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(54) Title: PROCESS FOR PREPARING DILUTED AGROCHEMICAL SPRAY FORMULATIONS WITH IMPROVED DRIFT CONTROL

(57) Abstract: The present invention relates to a process for the preparation of diluted agrochemical spray formulations with improved drift control comprising a hydrophobically modified hydroxypropyl guar drift control agent and the use in agriculture of the above spray formulations.



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PROCESS FOR PREPARING DILUTED AGROCHEMICAL SPRAY FORMULATIONS WITH IMPROVED DRIFT CONTROL

Technical Field

The present invention relates to a process for preparing diluted
5 agrochemical spray formulations with improved drift control comprising a
hydrophobically modified hydroxypropyl guar drift control agent and to
the use in agriculture of the above spray formulations.

This invention pertains also to the use, as drift control agent, of a
hydrophobically modified hydroxypropyl guar in diluted agrochemical
10 spray formulations.

Background Art

The problem of "drift" is well known in connection with the aerial spraying
of water during the fire fighting operations and the spraying of aqueous
compositions of agrochemicals, such as systemic herbicides, plant growth
15 regulators, pesticides, insecticides, and the like.

Spray drift is spray material that misses the target during application or
moves off the target after application.

Spray drift is a restriction factor which reduces the efficiency of pesticide
treatments, therefore it costs money through inefficient and off target
20 application. It also increases the impact of chemicals on the environment
and can adversely affect non-target plants.

Moreover spray drift can pollute adjacent water courses, groundwater,
landscapes, and woodland. Drift can bring the applicator and members of
the public into increased contact with potentially harmful or unpleasant
25 chemicals.

Spray drift is caused by a combination of factors such as wind velocity, local atmospheric conditions, nozzle choice, sprayer pressure, vehicle speed, boom height and chemical factors.

Previous research has focused on reducing spray drift by altering the sprayer features, such as nozzles and pressure of the sprayer and by
5 using spray adjuvants such as drift control agents to create larger droplets size.

The drift control agents (or anti-drift agent) change the visco-elastic properties of the spray liquid, more specifically by reducing its stretching
10 capability (elongational viscosity) and its tendency to separate into smaller droplets. These factors result in coarser spray with a higher percentage of larger droplets and a lower percentage of smaller droplets, i.e. those having a diameter below 150 microns.

A number of drift control additives are commercially available.

15 Typical drift control agents are synthetic or natural polymers such as polyacrylamides, polyethylene oxides, polyvinyl pyrrolidones, guar gum and guar gum derivatives. In particular in the agriculture industry, polyacrylamides and guar gum and its derivatives are the standard tank additive for spray drift reduction.

20 Acrylamide polymers which give an optimum spray drift control are either the non-ionic homopolymer or anionic copolymer, both with a relatively low anionic content, i.e. 5 to 30 % by weight of anionic monomer, and highly anionic.

CA1023264 (NALCO CHEMICAL) describes the use, as drift control agent,
25 of a water in oil emulsion containing a vinyl polymer having a molecular

weight above 100,000. Preferred vinyl monomers are acrylamide and salts of acrylic acid.

US 2001051145 (Clariant) describes a water-soluble and water-swellingable copolymers based on acrylamidoalkylsulfonates and olefinically unsaturated monomers containing at least one oxygen, nitrogen, sulfur or phosphorus atom and from 0 to 20% by weight of a suitable crosslinker, which are very good thickeners for aqueous compositions and, when these compositions are sprayed, increase the particle size and a reduce the spray cone.

10 Acrylamide (co)polymers are very good anti-drift agents, but unfortunately they tend to give too viscous aqueous solutions unless they are used at very low concentration. A normal field practice is to dissolve the polymer when in form of a powder or to reverse its phase emulsion when in form of an inverse latex by adding water and additive directly
15 into the spray tank to get a polymer aqueous solution. However, this procedure has the problem that emulsion polymers can be difficult to activate in this situation and polymer powders take a long time to dissolve. This can lead to the formation of gel particles which can block in-line screens and nozzles, resulting in pressure buildup in the system
20 and spotty spray patterns. In some cases it can be necessary to add more polymer as a result of inefficient dissolution of the same. Moreover acrylamide (co)polymers are essentially non-biodegradable and, therefore, it would be highly desirable to reduce their usage.

