), emulsion in water (EW), suspension concentrate (SC), suspo-emulsion (SE), micro-emulsion (ME), oil dispersion (OD) or suspension concentrate (SC), dispersible concentrate (DC), capsule suspension (CS), dispersible granules (WG), wettable powder (WP) and others.

The various types of agrochemical formulations are the result of the existence of a large variety of AIs of different chemical natures. For example, a water-soluble AI can be easily included into a water based SL while a high melting, water insoluble AI is commonly found in the form of a EC (Emulsifiable concentrate). For this reason, agrochemical formulations are distinct and can contain different inert components.

In recent years, suspension concentrate (SC) formulations have been the subject of studies by companies and formulators because of their advantages with respect to the agronomic performance in the field as compared with conventional formulations. Active ingredients (AIs) formulated in different types of formulations usually exhibit different physicochemical characteristics based on type of formulation they are incorporated in. Suspension concentrates have shown a rapid development in the past, mainly due to their several benefits when compared to other formulations as no dust; no problem of toxicity or flammability due to solvents; good efficiency due to the smaller particle size; low packaging volume. Further suspension concentrates (SC) formulations have technical benefits as easy dilution and application in the field, risk of phytotoxicity or flammability due to solvents reduced, good bio-efficiency due to the fine particle size, good adhesion and penetration into target surface.

Though suspension concentrate (SC) formulation is called as "flowables" formulation it still requires various adjuvants along with formulation excipients. Suspension concentrate (SC) formulation presents several challenges in the process of manufacturing and developing stable and effective formulation with choice of proper formulation excipient or adjuvants. To obtain a good and stable formulation over time, optimal formulation additives are required in addition to optimum processes. There were several development and research done in the filed field of formulation development of suspension concentrate (SC).

Therefore, there is further need and scope in the formulation development of the suspension concentrate (SC) formulations comprising one or more active ingredients with better stability profile and increases the synergistic effect of the active ingredients,

reduces the toxicity with less introduction of toxic material in environment, which may reduce the dose of the pesticides and eventually produce less chemicals in environment, with better safety profile for contact pesticides.

RU2395201C1 relates to an insecticide composition in the form of suspension concentrate containing as an active substance a combination of imidacloprid and lambda-Cyhalothrin in synergistically effective amounts. Amount of active ingredient is 6-45 wt. %, the ratio of components in it is from 1:5 to 5:1. To increase the effectiveness of the composition additional mineral or vegetable oil and as adhesive aqueous emulsion of acrylic copolymer are included. A method of cultivated plants insect pest control is also described.

CN102396475A relates to a pesticide composition containing cyantraniliprole and abamectin. The weight ratio of cyantraniliprole to abamectin is 1:12 to 12:1; and the cyantraniliprole and abamectin account for 0.5 to 80 percent of the weight of the pesticide composition in total, and agriculturally acceptable surfactant and solid carrier or liquid diluent account for the balance. The pesticide composition can be used for preventing and controlling various ground and underground pests in field crops, fruit trees, vegetables, other special crops and lawns, including lepidopterous pests, homopterous pests, coleopterous pests, dipterous pests and hemipterous pests.

CA2723616C relates to an active compound combination comprising: 6-[trifluormethylpyridin-3-yl]ethyl(methyl)oxido-.lambda.4-sulfanylidencyanamide and at least one compound selected from the group consisting of: acephate, chlorpyrifos-methyl, chlorpyrifos-ethyl, profenofos, triazophos, beta-cyfluthrin, bifenthrin, alpha-cypermethrin, beta-cypermethrin, theta-cypermethrin, zeta-cypermethrin, deltamethrin, gamma-cyhalothrin, lambda-cyhalothrin, dinotefuran, imidacloprid, imidaclothiz, thiacloprid, thiamethoxam, spinosad, spinetoram, abamectin, emamectin-benzoate, milbemectin, pymetrozine, flonicamid, diafenthiuron, chlorfenapyr, flufenoxuron, lufenuron, novaluron, triflumuron, moulting disruptors cyromazine, methoxyfenozide, amitraz, cyflumetofen, cyenopyrafen, fenpyroximate, pyridaben, tebufenpyrad, indoxacarb, metaflumizone, flubendiamide, chlorantraniliprole (rynaxypyr), cyantraniliprole (cyacypyr), buprofezin, pyridalyl, and 4-{[(6-chloropyrid-3-yl)methyl](2,2-difluoroethyl)amino}furan-2(5H)-one, has good insecticidal and acaricidal properties.

There is however a need for improvement of these compositions. Single active combination used over a long period of time has resulted in resistance. With the onset of resistance to certain pests, there is a need in the art for a combination of actives that decrease the chances of resistance and improves the spectrum of insect-pests control.

In general use, the pesticide actives are used in the form of a dilute aqueous composition because it can attain a good interaction with the target organism, such as plants, insect-pests. However, most active pesticide compounds that are used as pesticides are only sparingly or insoluble in water. The low solubility of such compounds presents the challenges and difficulties to formulator in formulating pesticide compounds in stable formulations that can be easily stored for a long time and which can still have a high stability and effective activity until end use. This problem especially occurs and may get worsen if more than one active compound is present in the mixture.

Therefore there is further need to formulate the novel suspension concentrate (SC) formulations which increases the synergistic activities between active ingredients by using the appropriate formulation excipients; enhance the duration of control of insect-pests; reduce the doses of active ingredients and thereby minimizing the pesticidal load into the environment; has thermal and chemical stability over a broad range of weather conditions; reduces the toxicity hazards to the applicators, i.e. improves the safety of applicators at the time of handling and spraying the pesticides; and improves leaf penetration of spray droplets, retard evaporation loss and enhance the absorption of active ingredients.

There is however a need for improvement of suspension concentrate (SC) formulations. Many times, it has been found that single or combination of active ingredients requires a high loading dose for the better results. Further this will create a higher loading of the pesticides in the environment. Further many of the suspension concentrate (SC) formulations recipe is prone to lose stability when exposed to the higher temperature. In addition, there are higher chances of formulation applied gets evaporated resulting in the loss of the active ingredients before penetration.

Therefore, one object of the present invention is to provide novel suspension concentrate formulation of (A) an insecticide Tolfenpyrad present in an amount of 5% - 25% w/w; and component (B) an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole,

Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w for the control of insect-pest.

Another object of the present invention is to provide a method and a composition for controlling insect pests on a full-grown plant.

Further object of the present invention is to provide suitable formulation excipients for the present suspension concentrate (SC) formulations in order to produce better stable and synergistic formulation.

Another object of the present invention is to provide a method of manufacture and a composition for the suspension concentrate (SC) formulations.

Inventors of the present invention have surprisingly found that the novel synergistic mixture of suspension concentrate (SC) formulations for plant treatment comprising of (A) an insecticide Tolfenpyrad present in an amount of 5% - 25% w/w; and component (B) an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w can provide solution to the above mentioned problems.

SUMMARY OF INVENTION

Therefore an aspect of the present invention provides a novel synergistic Suspension Concentrate (SC) composition comprising bioactive amount of component (A) an insecticide Tolfenpyrad present in an amount of 5% - 25% w/w; and component (B) an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat,

Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w; along with formulation excipients.

Further aspect of the present invention is to provide novel Suspension Concentrate (SC) formulation that exhibits synergistic activity and stable over wide range of the conditions.

Further aspect of the present synergistic Suspension Concentrate (SC) composition is to provide selection of suitable formulation excipients selected from category of super wetting-spreading-penetrating agent, dispersing agent, dispersing agent, suspending agent, anti-foaming agent preservative, anti-freezing agent, thickener, diluent.

Another aspect of the present invention is to provide synergistic Suspension Concentrate (SC)formulation comprising of Super Wetting-spreading-penetrating agent selected from- Methylated seed oil, polyalkyleneoxide modified trisiloxane;Methylated seed oil, polyalkyleneoxide modified polydimethylsiloxane;Methylated seed oil, trisiloxane ethoxylate;Methylated seed oil, polyoxyethylene methyl polysiloxane;Methylated seed oil, polyether polymethyl siloxane copolymer; Methylated seed oil, polyether modified polysiloxane.

The present synergistic Suspension Concentrate (SC) composition comprising bioactive amount of component (A) an insecticide Tolfenpyrad present in an amount of 5% - 25% w/w; and component (B) an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w described herein is obtained by a process comprising steps of :

1. Preparation of gum solution by charging thickening agent along with preservative in water followed by homogenizing to prepare gum solution.
2. Charging water with dispersing agent. Homogenize dispersing agent and suspending agent for 45-60 minutes in high shear homogenizer.
3. To formed premix all the active ingredients homoginized to prepare uniform slurry.

