FORM 2

THE PATENT ACT 1970

(39 OF 1970)

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THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

TITLE OF THE INVENTION

A VOLATILE PESTICIDE COMPOSITION AND A METHOD OF PRODUCTION THEREOF

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

FIELD OF INVENTION

[001] The present invention generally relates to a volatile pesticide composition and a method of production. More particularly, the invention relates to preparing a composition for a volatile pesticide produced from semivolatile pesticide, and extraction of the semivolatile pesticide is extracted from the neem seed, neem leaves, neem branches, and other parts of the neem tree.

BACKGROUND

[002] Synthetic chemical pesticides or insecticides, or herbicide have been considered a boon for the green revolution and, at the same time, a curse for the whole world. Now, most farming produce has been contaminated with these chemicals, and the world needs alternatives for pest and pesticide management. Though pests are known for centuries, pesticides have been part of human life for the past few decades. The initial launch of pesticides was done with the motto of yield improvement and immediate pest removal. The same is introduced with minimal testing. The pesticide introduction in the developing world 50-80 years back has now been seriously practised in the developed world. The often uncontrolled use of pesticides in the developing world has led these agrarian economics at the risk of losing their exports which contribute to their livelihood. The current strategy of banning a pesticide, which reaches dangerous levels in water, soil and food chains, is not sustainable. It is often perceived that about 200 pesticide levels need to be maintained for their presence in agriproducts to be fit enough to export, and this list is continuously growing.

[003] Hence there is a need for a volatile pesticide composition that acts only as pests and no hazardous to the environment, human beings. and a method of production of a volatile pesticide composition.

OBJECT OF THE INVENTION

[004] The principal object of the invention relates to a volatile pesticide composition and a method of production.

[005] Another objective of the invention is the method of preparation of a volatile pesticide composition from semivolatile pesticide. The semivolatile pesticide is prepared from the neem seeds, neem leaves, neem branches, neem bark and the volatile pesticide prepared by adding vaporizing the material.

[006] Another object of the invention is the preparation of composition and method for the volatile pesticide composition, which acts as over two hundred pests, without harming the pollination causing flies, honey bees, environment, and human health.

SUMMARY OF THE INVENTION

[007] Synthetic chemicals are never a solution for newly evolving pesticide-resistant strains. The negative effect of synthetic chemicals on beneficial insects and earthworms are also a concern, and most of these chemicals have region, environment, climatic, soil, water cycle etc., specific behaviours that have never been studied. For example, atrazine, commonly used for weed control, has detrimental effects on food crops and could lead to ecosystem damage. Most freshwater bodies like lakes in the developing world are wiped off most native fish verities and other aqueous-based ecosystems due to pesticide contamination, and this trend sees no abating in the distant future.

[008] The other issue with pesticide is the cost associated with the same. Most patented pesticides are pretty expensive and make them unaffordable for third world country farmers. A typical farming activity results in less than US$500 as profit if everything goes according to plan and the pesticide expenses are typically approaching 40% - 60% of the farming activity cost and importantly they are input cost, impressive of whether farmer makes a profit or loss. Farming has become expensive, and rejection of exports due to pesticide residues are wiping

the economies in third world countries. The typical contamination of pesticides in drinking water in and around farming communities affects the children of farmers and causing mental retardedness. For example, the belt of basmati rice producing farmers in and around Punjab and the Sindh region suffer from mentally disabled children due to contamination of pesticides in their village ecosystem, including water, milk, etc.

[009] Another example is a great Michigan lake where the pesticide runoffs have caused other legs in frogs and eroded fish scales. The endocrine disruptor activity of pesticides is no secret, and the consequences of ecosystem damage are visible now. Unfortunately, the brunt of this damage is severe for third-world countries became of the agrarian economic nature.

[0010] Pesticide usage needs to be viewed differently, and conventional methods are proven to be dangerous over the last century. The key points which needs to be remembered are (a) pesticides are most effective in gas phase, (b) the physiologically active concentration of pesticides is minimal compared to the extent of use, (c) emulsifiers destroy the volatility of pesticides and hence act on the pests only after they consume the pesticide redden vegetation / water (d) pesticide residues persist for years if not decades in soil (e) farming community ends up being the biggest victim of the pesticide ridden ecosystem (air, soil, water, produce food chain etc) (f) the spraying of pesticides as aerosols have no significant benefits and do trigger unwanted damage to farmers and farming workers (g) the cost of farming has significantly increased due to untenable cost of new generation pesticides and the framers is always at the receiving end of the cost (h) developing economics are blamed for pesticide residues in produce even though they have no control on the extensive recommendation of the same from government, private companies and NGOs alike (i) Safe synthetic pesticide is a myth as their use always results in toxicity (j) banning the pesticides whose concentration have increased in ecosystem is of no use either because the newer pesticides introduced are also equally toxic (k) rejection of pesticide residue ridden produce results in severe economical damage to developing and

agrarian countries (l) Pesticide resistance, the ecosystem damage especially on aquatic organisms is severe in case of frog, fish, which result in genetic mutations (m) the presence of pesticide residues in run off is so profound that they result in toxic algal growth and algal bloom, (n) in a way current pesticide regime is in humane to framers and public.