US 5,550,224 (Rhône Poulenc) reports that guar and guar derivatives,
25 as long as they are used at concentration characterized by Newtonian

behavior, not only possess the highly desirable characteristics of efficient drift control agents, but also maintain these properties under the prolonged high shear commercial spray conditions. In US 5,550,224 the Newtonian liquid behavior is stated to effectively reduce the number of spray droplets below about 150 microns, which are the responsible for the spray drift problems.

We have now surprisingly discovered that a drift control agent, based on a hydrophobically modified hydroxypropyl guar (HMHPG) which shows non-Newtonian (pseudoplastic) behavior at concentration between 0.1 and 0.5% by weight in water, can be utilized at pseudoplastic concentrations in an aqueous spray medium providing excellent drift control performances, without the above-identified disadvantages associated with current usage of the polyacrylamide agents.

By non-Newtonian or pseudoplastic behavior, we mean that an aqueous solution of HMHPG at 100 s^{-1} shear rate has a viscosity at least 20% lower than the average viscosity between 0.1 and 1.0 s^{-1} shear. If the loss is below 20%, the composition will be assumed to be Newtonian, i.e., non pseudoplastic.

According to the invention, the expression "hydrophobically modified hydroxypropyl guar" (HMHPG) defines a hydroxypropylated guar derivative which contains, in addition to the hydroxypropyl groups, also hydrophobic substituents.

Disclosure of the Invention

It is therefore an object of the present invention a process for the preparation of diluted agrochemical spray formulations with improved

drift properties, comprising the following steps: i) preparing a diluted aqueous agrochemical spray formulation, ii) adding to it from 0.10 to 0.50 % by weight (wt) of a hydrophobically modified hydroxypropyl guar having a non-Newtonian behavior at a concentration from 0.10 to 0.50 %
5 by weight in water.

The use in agriculture of the resulting diluted agrochemical spray formulations for the treatment of plants, fields, etc. is another object of the invention.

In an another aspect, the present invention is directed to the use of a
10 hydrophobically modified hydroxypropyl guar with non-Newtonian behavior at a concentration between 0.10 and 0.50 % by weight in water as spray drift control agent.

The characteristics and advantages related to the use of a hydrophobically modified hydroxypropyl guar as drift control agent
15 according to the present invention are illustrated in detail in the following description.

Description of the drawings

Fig. 1. Scheme of the apparatus for the spray drift tests

Detailed Description

20 The process for preparing diluted agrochemical spray formulations having improved spray drift properties applies to any agrochemical composition which can contains, as active ingredients, pesticides or crop protection agents including herbicides, fungicides, insecticides, plant growth regulators and the like; fertilizer; mixture thereof.

25 The pesticides or crop protection agents utilisable in the agrochemical

compositions of the invention are, by way of example: abamectin, acephate, acequinocyl, acetamiprid, acethion, acetoprole, acrinathrin, acrylonitrile, alanycarb, aldicarb, aldoxycarb, aldrin, allethrin, allosamidin, allyxycarb, alpha-cypermethrin, alpha-ecdysone, amidithion, 5 amidoflumet, aminocarb, amiton, amitraz, anabasine, arsenous oxide, athidathion, azadirachtin, azamethiphos, azinphos-ethyl, azinphos-methyl, azobenzene, azocyclotin, azothoate, barium hexafluorosilicate, barthrin, benclothiaz, bendiocarb, benfuracarb, benomyl, benoxafos, bensultap, benzoximate, benzyl benzoate, beta-cyfluthrin, beta-10 cypermethrin, bifenazate, bifenthrin, binapacryl, bioallethrin, bioethanomethrin, biopermethrin, bistrifluron, borax, boric acid, bromfenvinfos, bromo-DDT, bromoeyclen, bromophos, bromophos-ethyl, bromopropylate, bufencarb, buprofezin, butacarb, butathiofos, butocarboxim, butonate, butoxycarboxim, cadusafos, calcium arsenate, 15 calcium polysulfide, campheehlor, carbanolate, carbaryl, carbofuran, carbon disulfide, carbon tetrachloride, carbophenothion, carbosulfan, cartap, chinomethionat, chlorantraniliprole, chlorbenside, chlorbicyclen, chlordane, chlordecone, chlordimeform, chlorethoxyfos, chlorfenapyr, chlorfenethol, chlorfenson, chlorfensulphide, chlorfenvinphos, 20 chlorfluazuron, chlormephos, chlorobenzilate, chloroform, chloromebuform, chloromethiuron, chloropicrin, chloropropylate, chlorphoxim, chlorprazophos, chlorpyrifos, chlorpyrifos-methyl, chlorthiophos, chromafenozide, cinerin I, cinerin II, cismethrin, cloethocarb, clofentezine, closantel, clothianidin, copper acetoarsenite, 25 copper arsenate, copper naphthenate, copper oleate, coumaphos,