4. Grinding the antifoaming agent till the desired particle size achieved.
5. Finally adding 2% gum solution and Methylated seed oil, polyalkyleneoxide modified trisiloxane (super wetting-spreading-penetrating agent) to this formulation to prepare the final Suspension Concentrate (SC) formulation and sending to QC for quality check.

DETAIL DESCRIPTION OF THE INVENTION:

Formulation technology in the field of an agriculture is now seen as an "enabling technology" which can provide safe and effective products which are convenient to use. It can also modify the toxicity of active ingredients and improve their ability to target a specific pest. At a time when the discovery of new agrochemical compounds is more difficult and certainly a high risk and expensive operation, formulation technology can extent the useful patent life of an active ingredient. It can also provide a competitive edge by improving product quality of existing formulations, or by introducing a new formulation of an active ingredient.

Suspension concentrate (SC) formulations consist of having a solid active ingredient dispersed in water. SCs have grown in popularity due to benefits such as absence of dust, ease of use and effectiveness when compared to other formulation types such as emulsifiable concentrate (EC) and wettable powder (WP). To formulate a stable SC, the active ingredient must remain insoluble under all temperature conditions.

The suspension concentrates (SC) formulation consists of Stable dispersion of micronized active ingredient in water. Most of the pesticides are delivered to the target site by spray application in agriculture and public health sectors. The water-based Suspension Concentrate formulation provide easy application with elimination of disadvantages and risks posed by solvent based EC formulation like flammability, dermal toxicity and phytotoxicity.

Suspension concentrates (SC) formulation has advantage as easy dilution and application in the field; risk of phytotoxicity or flammability due to solvents reduced good bio-efficiency due to the fine particle size, good adhesion and penetration into target surface. The water-based SC formulations do not contain any organic solvent and minimizes environmental pollution by evaporation of solvents.

Further SC formulation has benefits as water based hence it provides good safety and user convenience, suitable for many active ingredients with low water solubility, absence of dust, absence of flammable liquids, small particle size of the active ingredient, adjuvants can be built-in for bio enhancement

Large volume of conventional EC and WP formulations are used in agriculture and public health. The developed SC formulation may have good potential as effective and safer alternative to existing EC, WP formulations.

Suspension Concentrate (SC) formulation presents several challenges in preparation and manufacturing phase. To obtain a good and stable formulation over time, optimal formulation additives are required in addition to optimum processes. Particular attention must be given to choose of all the formulation excipients. Its dispersion and activation are key to the stability of the formulation over time.

Some important requirement of the formulation excipients are perfectly dispersibility of active ingredients in aqueous phase, no phase separation, easy milling, with no agglomeration, excellent stable dilution, good coverage and penetration, even distribution through the whole formulation, provide the right yield value of active ingredients.

Therefore an aspect of the present invention provides a synergistic agrochemical Suspension Concentrate (SC) composition comprising bioactive amount of component (A) an insecticide Tolfenpyrad; and component (B) an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid.

Further aspect of the present invention is to provide novel agrochemical Suspension Concentrate (SC) formulation comprising binary insecticidal composition with formulation excipients shows synergistic activity and stability over wide range of the conditions.

In an especially preferred embodiment of the invention, the yield of the treated plant is increased.

In another preferred embodiment of the invention, the yield of the plants treated according to the method of the invention, is increased synergistically.

The term "synergistic", as used herein, refers the combined action of two or more active agents blended and administered conjointly that is greater than the sum of their individual effects.

Further aspect of the present invention is to provide synergistic agrochemical Suspension Concentrate (SC) formulation comprising formulation excipients from the category of super wetting-spreading-penetrating agent, dispersing agent, dispersing agent, suspending agent, anti-foaming agent preservative, anti-freezing agent, thickener, diluent.

The present inventors believe that the combination of the present invention synergistic agrochemical Suspension Concentrate (SC) composition comprising bioactive amount of bioactive amount of component (A) an insecticide Tolfenpyrad present in an amount of 5% - 25% w/w; and component (B) an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w surprisingly results in synergistic activity.

The combination of the present invention allows for a broad spectrum of insect-pest control and has surprisingly improved plant vigour and yield. The broad spectrum of the present combination also provides a solution for preventing the development of resistance.

The synergistic agrochemical mixture has very advantageous curative, preventive and systemic insecticidal properties for protecting cultivated plants. As has been mentioned, said active ingredient composition can be used to inhibit or destroy the insect-pests that occur on plants or parts of plants of useful crops. The synergistic agrochemical composition of specific active ingredient has the special advantage of being highly active against insect pests that mostly occur on plant parts.

The present invention will be used to control the following insects-pests.

The major insects pests are belongs to the order Hemiptera, for example, rice leafhopper/green leaf hopper (GLH) Nephotettix nigropictus, rice brown plant hopper (BPH) Nilaparvata lugen, rice backed plant hopper (WBPH) Sogatella furcifera, Apple Mealy bug Phenococcus aceris, bean aphid Aphis fabae, black citrus aphid Toxoptera aurantii, citrus black scale Saissetia oleae, cabbage aphid Brevicoryne brassicae, Lipaphis erysimi, citrus red scale Aonidiella aurantii, yellow scale Aonidiella citrine, citrus mealybug Planococcus citri, corn leaf aphid Rhopalosiphum maidis, aphid Aphis gossypii, jassid Amrasca biguttula biguttla, mealy bug Planococcus spp. And Pseudococcus spp., cotton stainer Dysdercus suturellus, whitefly Bemisia tabaci, cowpea aphid Aphis crassivora, grain aphid Sitobion avenae, golden glow aphid Uroleucon spp., grape mealybug Pseudococcus maritimus, green peach aphid Myzus persicae, greenhouse whitefly Trialeurodes vaporariorum, papaya mealy bug Pracoccus marginatus, pea aphid Acyrthosiphon pisum, sugarcane mealybug Saccharicoccus sacchari, potato aphid Myzus persicae, potato leaf hopper Empoasca fabae, cotton whitefly Bemisia tabaci, tarnished plant bug Lygus lineolaris, wooly apple aphid Eriosoma lanigerum, mango hopper Amritodus atkinsoni, Idioscopus spp. ; order Lepidoptera, army worm Mythimna unipuncta, asiatic rice borer Chilo suppressalis, beet armyworm Spodoptera exigua, black cutworm Agrotis ipsilon, bollworm Helicoverpa armigera , cabbage looper Trichoplusia ni, codling moth Cydia pomonella, croton caterpillar Achea janata, diamond backmoth Plutella xylostella, cabbage worm Pieris rapae, pink bollworm Pectinophora gossypiella, sugarcane borer Diatraea saccharalis, sugarcane early shoot borer Chilo infuscatellus tobacco budworm Heliothis virescens, tomato fruitworm Helicoverpa zea, velvet bean caterpillar Anticarsia gemmatalis, yellow stem borer Scirpophaga incertulas, spotted bollworm Earias vittella, rice leaffolder Cnaphalocrocis medinalis, pink stem borer Sesamia spp., tobacco leafeating caterpillar Spodoptera litura; brinjal fruit and shoot borer Leucinodes orbonalis, bean pod borer Maruca vitrata, Maruca testulalis, armyworm Mythimna separata, cotton pinkbollworm Pectinophora gossypiella, citrus leafminer Phyllocnistis citrella, cabbage butterfly Pieris bras-sicae, diamond backmoth Plutella xylostella, paddy stem borer Scirpophaga excerptallis, Scirpophaga incertulas, Scirpophaga innotata, wheat stem borer Sesamia inferens, Sitotroga cerealella, Spilosoma obliqua, fall armyworm Spodoptera frugiperda, Spodoptera littoralis, Spodoptera litura, Trichoplusia ni, Tryporyza nivella, Tryporyza incertulas, Tuta absoluta.

from the order Coleoptera, for example, apple twig borer Amphicerus spp., corn root worm Diabrotica virgifera, cucumber beetle diabrotica balteata, boll weevil Anthonomus grandis, grape flea beetle Altica chalybea, grape root worm Fidia viticola, grape trunk borer Clytoleptus albofasciatus, radish flea beetle Phyllotreta armoraciae, maize weevil Sitophilus zeamais, northern corn rootworm Diabrotica barberi, rice water weevil Lissorhoptrus oryzophilus, Anthonomus grandis, Bruchus lentis, Diabrotica semipunctata, Diabrotica virgifera, Dicladispa armigera, Epila-chna varivestis, various species of white grubs are Holotrichia bicolor, Holotrichia consanguinea, Holotrichia serrata, Leptinotarsa decemlineata, Phyllotreta chrysocephala, Popillia japonica etc; from the order Orthoptera, for example, Gryllotalpa spp., Locusta spp., and Schistocerca is spp.; from the order Thysanoptera, for example, Thrips- Frankliniella spp., Thrips palmi, Thrips tabaci, Thrips parvispinus, Scirtothrips dorsalis; termites (Isoptera), e.g. Calotermes flavicollis, Coptotermes formosanus, Heterotermes aureus, Leucotermes flavipes, Microtermes obesi, Odontotermes obesus, Reticulitermes flavipes, Termes natalensis; from the order Heteroptera, for example, Dysdercus spp., Leptocorisa spp., from the order Hymenoptera, for example, Solenopsis spp. ; from the order Diptera, for example, Antherigona soccata, Dacus spp., Liriomyza spp., Melanagromyza spp., from the order Acarina, for example, Aceria mangiferae, Brevipalpus spp., Eriophyes spp., Oligonychus mangiferus, Oligonychus punicae, Panonychus citri, Panonychus ulmi, Polyphagotarsonemus latus, Tarsonemus spp., Tetranychus urticae, Tetranychus cinnabarinus.