[0011] The universal pesticide or insecticide or herbicide can prevent or control pests infestation and benefit the farmers. The mechanism relies on the principle that (a) most efficient method pest of elimination is vapour route via volatile organic compounds (b) the delivery of pesticides is done through water but maintains a physiologically effective concentration for pest control in the air (c) No residue of pesticide in water, air, produce and is biodegradable. This invention solved the problem of low vapourization of semivolatile pesticide 101 into high volatile pesticide for effective vapourization to control the pest without harming the pollination supporting flies and the environment.

BRIEF DESCRIPTION OF DRAWINGS

[0012] This invention is detailed in the accompanying specification, drawings, and reference letters, indicating corresponding parts in the various figures.

[0013] The embodiments herein will be better detailed and understood from the following description with reference to the drawings, in which:

[0014] FIG. 1 shows a simplified block diagram representation of a volatile pesticide composition 100 compositions, following an example embodiment of the present disclosure.

[0015] FIG. 2A–2C shows multiple compositions to produce the volatile pesticide composition 100, following an example of the present disclosure.

[0016] FIG. 3 Illustrates the field deployment and vaporization ratio in the air of the volatile pesticide composition 100, following an example embodiment.

[0017] FIG. 4 illustrates a flow chart explaining a method of producing the volatile pesticide composition 100, following an example embodiment, and

[0018] FIG. 5 illustrates a block diagram explaining a method for the volatile pesticide composition 100 deploying in the field and following an example embodiment.

DETAILED DESCRIPTION OF INVENTION

[0019] The embodiments herein and the various aspects and advantageous details thereof are explained elaborately with means to the non-limiting examples illustrated in the accompanying complete specification, drawings and/or detailed in the following description. Details of very common aspects, manufacturing and processing methods are excluded so as to not unnecessarily obscure the examples herein. The examples detailed in this embodiment are meant merely to enable an understanding and practice of how the embodiments herein may be practised and enable those of skill in the art further to practice the embodiments herein. Accordingly, the examples should not be assumed as limiting the breadth and scope of the embodiments herein.

[0020] Reference in this document to “one embodiment” or “an embodiment” means that a particular aspect, structure, or characteristic described in connection with the embodiment is present in at least one embodiment of the present disclosure. The appearance of the phrase “in an embodiment” in various places in the specification does not necessarily refer to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Moreover, various aspects are described that may be exhibited by few embodiments and not by other ones. Similarly, various aspects are described, which may be requirements for some embodiments but need not be for other embodiments.

[0021] Although the following description details many specifics for drawings, whoever skilled in the art will understand that quite a few variations and/or modifications to said details are within the boundary of the present disclosure’s scope. Although quite many of the aspects of the present disclosure are detailed in terms of each other, or combined with each other, one skilled in the art understands that many of the aspects can be understood independently of other

features. Accordingly, the complete description of this present disclosure is considered without any loss of generality to, and without limitations upon, the present disclosure.

[0022] **FIG. 1** shows a simplified block diagram representation of a volatile pesticide composition 100 compositions, in accordance with an example embodiment of the present disclosure. In some example embodiments, the volatile composition 100 may comprise semivolatile pesticide 101, a vaporizing agent 103, and an excipient 105.

[0023] In some example embodiment, the semivolatile pesticide 101 selected from a group consisting of neem seed powder, neem leave extract, neem bark extract and neem branch powder.

[0024] In some example embodiment, vaporizing agent 103 selected from a group consisting of camphor, benzoin resin, piperidine, quercetin, genistein, naringin, sinomenine, glycyrrhet, citrin and nitrile glycoside.

[0025] In some example embodiments, the excipient 105 is selected from a group consisting of starch, cellulose, hydroxyl propyl cellulose, polypropylene pyrrolidone, and polyethene glycol and methylcellulose. The semivolatile pesticide 101, the vaporizing agent 103, and the excipients 105 may explain a synergistic effect in **FIG. 2A-2C.**

1 **FIG. 2A-2C** shows multiple compositions to produce the volatile pesticide composition 100, following an example embodiment of the present disclosure. In **FIG. 2 A,** Table 1 provides the volatile pesticide composition 100 may comprise the neem powder with a concentration of 80% by weight, camphor with a concentration of 6% by weight, benzoin resin with a concentration of 4% by weight, cellulose with a concentration of 2% by weight, polyvinyl pyrrolidone with a concentration of 8% by weight.