coumithoate, crotamiton, crotoxyphos, cruentaren A&B, cruformate, cryolite, cyanofenphos, cyanophos, cyanthoate, cyclethrin, cycloprothrin, cyenopyrafen, cyflumetofen, cyfluthrin, cyhalothrin, cyhexatin, cypermethrin, cyphenothrin, cyromazine, cythioate, d-limonene, 5 dazomet, DBCP, DCIP, DDT, decarbofuran, deltamethrin, demephion, demephion-O, demephion-S, demeton, demeton-methyl, demeton-O, demeton-O-methyl, demeton-S, demeton-S-methyl, demeton-S-methylsulphon, diafenthiuron, dialifos, diamidafos, diazinon, dicapthon, dichlofenthion, dichlofluanid, dichlorvos, dicofol, dicresyl, dicrotophos, 10 dicyclanil, dieldrin, dienochlor, diflovidazin, diflubenzuron, dilor, dimefluthrin, dimefox, dimetan, dimethoate, dimethrin, dimethylvinphos, dimetilan, dinex, dinobuton, dinocap, dinocap-4, dinocap-6, dinoceton, dinopenton, dinoprop, dinosam, dinosulfon, dinotefuran, dinoterbon, diofenolan, dioxabenzofos, dioxacarb, dioxathion, diphenyl sulfone, 15 disulfiram, disulfoton, dithicrofos, DNOC, dofenapyn, doramectin, ecdysterone, emamectin, EMPC, empenthrin, endosulfan, endothion, endrin, EPN, epofenonane, eprinomectin, esfenvalerate, etaphos, ethiofencarb, ethion, ethiprole, ethoate-methyl, ethoprophos, ethyl-DDD, ethyl formate, ethylene dibromide, ethylene dichloride, ethylene oxide, 20 etofenprox, etoxazole, etrimfos, EXD, famphur, fenamiphos, fenazaflor, fenazaquin, fenbutatin oxide, fenchlorphos, fenethacarb, fenfluthrin, fenitrothion, fenobucarb, fenothiocab, fenoxacrim, fenoxycarb, fenpirithrin, fenpropathrin, fenpyroximate, fenson, fensulfothion, fenthion, fenthion-ethyl, fentrifanil, fenvalerate, fipronil, flonicamid, 25 fluacrypyrim, fluazuron, flubendiamide, flubenzimine, flucofuron,

flucycloxuron, flucythrinate, fluenetil, flufenerim, flufenoxuron,
flufenprox, flumethrin, fluorbenside, fluvalinate, fonofos, formetanate,
formothion, formparanate, fosmethilan, fospirate, fosthiazate, fosthietan,
furathiocarb, furethrin, furfural, gamma cyhalothrin, gamma HCH,
5 glyphosate, gluphosinate, halfenprox, halofenozide, HCH, HEOD,
heptachlor, heptenophos, heterophos, hexaflumuron, hexythiazox, HHDN,
hydramethylnon, hydrogen cyanide, hydroprene, hyquincarb, imicyafos,
imidacloprid, imiprothrin, indoxacarb, iodomethane, IPSP, isamidofos,
isazofos, isobenzan, isocarbophos, isodrin, isofenphos, isoprocab,
10 isoprothiolane, isothioate, isoxathion, ivermectin, jasmolin I, jasmolin II,
jodfenphos, juvenile hormone I, juvenile hormone II, juvenile hormone III,
lambda-cyhalothrin, lead arsenate, lepimectin, leptophos, lindane,
lirimfos, lufenuron, lythidathion, malathion, malonoben, mazidox,
mecarbam, mecarphon, menazon, mephosfolan, mercurous chloride,
15 mesulfen, mesulfenfos, metaflumizone, metam, methacrifos,
methamidophos, methidathion, methiocarb, methocrotophos, methomyl,
methoprene, methoxychlor, methoxyfenozide, methyl bromide,
methylchloroform, methylene chloride, methyl isothiocyanate,
metofluthrin, metolcarb, metoxadiazone, mevinphos, mexacarbate,
20 milbemectin, milbemycin oxime, mipafox, mirex, MNAF, monocrotophos,
morphothion, moxidectin, naftalofos, naled, naphthalene, nicotine,
nifluridide, nikkomycins, nitenpyram, nithiazine, nitrilacarb, novaluron,
noviflumuron, omethoate, oxamyl, oxydemeton-methyl, oxydeprofos,
oxydisulfoton, para-dichlorobenzene, parathion, parathion-methyl,
25 penfluron, pentachlorophenol, permethrin, phenkapton, phenothrin,