The mixtures according to the invention can be applied to any and all developmental stages of pests, such as egg, larva, pupa, and adult. The pests may be controlled by contacting the target pest, its food supply, habitat, breeding ground or its locus with a pesticidally effective amount of the inventive mixtures or of compositions comprising the mixtures.

Examples of the crops on which the present compositions may be used include GMO (Genetically Modified Organism) and Non GMO traits, hybrids and conventional varieties of Cotton (Gossypium spp.), Paddy (Oryza sativa), Wheat (Triticum aestavum), Barley (Hordeum vulgare), Maize (Zea mays), Sorghum (Sorghum bicolor), Oat (Avena sativa), Pearl millet (Pennisetum glaucum), Sugarcane (Saccharum officinarum), Sugarbeet (Beta vulgaris), Soybean (Glycin max), Groundnut/Peanut (Arachis hypogaea), Sunflower (Helianthus annuus), Mustard (Brassica juncea), Rape seed (Brassica napus), Sesame (Sesamum indicum), Green

gram (Vigna radiata), Black gram (Vigna mungo), Chickpea (Cicer aritinum), Cowpea (Vigna unguiculata), Red gram (Cajanus cajan), French bean (Phaseolus vulgaris), Indian bean (Lablab purpureus), Horse gram (Macrotyloma uniflorum), Field pea (Pisum sativum), Cluster bean (Cyamopsis tetragonoloba), Lentils (Lens culinaris), Brinjal (Solanum melongena), Cabbage (Brassica oleracea var. capitata), Cauliflower (Brassica oleracea var. botrytis), Okra (Abelmoschus esculentus), Onion (Allium cepa L.), Tomato (Solanum lycopersicun), Potato (Solanum tuberosum), Sweet potato (Ipomoea batatas), Chilly (Capsicum annum), Bell pepper (Capsicum annum), Garlic (Allium sativum), Cucumber (Cucumis sativus), Muskmelons (Cucumis melo), Watermelon (Citrullus lanatus), Bottle gourd (Lagenaria siceraria), Bitter gourd (Momordica charantia), Radish (Raphanus sativus), Carrot (Dacus carota subsp. sativus), Turnip (Brassica rapa rapa), Apple (Melus domestica), Banana (Musa spp.), Citrus groups (Citrus spp.), Grape (Vitis vinifera), Guava (Psidium guajava), Mango (Mangifera indica), Papaya (Carica papaya), Pineapple (Ananas comosus), Pomegranate (Punica granatum), Sapota (Manilkara zapota), Tea (Camellia sinensis), Coffea (Coffea Arabica), Turmeric (Curcuma longa), Ginger (Zingiber officinale), Cumin (Cuminum cyminum), Black Pepper (Piper nigrum), Mentha (Mentha spp.), Rose (Rosa spp.), Jasmine (Jasminum spp.), Marigold (Tagetes spp.), Common daisy (Bellis perennis), Dahlia (Dahlia hortnesis), Gerbera (Gerbera jamesonii), Carnation (Dianthus caryophyllus).

Crops are to be understood as also including those crops which have been rendered tolerant to herbicides or classes of herbicides (e.g. ALS-, GS-, EPSPS-, PPO-, ACCase- and HPPD-inhibitors) by conventional methods of breeding or by genetic engineering. An example of a crop that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding is Clearfield® summer rape (canola). Examples of crops that have been rendered tolerant to herbicides by genetic engineering methods include e.g. glyphosate- and glufosinate-resistant maize varieties commercially available under the trade names RoundupReady® and LibertyLink®.

Crops are also to be understood as being those which have been rendered resistant to harmful insects by genetic engineering methods, for example Bt maize (resistant to European corn borer), Bt cotton (resistant to cotton boll weevil) and also Bt potatoes (resistant to Colorado beetle). Examples of Bt maize are the Bt 176 maize hybrids of

NK® (Syngenta Seeds). The Bt toxin is a protein that is formed naturally by Bacillus thuringiensis soil bacteria. Examples of toxins, or transgenic plants able to synthesise such toxins, are described in EP-A-451 878, EP-A-374 753, WO 93/07278, WO 95/34656, WO 03/052073 and EP-A-427 529. Examples of transgenic plants comprising one or more genes that code for an insecticidal resistance and express one or more toxins are KnockOut® (maize), Yield Gard® (maize), NuCOTIN33B® (cotton), Bollgard® (cotton), NewLeaf® (potatoes), NatureGard® and Protexcta®. Plant crops or seed material thereof can be both resistant to herbicides and, at the same time, resistant to insect feeding ("stacked" transgenic events). For example, seed can have the ability to express an insecticidal Cry3 protein while at the same time being tolerant to glyphosate.

Crops are also to be understood to include those which are obtained by conventional methods of breeding or genetic engineering and contain so-called output traits (e.g. improved storage stability, higher nutritional value and improved flavour).

Other useful plants include turf grass for example in golf-courses, lawns, parks and roadsides, or grown commercially for sod, and ornamental plants such as flowers or bushes.

More particularly in further aspect of the present invention provides the Suspension Concentrate formulation of agrochemical composition comprising bioactive amounts of Compound A: Tolfenpyrad present in an amount of 5% - 25% w/w; Compound B: an insecticide compound selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w.

Active Ingredients	Compound A	Compound B
Examples	Tolfenpyrad	Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole,

		Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid
% Active Ingredient	5% - 25% w/w	0.5% - 30% w/w

The process for preparing the present synergistic mixture can be modified accordingly by any person skilled in the art based on the knowledge of manufacturing the formulation. However, all such variations and modifications are covered by the scope of the present invention.

The composition of the present invention in addition to bioactive amounts of active ingredients further comprises of formulation excipients including but not limited to Super Wetting-spreading-penetrating agent, Dispersing agent, Suspending agent, Anti-foaming agent, Anti-freezing agent, Preservatives, Thickeners, Humectant, Diluent/Solvent.

A wetting agent is a substance that when added to a liquid increases the spreading or penetration power of the liquid by reducing the interfacial tension between the liquid and the surface on which it is spreading. Wetting agents are used for two main functions in agrochemical formulations: during processing and manufacture to increase the rate of wetting of powders in water to make concentrates for soluble liquids or suspension concentrates; and during mixing of a product with water in a spray tank or other vessel to reduce the wetting time of wettable powders and to improve the penetration of water into water-dispersible granules.

Examples of Super Wetting-spreading-penetrating agent for Suspension Concentrate (SC) formulation includes but not limited Methylated seed oil, polyalkyleneoxide modified trisiloxane; Methylated seed oil, polyalkyleneoxide modified polydimethylsiloxane; Methylated seed oil, trisiloxane ethoxylate; Methylated seed oil, polyoxyethylene methyl polysiloxane; Methylated seed oil, polyether polymethyl siloxane copolymer; Methylated seed oil, polyether modified polysiloxane.

The seed oil may be any one or mixture of two or more selected from soybean (Glycine max) oil, groundnut (Arachis hypogaea) oil, rapeseed (Brassica napus subspecies) oil,

mustard (Brassica juncea) oil, sesame (Sesamum indicum) oil, Corn (Zea mays) oil, rice (Oryza sativa) bran oil, castor (Ricinum communis) seed oil, cotton (Gossypium hirsutum) seed oil, linseed (Linum usitatissimum), coconut (Cocos nucifera) oil, Kapok (Ceiba pentandra) oil, Papaya (Carica papaya) seed oil, Tea seed (Camellia oleifera) oil, sunflower (Helianthus annuus) oil, safflower (Carthamus tinctorius) seed oil, Eucalyptus (Eucalyptus globulus) oil, Olive (Olea europaea) oil, Jatropha (Jatropha curcas) oil, Garlic acid (Allium sativum), Ginger oil (Zingiber officinale), D-limonene, Citronella oil or Ceylon ironwood (Mesua ferrea) oil. The preferred seed oils are sunflower oil, soybean oil, rapeseed oil, mustard oil or their blend.

A dispersant or a dispersing agent is a substance which adsorbs onto the surface of particles and helps to preserve the state of dispersion of the particles and prevents them from re-aggregating. Dispersants are added to agrochemical formulations to facilitate dispersion and suspension during manufacture, and to ensure the particles re-disperse into water in a spray tank. They are widely used in wettable powders, suspension concentrates and water-dispersible granules. Surfactants that are used as dispersants has the ability to adsorb strongly onto a particle surface and provide a charged or steric barrier to re-aggregation of particles. The most commonly used surfactants are anionic, non-ionic, or mixtures of the two types. For wettable powder formulations, the most common dispersants are sodium lingo sulphonates. In recent years, new types of very high molecular weight polymeric surfactants have been developed as dispersants. These have very long hydrophobic ‘backbones’ and a large number of ethylene oxide chains forming the ‘teeth’ of a ‘comb’ surfactant. These high molecular weight polymers can give very good long-term stability to suspension concentrates because the hydrophobic backbones have many anchoring points onto the particle surfaces.

Examples of dispersants or dispersing agent used herein for Suspension Concentrate (SC) formulation includes but not limited to Ethylene-propylene oxide block copolymer, Sodium salt of polycarboxylate, Naphthalenesulfonic acid, sodium salt condensated with formaldehyde, alkylated naphthalene sulfonate, sodium salt, sodium salt of naphthalene sulfonate condensate, sodium ligno sulfonate, phenol sulfonate, sodium methyl oleoyl taurate, styrene acrylic acid copolymer, propylene oxide-ethylene oxide-copolymer, polyethylene glycol 2,4,6-tristyrylphenyl ether, tristyrylphenol-polyglycol ether-phosphate, tristyrylphenole with 16 moles EO,

tristyrylphenol-polyglycol ether-phosphate, oleyl-polyglycol ether with ethylene oxide, tallow fatty amine polyethylene oxide, nonylphenol polyglycol ether with 9-10 moles ethylene oxide;

Examples of suspending agent used herein for Suspension Concentrate (SC) formulation includes but not limited to aluminum magnesium silicate, attapulgite clay.

Examples of Antifoaming agent used herein for Suspension Concentrate (SC) formulation includes but not limited to polydimethyl siloxane, silicone oil, silicone compound, silicone antifoam emulsion, C10～C20 saturated fat acid compounds or C8～C10 aliphatic alcohols compound.

Examples of Anti-freezing agent used herein for Suspension Concentrate (SC) formulation includes but not limited to ethylene glycol, propane diols, glycerin or the urea, glycol (monoethylene glycol, diethylene glycol, polypropylene glycol, polyethylene glycol), glycerin, urea, magnesium sulfate heptahydrate, sodium chloride.

Examples of Preservative used herein for Suspension Concentrate (SC) formulation includes but not limited to 11,2-benzisothiazolin-3(2H)-one, sodium salt, sodium benzoate, 2-bromo-2-nitropropane-1,3-diol, formaldehyde, sodium o-phenyl phenate, 5-chloro-2-methyl-4-isothiazolin-3-one & 2-methyl-4-isothiazolin-3-one.

Examples of Thickeners used herein for Suspension Concentrate (SC) formulation includes but not limited to xanthan gum, PVK, carboxymethyl celluloses, polyvinyl alcohols, gelatin, sodium carboxymethylcellulose, hydroxyethyl cellulose, sodium polyacrylate, modified starch.

Examples of Diluent/Solvent used herein for Suspension Concentrate (SC) formulation includes water.

While the foregoing written description of the invention enables one of ordinary skill to make and use what is considered presently to be the best mode thereof, those of ordinary skill will understand and appreciate the existence of variations, combinations, and equivalents of the specific embodiment, method, and examples herein. The invention should therefore not be limited by the above described embodiment, method, and examples, but by all embodiments and methods within the scope and spirit of the

invention. The invention shall now be described with reference to the following specific examples. It should be noted that the example(s) appended below illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the present invention.

These and other aspects of the invention may become more apparent from the examples set forth herein below. These examples are provided merely as illustrations of the invention and are not intended to be construed as a limitation thereof.

EXAMPLE 1:

Recipe A-Tolfenpyrad 15%+Cyantraniliprole 6.3% SC (Novel)

Chemical composition	**Percent (w/w)**
Tolfenpyrad a.i.	15.00
Cyantraniliprole a.i.	6.30
Methylated seed oil, polyether modified polysiloxane (super wetting-spreading-penetrating agent)	6.00
Ethylene-propylene oxide block copolymer (dispersing agent I)	4.50
Sodium salt of polycarboxylate (dispersing agent II)	1.00
Aluminum magnesium silicate (suspending agent)	0.50
Polydimethylsiloxane (anti foaming agent)	0.30
1,2-benzisothiazolin-3(2H)-one (preservative)	0.20
Polypropylene glycol (anti freezing agent)	5.00
Xanthum gum (thickner)	0.15
Diluent water	61.05
Total	100.00

Storage Stability Study: Tolfenpyrad 15%+Cyantraniliprole 6.3% SC (Novel)

Storage stability-Recipe A-Tolfenpyrad 15%+Cyantraniliprole 6.3% SC (Novel)					
Laboratory storage stability for 14 days					
Parameters	Specification (in house)	Initial	At 54±2 ^{0}C	At 0±2 ^{0}C	
Tolfenpyrad a.i. (% w/w)	14.25 to 15.75	15.60	15.42	15.52	
Cyantraniliprole a.i. (% w/w)	5.99 to 6.93	6.75	6.58	6.69	
Tolfenpyrad suspensibility (%)	80	98.20	97.20	97.80	

Cyantraniliprole suspensibility (%)	80	98.50	98.00	98.20	
pH range (1% aq. Suspension)	5.5 to 8.0	7.00	7.00	7.00	
Pourability (%)	95	98.50	98.30	97.80	
Specific gravity	1.05-1.10	1.05	1.05	1.05	
Viscosity at spindle no.62,20 rpm	350-800 cps	600	610	600	
Particle size (micron)	D50<3, D90<10	2.1, 7.5	2.2, 7.6	2.1, 7.5	
Persistent foam ml (after 1 minute) max.	60	nil	2	nil	
Room temperature storage stability up to 12 months					
Parameters	Specification (in house)	Initial	1 month	6 month	12 month
Tolfenpyrad a.i. (% w/w)	14.25 to 15.75	15.60	15.60	15.52	15.46
Cyantraniliprole a.i. (% w/w)	5.99 to 6.93	6.75	6.75	6.72	6.68
Tolfenpyrad suspensibility (%)	80	98.20	98.20	97.80	97.40
Cyantraniliprole suspensibility (%)	80	98.50	98.50	98.30	98.20
pH range (1% aq. Suspension)	5.5 to 8.0	7.05	7.05	7.05	7.05
Pourability (%)	95	98.50	98.50	98.20	97.80
Specific gravity	1.05-1.10	1.07	1.07	1.07	1.06
Viscosity at spindle no. 62, 20 rpm	350-800 cps	470	470	460	440
Particle size (micron)	D50<3, D90<10	2.1, 7.5	2.1,7.5	2.1,7.6	2.2, 7.6
Persistent foam in ml (after 1 minute) max.	60	nil	nil	nil	2

The novel SC formulation of Tolfenpyrad 15%+Cyantraniliprole 6.3% meets the all inhouse specifications for storage stability studies in laboratory (at 54±2 C & At 0±2 C for 14 days) and room temperature (for 12 months).

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Procedure: Manufacturing process for Novel Suspension Concentrate formulation

Step 1	2% Gum Solution: Charge Xanthan gum (2.0 kg) and 1,2-benzisothiazoline-3-one (2.0 kg) into 96 kg water and homogenize. It should be made 12-18 hour prior to use.
Step 2	Charge DM water (50 liter) and 1,2-propylene glycol (5 kg) into designated vessel and mix thoroughly.
Step 3	Add Ethylene-propylene oxide block copolymer (4.5 kg), Sodium salt of polycarboxylate(1kg) and Aluminium magnesium silicate (0.5 kg) into the vessel having water and homogenize the contents for 45 – 60 minutes using high shear homogenizer
Step 4	Then add Tolfenpyrad technical (15 kg) and Cyantraniliprole technical (6.3 kg) to this premix slowly and homogenized to get uniform slurry ready for grinding.
Step 5	Before grinding half the quantity of Polydimethylsiloxane (0.15 kg) was added and then material was subjected to grinding in Dyno mill till desired particle size is achieved.
Step 6	Add remaining Polydimethyl siloxane (0.15 kg) antifoam was added after grinding process completes and before sampling for in process analysis.
Step 7	Finally add 11.05 kg of 2% Xanthum gum solution and 6.0 kg of Methylated seed oil, polyalkyleneoxide modified trisiloxane (super wetting-spreading-penetrating agent) to this formulation and send to QC for quality check.