phenthoate, phorate, phosalone, phosfolan, phosmet, phosnichlor, phosphamidon, phosphine, phosphocarb, phoxim, phoxim-methyl, pirimetaphos, pirimicarb, pirimiphos-ethyl, pirimiphos-methyl, potassium arsenite, potassium thiocyanate, pp'-DDT, prallethrin, precocene I, precocene II, precocene III, primidophos, proclonol, profenofos, profluthrin, promacyl, promecarb, propaphos, propargite, propetamphos, propoxur, prothidathion, prothiofos, prothoate, protrifenbute, pyraclofos, pyrafluprole, pyrazophos, pyresmethrin, pyrethrin I, pyrethrin II, pyridaben, pyridalyl, pyridaphenthion, pyrifluquinazon, pyrimidifen, pyrimitate, pyriprole, pyriproxyfen, quassia, quinalphos, quinalphos-methyl, quinothion, quantiofos, rafoxanide, resmethrin, rotenone, ryania, sabadilla, schradan, selamectin, silafluofen, sodium arsenite, sodium fluoride, sodium hexafluorosilicate, sodium thiocyanate, sophamide, spinetoram, spinosad, spirodiclofen, spiromesifen, spirotetramat, sulcofuron, sulfiram, sulfluramid, sulfotep, sulfur, sulfuryl fluoride, sulprofos, tau fluvalinate, tazimcarb, TDE, tebufenozide, tebufenpyrad, tebupirimfos, teflubenzuron, tefluthrin, temephos, TEPP, terallethrin, terbufos, tetrachloroethane, tetrachlorvinphos, tetradifon, tetramethrin, tetranactin, tetrasul, theta-cypermethrin, thiacloprid, thiamethoxam, thicrofos, thiocarboxime, thiocyclam, thiodicarb, thiofanox, thiometon, thionazin, thioquinox, thiosultap, thuringiensin, tolfenpyrad, tralomethrin, transfluthrin, transpermethrin, triarathene, triazamate, triazophos, trichlorfon, trichlormetaphos-3, trichloronat, trifenofos, triflumuron, trimethacarb, triprene, vamidothion, vaniliprole, XMC, xylylcarb, zeta-cypermethrin and zolaprofos.

The preferred agrochemical active ingredient is a glyphosate salt.

The fertilizers utilisable in the agrochemical composition of the invention are, by way of example: ammonia salts such as ammonium sulfate, ammonium bisulfate, ammonium salts of carboxylic acids, ammonium chloride, ammonium carbonate, ammonium phosphate; urea and urea derivatives; phosphate sources, such as phosphoric acid; potash sources, like potassium phosphate (mono- or di-), potassium carbonate; compounds containing micronutrients and secondary nutrients like Zinc, Manganese, Magnesium, Iron, Calcium, Sulfur, Boron, etc; and mixture thereof.

The agrochemical compositions can be supplied to the farmer in various forms, for instance as neat liquids or powders, granules, aqueous solutions, concentrated suspensions or concentrated emulsions, in combination with other additives having different functions, such as solvents, surfactants, anti-foam agents, anti-freeze agents, colorants, dispersants, stabilisers, preservatives and buffers.

These agrochemical compositions are dissolved/diluted before use, usually with water, to provide a diluted agrochemical spray formulation. By diluted formulations we mean formulations typically comprising the active substance(s) in concentration between 0.001 and 50 g/l.

After preparation of the diluted aqueous agrochemical spray formulation, to reduce spray drift during application, from 0.10 to 0.50 % by weight of a hydrophobically modified hydroxypropyl guar having a non-Newtonian behavior at a concentration from 0.10 to 0.50 % by weight in water shall be added to it.

Guar, or guar gum, is a polysaccharide belonging to the family of galactomannans and is extracted from a leguminosae, "Cyamopsis Tetragonolobus", that grows in the semi-dry region of tropical countries, particularly in India and in Pakistan.