General Recipe: Conventional SC

Recipe B-Tolfenpyrad 15%+Cyantraniliprole 6.3% SC (Conventional formulation)

Chemical composition	**Percent % (w/w)**
Tolfenpyrad a.i.	15.00
Cyantraniliprole a.i.	6.30
Polyoxyethylene styryl phenyl ehter and polyoxyethylene alkyl aryl ether (wetting cum dispersing agent)	4.00
Sodium Ligno sulfonate (dispersing agent)	1.00
Silica (suspending agent)	1.00
Polydimethylsiloxane (antifoaming agent)	0.50
1,2-benzisothiazolin-3(2H)-one (preservative)	0.30
Polypropylene glycol (antifreezing agent)	5.00
Xanthum gum (thickner)	0.15
Water (diluent)	68.72
Total	100.00

Storage Stability Study: Tolfenpyrad 15% + Cyantraniliprole 6.3% SC (Conventional)

Storage stability-Recipe B-Tolfenpyrad 15%+Cyantraniliprole 6.3% SC(Conventional)					
Laboratory storage stability for 14 days					
Parameters	Specification (in house)	Initial	At 54±2 ^{0}C	At 0±2 ^{0}C	
Tolfenpyrad a.i. (% w/w)	14.25 to 15.75	15.60	15.04	15.26	
Cyantraniliprole a.i. (% w/w)	5.99 to 6.93	6.75	6.35	6.45	
Tolfenpyrad suspensibility (%)	80	95.40	88.40	92.60	
Cyantraniliprole suspensibility (%)	80	95.30	89.50	93.80	
pH range (1% aq. Suspension)	5.5 to 8.0	7.00	6.80	7.0	
Pourability (%)	95	95.00	93.60	94.80	
Specific gravity	1.05-1.10	1.05	1.06	1.05	
Viscosity at spindle no.62,20 rpm	350-800 cps	600	780	670	
Particle size (micron)	D50<3, D90<10	2.2, 8.0	3.8, 12.5	3.7, 12.1	
Persistent foam ml (after 1 minute) max.	60	nil	5	nil	
Room temperature storage stability up to 12 months					
Parameters	Specification (in house)	Initial	1 month	6 month	12 month
Tolfenpyrad a.i. (% w/w)	14.25 to 15.75	15.60	15.52	15.36	15.05
Cyantraniliprole a.i. (% w/w)	5.99 to 6.93	6.75	6.74	6.48	6.35
Tolfenpyrad suspensibility (%)	80	95.40	94.40	93.20	92.50
Cyantraniliprole suspensibility (%)	80	95.30	94.60	94.00	93.60
pH range (1% aq. Suspension)	5.5 to 8.0	7.00	7.00	6.90	6.80
Pourability (%)	95	95.00	94.80	94.00	93.60
Specific gravity	1.05-1.10	1.05	1.05	1.05	1.05
Viscosity at spindle no. 62, 20 rpm	350-800 cps	600	630	680	740
Particle size (micron)	D50<3, D90<10	2.2, 8.1	2.5, 8.6	3.8, 12.1	3.8, 13.8
Persistent foam in ml (after 1 minute) max.	60	3	5	10	30

The conventional SC formulation recipe of Tolfenpyrad 15%+Cyantraniliprole 6.3% does not meets the pourability and particle size criteria for storage stability studies in laboratory (at 54±2 C & At 0±2 C for 14 days) and room temperature (for 12 months).

EXAMPLE 2:

Lists of preferred combinations and ratio of active ingredients for novel SC formulation:

Compound A	Compound C	Active ingredients (%)		Formulation Strength (%)	Formulation Type
		Compound A	Compound B		
Tolfenpyrad	Cyantraniliprole	15	6.3	21.30	Novel SC
Tolfenpyrad	Abamectin	15	1.2	16.20	Novel SC
Tolfenpyrad	Fipronil	15	7.5	22.50	Novel SC
Tolfenpyrad	Fenpyroximate	15	2.5	17.50	Novel SC
Tolfenpyrad	Hexythiazox	15	2.5	17.50	Novel SC
Tolfenpyrad	Etoxazole	15	3.1	18.10	Novel SC
Tolfenpyrad	Cyenopyrafen	15	8.8	23.80	Novel SC
Tolfenpyrad	Spiromesifen	15	12	27.00	Novel SC
Tolfenpyrad	Fluxametamide	15	1.5	16.50	Novel SC
Tolfenpyrad	Chlorantraniliprole	20	5	25.00	Novel SC
Tolfenpyrad	Tetraniliprole	20	5	25.00	Novel SC
Tolfenpyrad	Cyflumetofen	12	12	24.00	Novel SC
Tolfenpyrad	Clofentezine	12	12	24.00	Novel SC
Tolfenpyrad	Pyridaben	12	10	22.00	Novel SC
Tolfenpyrad	Bifenazate	12	12	24.00	Novel SC
Tolfenpyrad	Diafenthiuron	10	22.5	32.50	Novel SC
Tolfenpyrad	Dimpropyridaz	12	6	18.00	Novel SC
Tolfenpyrad	Spiropidion	12	6	18.00	Novel SC
Tolfenpyrad	Spirotetramat	12	6	18.00	Novel SC
Tolfenpyrad	Spinosad	12	8	20.00	Novel SC
Tolfenpyrad	Spinetoram	12	8	20.00	Novel SC
Tolfenpyrad	Chlorfenapyr	20	12	32.00	Novel SC
Tolfenpyrad	Fenazaquin	12	12	24.00	Novel SC
Tolfenpyrad	Broflanilide	12	1	13.00	Novel SC
Tolfenpyrad	Clothianidin	20	10	30.00	Novel SC
Tolfenpyrad	Thiamethoxam	12	4	16.00	Novel SC
Tolfenpyrad	Dinotefuran	12	2.67	14.67	Novel SC
Tolfenpyrad	Flonicamid	20	10	30.00	Novel SC

Biological Examples:

A synergistic effect exists wherever the action of a combination of active ingredient is greater than the sum of the action of each of the components alone. Therefore, a

synergistically effective amount or an effective amount of a synergistic composition or combination is an amount that exhibits greater pesticidal activity than the sum of the pesticidal activities of the individual components.

The action expected for a given combination of two active components can be calculated as follows:

Colby's formula for calculating synergism between two active ingredients

$$E = X + Y - \frac{X\,Y}{100}$$

Where,

E=Expected control by mixture or combination of Compound A and Compound B in a defined dose

X=Observed control by Compound A

Y=Observed control by Compound B

$$\text{Colby's Ratio} = \frac{\text{Observed control}}{\text{Expected control}}$$

If Colby/s ratio of O/E >1 means synergism observed,
O/E <1 means antagonism observed
O/E =1 means simple additive effect
Higher the ratio means stronger the synergism, Lower ration means weak synergism.

FIELD BIO-EFFICACY STUDIES:

The novel SC (Suspension Concentrate) formulation of Tolfenpyrad+Insecticide has been developed in the laboratory and evaluated for its efficacy, residual control and rain-fast action in comparison with prior art formulations and tank mixes.

Experiment 1: Synergistic control of thrips and mites in Chilli

Crop : Chilli

Location : Umreth, Gujarat

Treatments : 20

Plot size : 20sq.m.

Crop age : 80 days

Spray water volume : 520 liter per hectare

Method of Application: Foliar spray with battery operated knapsack sprayer fitted with hollow cone nozzle.

Agronomic Practices : All agronomic practices followed as per the crop requirement.

Observation Methods:

Thrips (Scirtothrips dorsalis& Thrips parvispinus) control (%):

Count the number of live thrips per twigs by shaking it gently over piece of paper. Record the observations from 4 twigs per plant and 10 plants per plot. Calculate thrips control(%) as;

$$\text{Thrips Control (\%)} = 100 - \frac{\text{number of live thrips in treatment}}{\text{number of live thrips in untreated (UTC)}} \times 100$$

Mite (Polyphagotarsonemus latus) control (%):

Record the number of motile stages of mite per spot, 4 spots per plant and 10 plants per plot. Calculate mite control(%) as;

$$\text{Mite Control (\%)} = 100 - \frac{\text{number of live/motile stages of mite in treatment}}{\text{number of live/motile stages of mite in untreated (UTC)}} \times 100$$

Thrips and Mite control (%) data were used to check the synergism by applying Colby's.

Fruit/Flower count: Count the number of healthy fruits and flowers per plant. Record the observations from 10 plants per plot on 15th day after spray.

Table 1: Treatment details

Treatment Number	Treatment details	gram active per hectare
T1	Tolfenpyrad 15%+Cyantraniliprole 6.3% SC	120+50
T2	Tolfenpyrad 15%+Abamectin 1.2% SC	120+10
T3	Tolfenpyrad 15%+Fipronil 7.5% SC	120+60
T4	Tolfenpyrad 15%+Fenpyroximate 2.5% SC	120+20
T5	Tolfenpyrad 15%+Hexythiazox 2.5% SC	120+20
T6	Tolfenpyrad 15%+Etoxazole 3.1% SC	120+25
T7	Tolfenpyrad 15%+Cyenopyrafen 8.8% SC	120+70
T8	Tolfenpyrad 15%+Spiromesifen 12% SC	120+96
T9	Tolfenpyrad 15%+Fluxametamide 1.5% SC	120+12
T10	Tolfenpyrad 15% EC	120
T11	Cyantraniliprole 10.26% OD	50
T12	Abamectin 1.9% EC	10
T13	Fipronil 18.87% SC	60
T14	Fenpyroximate 5% SC	20
T15	Hexythiazox 5.45% EC	20
T16	Etoxazole 10% SC	25
T17	Cyenopyrafen 30% SC	70
T18	Spiromesifen 22.9% SC	96
T19	Fluxametamide 10% EC	12
T20	Untreated Check (UTC)	-

T1 to T9 were novel ready mix Novel SC formulation.

Table 2a: Synergistic control of Chilli Thrips and Mites.

Treatment Number	Thrips control (%) at 5 DAA				Mite control (%) at 5 DAA			
	Observed control	Expected control	Colby's ratio	Synergism (Y/N)	Observed control	Expected control	Colby's ratio	Synergism (Y/N)
T1	98.8	87.76	1.13	Yes	90.0	77.79	1.16	Yes
T2	98.2	86.59	1.13	Yes	95.8	84.30	1.14	Yes
T3	97.6	87.48	1.12	Yes	91.4	76.90	1.19	Yes
T4	95.8	85.23	1.12	Yes	94.2	84.93	1.11	Yes
T5	94.6	84.75	1.12	Yes	93.8	84.57	1.11	Yes
T6	93.2	85.36	1.09	Yes	95.2	85.37	1.12	Yes
T7	97.4	86.11	1.13	Yes	96.2	86.00	1.12	Yes
T8	95.2	86.46	1.10	Yes	95.8	83.32	1.15	Yes
T9	96.0	84.13	1.14	Yes	92.4	82.34	1.12	Yes
T10	65.8				55.4			
T11	64.2				50.2			
T12	60.8				64.8			
T13	63.4				48.2			
T14	56.8				66.2			
T15	55.4				65.4			
T16	57.2				67.2			
T17	59.4				68.6			
T18	60.4				62.6			
T19	53.6				60.4			
T20	0.0				0.0			

Table 2b: Fruit yield in Chilli.

Treatment number	Number of flowers per plant	Number of healthy fruits per plant	Increase (%) in healthy fruits over T24
T1	36.5	44.1	150.6
T2	37.1	44.6	153.4
T3	34.8	42.9	143.8
T4	33.6	43.7	148.3
T5	33.2	42.7	142.6
T6	34.5	42.5	141.5
T7	32.1	42.6	142.0
T8	32.7	42.4	140.9
T9	31.7	42.6	142.0
T10	25.8	32.1	82.4
T11	26.9	34.7	97.2
T12	24.8	30.8	75.0
T13	23.5	29.7	68.8
T14	22.6	28.5	61.9
T15	23.1	27.9	58.5
T16	22.8	28.4	61.4

T17	21.8	27.6	56.8
T18	22.8	26.9	52.8
T19	20.9	27.0	53.4
T20	11.7	17.6	0.0

DAA-days after application

The novel ready mix SC formulations of Tolfenpyrad+Insecticide (T1 to T9) provides very strong synergistic control of chilli thrips and mites on 5th days after application as compared to their solo application. All the novel SC treatments (T1 to T9) produces significantly higher number of fruits and flowers per plant as compared to their solo (T10 to T19).

Experiment 2: Comparison of Novel SC formulation with conventional SC and tank mixes (Dose reduction)

Crop & Variety : Chilli

Location : Umreth, Gujarat

Treatments : 7

Plot size : 50sq.m.

Crop age : 86 days after transplanting.

Spray water volume : 550 liter per hectare

Method of Application: Foliar spray with battery operated knapsack sprayer fitted with hollow cone nozzle.

Agronomic Practices : All agronomic practices followed as per the crop requirement.

Observation Methods:

Thrips control (%): as given in experiment 1.

Table 3a: Efficacy and residual control observed with Novel SC, conventional SC and tank mixes against chilli thrips.

Treatment Number		Treatment details with application Rate (gai/h)	Thrips control (%)			
			3 DAA	7 DAA	10 DAA	14 DAA
T1	Novel SC	Tolfenpyrad 15%+Cyantraniliprole 6.3% SC, 800 ml (120+50 gia/h)	99.8	96.4	90.2	85.4
T2		Tolfenpyrad 15%+Cyantraniliprole 6.3% SC, 600 ml (90+38 gia/h)	96.2	91.4	82.6	75.8
T3	Conventional SC	Tolfenpyrad 15%+Cyantraniliprole 6.3% SC, 800 ml (120+50 gia/h)	98.0	92.2	85.4	72.8
T4		Tolfenpyrad 15%+Cyantraniliprole 6.3% SC, 600 ml (90+38 gia/h)	91.6	82.0	72.8	56.4
T5	Tank mixes	Tolfenpyrad 15% SC, 800 ml + Cyantraniliprole 20% SC, 250 ml	92.8	85.6	71.6	61.2

T6		Tolfenpyrad 15% SC, 600 ml + Cyantraniliprole 20% SC, 190 ml	84.2	70.8	53.8	38.8
T7		UTC (Untreated Check)	0.0	0.0	0.0	0.0

Table 3b: Efficacy and residual control observed with Novel SC, conventional SC and tank mixes against chilli thrips

Treatment Number	Drop in efficacy due to dose reduction			
	3 DAA	7 DAA	10 DAA	14 DAA
Novel Formulation (T1-T2)	3.6	5.0	7.6	9.6
Conventional SC (T3-T4)	6.4	10.2	12.6	16.4
Tank mixes (T5-T6)	8.6	14.8	17.8	22.4

The field trial results shows that novel SC formulation provides better efficacy as compared to conventional SC and tank mixes when the dose was reduced from 800 ml/h to 600ml/h (i.e. 25%). The drop in efficacy were 3.6%, 5.0%, 7.6%, 9.6%at 3 DAA, 7 DAA, 10 DAA, 14 DAA respectively in novel SC formulation, 6.4%, 10.2%, 12.6%, 16.4% at 3 DAA, 7 DAA, 10 DAA, 14 DAA respectively in conventional SC. Further the drop in efficacy was higher in tank mixes. We can conclude that novel SC formulation will helps the farmer by providing better efficacy as compared to conventional SC and tank mixes. The novel SC formulation performs better in comparison with conventional SC and tank mixes even at 25% dose reduction.

Experiment 3: Study of rain fastness properties of novel SC formulation

Crop & Variety : Cauliflower

Location :Anand, Gujarat

Treatments : 6

Plot size : 100 sq.m.

Crop age : 64 days after transplanting.

Spray water volume : 500 liter per hectare

Method of Application: Foliar spray with battery operated knapsack sprayer fitted with hollow cone nozzle.

Agronomic Practices : All agronomic practices followed as per the crop requirement.

Methods for rain fastness study:

The treatment application (spraying) was done with knap sack sprayer by using 500 liter spray volume. After 60 minutes of spraying, artificial raining was done through overhead sprinkler system in trial plot for 30 minutes which was approximately equal

to 10 mm of rainfall (measured by rain gauge). After 24 hrs. of artificial rain, the leaves were collected from treatment and put them into the PVC/plastic box. 20 larvae (3rd instar) of Spodoptera were release into the PVC box containing cauliflower leaves and larval mortality was observed on 72 hrs. The % larval control were calculated. Similar way, the cauliflower leaves were collected on 3rd, 7th, $10^{th}$and 14^{th}day and spodoptera (3rd instar, 20 larvae) were released and allow to feed and % larval mortality were recorded after 72 hrs. The % larval control data further used to calculate synergism.