- 5 The polysaccharide molecule of guar consists of a main linear chain of poly-mannose bearing branches of galactose units in a molar ratio of about 2:1.

The procedure for the preparation of a hydrophobically modified hydroxypropyl guar is known in the art, by way of example in EP 323,627

- 10 and EP 1,786,840, and usually comprises the following steps :

- a. guar gum is treated with an aqueous alkaline hydroxide and is reacted with propylene oxide;
- b. an hydrophobizing agent is introduced into the reaction mixture, possibly dispersed in an organic diluent, preferably isopropanol, and
15 the reaction is completed;
- c. the alkaline hydroxide is neutralized, the possible organic diluent is distilled off and the product obtained is dried, ground and sieved to obtain a hydrophobically modified hydroxypropyl guar derivative.

The hydrophobically modified hydroxypropyl guar of the invention has
20 molar hydroxypropyl substitution from 0.2 to 2.5, preferably from 0.8 to 1.7, and contains an average of from 10^{-5} to 10^{-1} , preferably from 10^{-4} to 10^{-2} , of hydrophobic groups per anhydroglycosidic unit (DS).

The expression "molar hydroxypropyl substitution" (MS) means the average number of moles of hydroxypropyl groups for each
25 anhydroglycosidic unit of the guar and can be measured by $^1\text{H-NMR}$.

The HMHPG of the invention contains as hydrophobic groups C₁₀-C₃₂ alkyl chains.

Preferably the hydrophobizing agent is a C₁₀-C₃₂ alkyl glycidylether.

Technical grade HMHPG (i.e. not purified from the reaction by-products)

5 are suitable for the scope of the invention.

The HMHPG useful for the present invention has Brookfield viscosity at 20°C, 20 rpm and 1 % in water comprised between 500 and 20,000 mPa*s, preferably between 3,000 and 10,000 mPa*s, and when dissolved in water at a concentration between 0.10 and 0.50 % by weight it shows

10 a non-Newtonian behavior.

Preferably the HMHPG of the invention is added at a concentration from 0.15 to 0.30 % by weight in the diluted agrochemical spray formulation.

The HMHPG of the invention can be incorporated into the diluted agrochemical spray formulations as solid or can be added as a

15 concentrated liquid formulation.

Generally, it is preferred to add the drift control agent of the invention in concentrated liquid form.

The Brookfield viscosity of the diluted agrochemical spray formulations of the invention is between 1 and 50 mPa*s, preferably from 5 to 30 mPa*s,

20 measured using a Brookfield LVT viscometer at 30 rpm, 20 °C.

The here disclosed diluted agrochemical spray formulations do not require special spraying devices and can be applied on the target area using conventional spray equipments for aerial or ground applications.

Examples

Rheology Test

Solutions of an HMHPG (HMHPG 1) having hydroxypropyl MS of 1.3 and hydrophobic C₂₂ DS of $5 \cdot 10^{-4}$ (Brookfield Viscosity RVT, 1% water sol., at 20 °C and 20 rpm, 4,600 mPa*s), at the concentrations reported in Table 1, were prepared by dissolving the polymer in water by mechanical stirring at room temperature.

All rheological measurements were performed at 20°C using a shear stress controlled rheometer (Anton Paar Physica UDS 200) with a cone and plate geometry (75 mm diameter, 1°, 0.05 mm gap). The viscosity was determined by monitoring shear rate in continuous flow conditions in the range of shear stress between 0.01 and 10 Pa.

Table 1 reports the viscosity results for HMHPG 1 at different shear rate and concentrations.

Table 1

<i>Guar Derivative</i>	<i>Concentration, % wt</i>	<i>Average Viscosity, mPa*s (0.1-1.0 s⁻¹)</i>	<i>Viscosity, mPa*s (100 s⁻¹)</i>	<i>ΔViscosity, %</i>
HMHPG 1	0.50	275.5	52.4	-81.0
	0.30	39.5	16.7	-57.7
	0.25	21.0	11.2	-46.8
	0.20	11.7	7.1	-39.1
	0.15	7.0	4.8	-31.8
	0.10	4.0	3.1	-22.5

HMHPG 1 shows a pseudoplastic (non-Newtonian) behavior at the concentration between 0.10 and 0.5 % wt.