Table 4: Treatment details to study the rain fastness property of novel SC formulation

Treatment Number	Treatment details with application Rate (gai/h)
T1	Tolfenpyrad 15%+Fipronil 7.5% SC (Novel), 800 ml (120+60 gai/h)
T2	Tolfenpyrad 15%+Fipronil 7.5% SC (Conventional), 800 ml (120+60 gai/h)
T3	Tolfenpyrad 15%+Fipronil 7.5% OD (Conventional), 800 ml (120+60 gai/h)
T4	Tolfenpyrad 15%+Fipronil 7.5% WG (Conventional), 800 g (120+60 gai/h)
T5	Tolfenpyrad 15% EC, 800 ml+Fipronil 18.87% SC, 300 ml (120+60 gai/h) tank mix
T6	UTC (Untreated Check)

Table 5a: Spodoptera lituralarval control (%) on cauliflower.

Treatment Number	Spodoptera litura larval control (%)				
	1 DAA	3 DAA	7 DAA	10 DAA	14 DAA
T1	100.0	100.0	98.8	93.2	86.2
T2	100.0	98.4	91.6	82.4	74.8
T3	100.0	98.6	90.4	80.6	72.6
T4	100.0	95.2	87.6	76.4	66.6
T5	99.2	91.8	84.2	74.2	60.8
T6	0.0	0.0	0.0	0.0	0.0

Table 5b: Spodoptera litura larval control (%) on cauliflower.

Treatment Number	Increase in larval control (T1) over				
	1 DAA	3 DAA	7 DAA	10 DAA	14 DAA
T2	0.0	1.6	7.2	10.8	11.4
T3	0.0	1.4	8.4	12.6	13.6
T4	0.0	4.8	11.2	16.8	19.6
T5	0.8	8.2	14.6	19.0	25.4

The field trial results shows that novel SC formulation (T1) provides excellent rainfast properties by providing 1.6% (at 3 DAA), 7.2% (at 7 DAA), 10.8% (at 10 DAA) and 11.4% (at 14 DAA) higher larval control as compared to conventional SC (T2), 1.4% (at 3 DAA), 8.4% (at 7 DAA), 12.6% (at 10 DAA) and 13.6% (at 14 DAA) higher larval control as compared to conventional OD (T3), 4.8% (at 3 DAA), 11.25% (at 7

DAA), 16.8% (at 10 DAA), 19.6% (at 14 DAA) higher larval control as compared to conventional WG (T4), 8.2% (at 3 DAA), 14.6% (at 7 DAA), 19% (at 10 DAA), 25.4% (at 14 DAA) higher larval control as compared to tank mixes (T5). It can be concluded that novel SC formulation provides excellent rainfast properties as compared to conventional SC, OD, WG formulation and tank mixes.

Experiment 4: Synergistic insect control in brinjal crop

Crop & Variety : Brinjal, Dolly

Location : Anand, Gujarat

Treatments : 10

Plot size : 40sq.m.

Crop age : 58 days after transplanting.

Spray water volume : 480 liter per hectare

Method of Application: Foliar spray with battery operated knapsack sprayer fitted with hollow cone nozzle.

Agronomic Practices : All agronomic practices followed as per the crop requirement.

Observation Methods:

Sucking insect (Jassid, Amrascabiguttulabiguttula + Whitefly, Bemisiatabaci) control (%): Count the number of live insect per leaf, 3 leaves per plant and 10 plants per plot. Calculate % Insect control.

Table 6: Treatment details

Treatment Number	Treatment details	gram active per hectare
T1	Tolfenpyrad 10%+Diafenthiuron 22.5% SC	100+225
T2	Tolfenpyrad 20%+Flonicamid 10% SC	100+50
T3	Tolfenpyrad 20%+Chlorfenapyr 12% SC	100+60
T4	Tolfenpyrad 20%+Clothianidin 10% SC	100+50
T5	Tolfenpyrad 15% EC	100
T6	Diafenthiuron 47.8% SC	225
T7	Flonicamid 50% WG	50
T8	Chlorfenapyr 10% SC	60
T9	Clothianidin 40% SC	50
T10	Untreated Check (UTC)	-

Table 7: Synergistic control of sucking insects

Treatment Number	Sucking Insects control (%)				
					14 DAA

	1 DAA	3 DAA	7 DAA	10 DAA	Observed control	Expected control	Synergism
T1	99.2	96.20	90.60	82.60	68.6	42.66	Yes
T2	99.6	97.40	89.80	80.80	65.4	53.81	Yes
T3	99.0	95.80	90.40	81.20	67.6	48.31	Yes
T4	98.8	96.20	88.60	79.60	63.2	47.73	Yes
T5	72.6	64.80	52.60	41.20	27.6		
T6	65.4	60.60	46.40	34.60	20.8		
T7	75.8	67.40	58.40	45.80	36.2		
T8	68.4	56.40	50.80	38.20	28.6		
T9	66.6	58.40	50.60	35.40	27.8		
T10	0.0	0.00	0.00	0.00	0.0		

The novel SC formulation of Tolfenpyrad+Insecticide (T1 to T4) provides synergistic control of sucking insects up to 14 days.

Overall summery of field trials:

The field trials results shows many benefits/advantages of novel SC formulations of Tolfenpyrad+Insecticide as compared to their conventional SC, WG, OD, EC formulation and tank mixes.

- Novel SC formulation shows strong synergism between Tolfenpyrad + Insecticide.
- Novel SC formulation shows strong synergism in comparison with their conventional SC, OD and WG formulations and tank mixes.
- Novel SC formulation provides longer residual control. The longer residual control experienced due to improved spreading properties of spray solution over leaf surface, increase in penetration in to the leaf surface.
- Protection against multiple insect pests i.e. thrips, mites and lepidopteran insects at a time
- Novel SC formulation helps to reduce the doses of active ingredients to get desirable insect control and thereby minimizing the pesticidal load into the environment.
- The improved rain fastness properties of novel SC formulation experienced due to better retention of spray solution over the waxy leaf surface.
- The novel SC formulations meets all the in-house parameters of storage stability studies.

Spreading properties study:

Method: Spreading properties test conducted by preparing 1% solution (1 ml formulation in 100 ml water). Drop the solution on leaf surface and measure the spreading diameter (mm) after 30 seconds. Spreading diameter measured by graph paper.

Table 1: Spreading properties of Tolfenpyrad 15%+Fipronil 7.5% SC (Novel)

Treatments	Samples of room temperature storage		
	1 month	6 months	12 months
	(Spreading diameter in mm)		
Tolfenpyrad 15%+Fipronil 7.5% SC (Novel)	25	22	20
Tolfenpyrad 15%+Fipronil 7.5% SC (Conventional)	15	12	8
Tolfenpyrad 15%+Fipronil 7.5% OD (Conventional)	14	10	8
Tolfenpyrad 15%+Fipronil 7.5% WG (Conventional)	7	5	2

The novel SC formulations of Tolfenpyrad15%+Fipronil 7.5% shows excellent spreading properties even after 12 month of storage. This helps to the bio-efficacy under field condition, ensures quick control of target insect-pests and also improves the rain-fast properties during rainy days.

CLAIMS

We claim;

1. A novel Suspension Concentrate agrochemical composition comprising:

a. Tolfenpyrad present in an amount of 5% - 25% w/w;

b. an insecticide selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w;

c. a methylated seed oil, polyalkyleneoxide modified polydimethylsiloxane, a super wetting-spreading-penetrating agent is present in an amount of 1% to 10% w/w; and

one or more formulation excipients.

2. The novel Suspension Concentrate agrochemical composition as claimed in claim 1, wherein combination of active ingredient is selected from

i. Tolfenpyrad 15% + Cyantraniliprole 6.3%;
ii. Tolfenpyrad 15% + Abamectin 1.2%;
iii. Tolfenpyrad 15% + Fipronil 7.5%;
iv. Tolfenpyrad 15% + Fenpyroximate 2.5%;
v. Tolfenpyrad 15% + Hexythiazox 2.5%;
vi. Tolfenpyrad 15% + Etoxazole 3.1%;
vii. Tolfenpyrad 15% + Cyenopyrafen 8.8%;
viii. Tolfenpyrad 15% + Spiromesifen 12%;
ix. Tolfenpyrad 15% + Fluxametamide 1.5%;
x. Tolfenpyrad 20% + Chlorantraniliprole 5%;
xi. Tolfenpyrad 20% + Tetraniliprole 5%;
xii. Tolfenpyrad 12% + Cyflumetofen 12%;
xiii. Tolfenpyrad 12% + Clofentezine 12%;
xiv. Tolfenpyrad 12% + Pyridaben 10%;
xv. Tolfenpyrad 12% + Bifenazate 12%;
xvi. Tolfenpyrad 10% + Diafenthiuron 22.5%;

xvii. Tolfenpyrad 12% + Dimpropyridaz 6%;
xviii. Tolfenpyrad 12% + Spiropidion 6%;
xix. Tolfenpyrad 12% + Spirotetramat 6%;
xx. Tolfenpyrad 12% + Spinosad 8%;
xxi. Tolfenpyrad 12% + Spinetoram 8%;
xxii. Tolfenpyrad 20% + Chlorfenapyr 12%;
xxiii. Tolfenpyrad 12% + Fenazaquin 12%;
xxiv. Tolfenpyrad 12% + Broflanilide 1%;
xxv. Tolfenpyrad 20% + Clothianidin 10%;
xxvi. Tolfenpyrad 12% + Thiamethoxam 4%;
xxvii. Tolfenpyrad 12% + Dinotefuran 2.67%;
xxviii. Tolfenpyrad 20% + Flonicamid 10%.

3. The novel Suspension Concentrate agrochemical composition as claimed in claim 2, wherein preferred combinations of active ingredients in the composition comprises:

i. Tolfenpyrad 15% + Cyantraniliprole 6.3%;
ii. Tolfenpyrad 15% + Abamectin 1.2%;
iii. Tolfenpyrad 15% + Fipronil 7.5%;
iv. Tolfenpyrad 15% + Fenpyroximate 2.5%;
v. Tolfenpyrad 15% + Hexythiazox 2.5%;
vi. Tolfenpyrad 15% + Etoxazole 3.1%;
vii. Tolfenpyrad 15% + Cyenopyrafen 8.8%;
viii. Tolfenpyrad 15% + Spiromesifen 12%;
ix. Tolfenpyrad 15% + Fluxametamide 1.5%;

4. The novel Suspension Concentrate agrochemical composition as claimed in claim 1, wherein Suspension Concentrate formulation comprises

i. Tolfenpyrad present in an amount of 5% - 25% w/w;
ii. an insecticide selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr,

Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid present in an amount of 0.5% - 30% w/w;

iii. super wetting-spreading-penetrating agent present in an amount of 1 to 10 w/w;

iv. dispersing agent I present in an amount of 2 to 8 %w/w;

v. dispersing agent II present in an amount of 0.1 to 2 %w/w;

vi. suspending agent present in an amount of 0.1 to 2 %w/w;

vii. anti-foaming agent present in an amount of 0.01 to 2 %w/w;

viii. preservative present in an amount of 0.01 to 1.5 %w/w;

ix. anti-freezing agent present in an amount of 1 to 10 %w/w;

x. thickener present in an amount of 0.01 to 2 %w/w ;

xi. Diluent present in an amount of 60 to 80 %w/w.

5. The novel Suspension Concentrate agrochemical composition as claimed in claim 1 or 4, wherein super wetting-spreading-penetrating agent is selected from Methylated seed oil, polyalkyleneoxide modified trisiloxane; Methylated seed oil, polyalkyleneoxide modified polydimethylsiloxane; Methylated seed oil, trisiloxane ethoxylate; Methylated seed oil, polyoxyethylene methyl polysiloxane; Methylated seed oil, polyether polymethyl siloxane copolymer; Methylated seed oil, polyether modified polysiloxane.

6. The novel Suspension Concentrate agrochemical composition as claimed in claim 5, wherein seed oil any one or mixture of two or more selected from soybean (Glycine max) oil, groundnut (Arachis hypogaea) oil, rapeseed (Brassica napus subspecies) oil, mustard (Brassica juncea) oil, sesame (Sesamum indicum) oil, Corn (Zea mays) oil, rice (Oryza sativa) bran oil, castor (Ricinum communis) seed oil, cotton (Gossypium hirsutum) seed oil, linseed (Linum usitatissimum), coconut (Cocos nucifera) oil, Kapok (Ceiba pentandra) oil, Papaya (Carica papaya) seed oil, Tea seed (Camellia oleifera) oil, sunflower (Helianthus annuus) oil, safflower (Carthamus tinctorius) seed oil, Eucalyptus (Eucalyptus globulus) oil, Olive (Olea europaea) oil, Jatropha (Jatropha curcas) oil, Garlic acid (Allium sativum), Ginger oil (Zingiber officinale), D-limonene, Citronella oil or Ceylon ironwood (Mesua ferrea) oil.

7. The novel Suspension Concentrate agrochemical composition as claimed in claim 6, wherein preferred seed oils are sunflower oil, soybean oil, rapeseed oil, mustard oil or their blend.

8. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein dispersing agent is selected from Ethylene-propylene oxide block copolymer, Sodium salt of polycarboxylate, Naphthalenesulfonic acid, sodium salt condensated with formaldehyde, alkylated naphthalene sulfonate, sodium salt, sodium salt of naphthalene sulfonate condensate, sodium ligno sulfonate, phenol sulfonate, sodium methyl oleoyl taurate, styrene acrylic acid copolymer, propylene oxide-ethylene oxide-copolymer, polyethylene glycol 2,4,6-tristyrylphenyl ether, tristyrylphenol-polyglycol ether-phosphate, tristyrylphenole with 16 moles EO, tristyrylphenol-polyglycol ether-phosphate, oleyl-polyglycol ether with ethylene oxide, tallow fatty amine polyethylene oxide, nonylphenol polyglycol ether with 9-10 moles ethylene oxide.

9. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein suspending agent is selected from aluminum magnesium silicate, attapulgite clay.

10. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein anti-foaming agent is selected from polydimethyl siloxane, silicone oil, silicone compound, silicone antifoam emulsion, C10～C20 saturated fat acid compounds or C8～C10 aliphatic alcohols compound.

11. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein anti-freezing agent is selected from ethylene glycol, propane diols, glycerin or the urea, glycol (monoethylene glycol, diethylene glycol, polypropylene glycol, polyethylene glycol), glycerin, urea, magnesium sulfate heptahydrate, sodium chloride.

12. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein Preservative is selected from 1,2-benzisothiazolin-3(2H)-one, sodium

salt, sodium benzoate, 2-bromo-2-nitropropane-1,3-diol, formaldehyde, sodium o-phenyl phenate, 5-chloro-2-methyl-4-isothiazolin-3-one & 2-methyl-4-isothiazolin-3-one.

13. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein thickener is selected from xanthan gum, PVK, carboxymethyl celluloses, polyvinyl alcohols, gelatin, sodium carboxymethylcellulose, hydroxyethyl cellulose, sodium polyacrylate, modified starch.

14. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein humectant is selected from urea, humic acid, glycerol, lactose.

15. The novel Suspension Concentrate agrochemical composition as claimed in claim 4, wherein diluent is water.

16. The novel Suspension Concentrate agrochemical composition as claimed in any of preceding claims, wherein Suspension Concentrate formulation comprises

i. Tolfenpyrad present in an amount of 5% - 25% w/w;
ii. Cyantraniliprole present in an amount of 0.5% - 30% w/w;
iii. Methylated seed oil, polyalkyleneoxide modified trisiloxane present in an amount of 1 to 10 %w/w;
iv. Ethylene-propylene oxide block copolymer present in an amount of 2 to 8 %w/w;
v. Sodium salt of polycarboxylate present in an amount of 0.1 to 2 %w/w;
vi. Aluminum magnesium silicate present in an amount of 0.1 to 2 %w/w;
vii. Polydimethylsiloxane present in an amount of 0.01 to 2 %w/w;
viii. 1,2-benzisothiazolin-3(2H)-one present in an amount of 0.01 to 1.5 %w/w;
ix. Polypropylene glycol present in an amount of 1 to 10 %w/w;
x. Xanthum gum present in an amount of 0.01 to 2 %w/w;
xi. Diluent present in an amount of 60 to 80 %w/w.

Dated this 01st day of February 2022



Signature:
Name: Bhavik Patel
Applicant's Agent: IN/PA-1379
INFINVENT IP

TITLE: NOVEL SYNERGISTIC SUSPENSION CONCENTRATE COMPOSITION CONTAINING TOLFENPYRAD AND INSECTICIDE

ABSTRACT

Novel Synergistic Suspension Concentrate (SC) agrochemical composition containing Tolfenpyrad. More particularly the present invention relates to a novel Suspension Concentrate (SC) agrochemical composition comprising bioactive amount of component (A) Tolfenpyrad; and component (B) an insecticide selected from Cyantraniliprole, Abamectin, Fipronil, Fenpyroximate, Hexythiazox, Etoxazole, Cyenopyrafen, Spiromesifen, Fluxametamide, Chlorantraniliprole, Tetraniliprole, Cyflumetofen, Clofentezine, Pyridaben, Bifenazate, Diafenthiuron, Dimpropyridaz, Spiropidion, Spirotetramat, Spinosad, Spinetoram, Chlorfenapyr, Fenazaquin, Broflanilide, Clothianidin, Thiamethoxam, Dinotefuran, Flonicamid. The present invention further relates to selection of suitable formulation excipients, process of preparation of the said Suspension Concentrate formulation and its application in the field of agriculture.

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