Spray Drift Test

A diluted agrochemical spray formulation was prepared by carefully mixing 1% wt of a composition, which simulates a Glyphosate based SL formulation, containing :

- 5 • 10% Tallow amine ethoxylated (15EO)
- 90% Water buffered at pH 4.7

with 0.1-0.3 % wt of drift control agent and up to 100% of CIPAC D water.

A HPG (HPG1) having MS 1.3 and Brookfield Viscosity RVT 8,600 mPa*s
10 at 2% in water, 20°C and 20 rpm, and a HPG (HPG2) having MS 0.5
and Brookfield Viscosity RVT 4,600 mPa*s at 1% in water, 20 °C and 20
rpm, were chosen as comparative anti-drift agents.

The effect of the anti-drift agent was evaluated in a wind chamber (see
Fig. 1) at a temperature of 15°C ± 2. The diluted agrochemical spray
15 formulation is pumped at a pressure of 2.0 bar through a Teejet TP
11003 VP nozzle, placed vertically at 60 cm from the floor. An axial fan
pulls air through the wind chamber colliding transversally the spray cone
at a speed of approximately 4 m/s.

Drifted droplets were collected by a weighted dry paper sheet (WxLxH =
20 1mx2mx0,2cm), placed on the floor at the border of the spray cone. Drift
was determined as weight difference within 2 minutes from the collection
by weighting the paper sheet after 60 seconds of spraying. All tests were
replicated 3 times. The weight difference is reported as percentage
considering 100% the drift of the blank (spray formulation without drift
25 agent).

Table 2

Anti-drift agent	0,05% wt		0,10% wt		0,20% wt		0,30% wt	
	DRIFT (%)	DRIFT REDUCT. (%)	DRIFT (%)	DRIFT REDUCT. (%)	DRIFT (%)	DRIFT REDUCT. (%)	DRIFT (%)	DRIFT REDUCT. (%)
Blank	100	0	100	0	100	0	100	0
HMHPG 1	81,8	-18,2	26,1	-73,9	23,9	-76,1	23,0	-77,0
HPG 1	79,5	-20,5	34,5	-65,5	33,0	-67,0	31,8	-68,2
HPG 2	61,8	-38,2	33,0	-67,0	31,8	-68,2	31,1	-68,9

Claims

1. Process for preparing a diluted agrochemical spray formulation having improved spray drift properties comprising the following steps: i) preparing a diluted aqueous agrochemical spray formulation, ii) adding from 0.10 to 0.50 % by weight (wt) of hydrophobically modified hydroxypropyl guar having non-Newtonian behavior at concentration between 0.10 and 0.50 % by weight in water.
2. Process of claim 1 wherein the diluted agrochemical spray formulation of step i) contains one or more pesticides or crop protection agents including herbicides, fungicides, insecticides, plant growth regulators; fertilizers; or a mixture thereof.
3. Process of claim 2 in which the diluted agrochemical spray formulation of step i) contains a glyphosate salt.
4. Process of claim 1 wherein in step ii) from 0.15 to 0.30 % by weight of hydrophobically modified hydroxypropyl guar is added.
5. Process according to any of the preceding claims wherein the diluted agrochemical spray formulation having improved spray drift properties has Brookfield viscosity comprised between 1 and 50 mPa*s.
6. Use as drift control agent of a hydrophobically modified hydroxypropyl guar having non-Newtonian behavior at concentration between 0.10 and 0.50 % wt in water, having a hydroxypropyl molar substitution between 0.2 and 2.5 and containing an average of from 10^{-5} to 10^{-1} of hydrophobic groups per anhydroglycosidic unit.

7. The use of claim 6 wherein the hydrophobically modified hydroxypropylguar has molar hydroxypropyl substitution between 0.8 and 1.7 and contains from 10^{-4} to 10^{-2} of hydrophobic groups comprising a C₁₀-C₃₂ alkyl chain per anhydroglycosidic unit.
8. The use of claim 6 wherein the hydrophobically modified hydroxypropyl guar has Brookfield viscosity at 20°C, 20 rpm and 1 % in water comprised between 500 and 20,000 mPa*s.
9. The use of claim 8 wherein the hydrophobically modified hydroxypropyl guar has Brookfield viscosity at 20°C, 20 rpm and 1 % in water comprised between 3,000 and 10,000 mPa*s
10. Use of the diluted agrochemical spray formulations having improved spray drift properties as defined in claims 1-5 for the treatment of plants, fields, and crop areas.