2 In some example embodiment **FIG. 2A, table 2** provides the volatile pesticide composition 100 may comprise the neem powder with a concentration of 55% by weight, camphor with a concentration of 15% by weight, benzoin resin

with a concentration of 8% by weight, cellulose with a concentration of 12% by weight, polyvinyl pyrrolidone with a concentration of 10% by weight.

[0026] In some example embodiment **FIG. 2B, table 1** provides the volatile pesticide composition 100 may comprise the neem powder with a concentration of 65% by weight, camphor with a concentration of 10% by weight, benzoin resin with a concentration of 5% by weight, hydroxyl propyl cellulose with a concentration of 3% by weight, polyvinyl pyrrolidone with a concentration of 17% by weight.

[0027] In some example embodiment **FIG. 2B, table 2** provides the volatile pesticide composition 100 may comprise the neem powder with a concentration of 75% by weight, camphor with a concentration of 10% by weight, benzoin resin with a concentration of 2% by weight, hydroxyl propyl cellulose with a concentration of 3% by weight, polyvinyl pyrrolidone with a concentration of 11% by weight.

[0028] In some example embodiment **FIG. 2C, table 1** provides the volatile pesticide composition 100 may comprise the neem powder with a concentration of 62% by weight, camphor with a concentration of 15% by weight, benzoin resin with a concentration of 7% by weight, hydroxyl propyl cellulose with a concentration of 5% by weight, polyvinyl pyrrolidone with a concentration of 13% by weight.

[0029] In some example embodiment **FIG. 2C, table 2** provides the volatile pesticide composition 100 may comprise the neem powder with a concentration of 70% by weight, camphor with a concentration of 10% by weight, benzoin resin with a concentration of 8% by weight, hydroxyl propyl cellulose with a concentration of 3% by weight, polyvinyl pyrrolidone with a concentration of 9% by weight.

[0030] In some example embodiments, **FIG. 3, graph 1** explaining the concentration of vapour on the head surfaces of the semivolatile pesticide 100 and the volatile pesticide composition 100. The studies inferred that the

semivolatile pesticide 101 concentration on the head surface is 3%, and the volatile pesticide composition 100 ten folds more, i.e. 30% on the head surface.

[0031] In some example embodiments, **FIG. 3, graph 1** explaining the feasibility of the volatile pesticide composition 100 and semivolatile pesticide 101. The studies in the field with trails proven that the volatile pesticide composition 100 has more feasible to deploy in the field when compared to semivolatile pesticide 101. The semivolatile pesticide was having 30% feasibility in deployment in the field, whereas the volatile pesticide composition of 100 has 100% feasibility.

[0032] **FIG. 4** illustrates a flow chart enlightening a method of producing the volatile pesticide composition 100, in accordance with an example embodiment. **At step 401**, the process may include fetching a semivolatile pesticide 101, a vaporizing agent 103, and an excipients 105.

3 In some example embodiments, the semivolatile pesticide 101 is selected from a group consisting of neem seed powder with a concentration in the range of 30% by weight to 90% by weight, neem leave extract with a concentration in the range of 30% by weight to 90% by weight, neem bark extract with a concentration in the range of 30% by weight to 90% by weight and neem branch powder with a concentration in the range of 30% by weight to 90% by weight.

4 In some example embodiments, the vaporizing agent 103 is selected from a group consisting of camphor with a concentration in the range of 1% by weight to 20% by weight, benzoin resin with a concentration in the range of 1% by weight to 20% by weight, piperidin with a concentration in the range of 1% by weight to 20% by weight, quercetin with a concentration in the range of 1% by weight to 20% by weight, genistein with a concentration in the range of 1% by weight to 20% by weight, naringin with a concentration in the range of 1% by weight to 20% by weight, sinomenine with a concentration in the range of 1% by weight to 20% by weight with a concentration in the range of 1% by weight to 20% by weight, glycyrrhet with a concentration in the range of 1% by weight to 20% by weight, citrin with a concentration in the range of 1% by weight to20 %

by weight and nitrile glycoside with a concentration in the range of 1% by weight to 20% by weight.

[0033] In some example embodiment, the one of the excipient 105 selected from a group consisting of starch with a concentration in the range of 1% by weight to20 % by weight, cellulose with a concentration in the range of 1% by weight to 20 % by weight, hydroxyl propyl cellulose with a concentration in the range of 1% by weight to 20 % by weight, polypropyl pyrrolidone with a concentration in the range of 1% by weight to 20 % by weight, polyethene glycol with a concentration in the range of 1% by weight to 20 % by weight and methylcellulose with a concentration in the range of 1% by weight to 20 % by weight.

[0034] At step 403, the method may include extraction of the semivolatile pesticide 101 from extracted from neem seeds, neem bark, neem leaves, and neem branches by physical distillation process or suitable chemical methods

[0035] At step 405, the method may include mixing of the semivolatile pesticide 101 with vaporizing agent 103, and it provides the adequate surface area to promote the volatilization of the semivolatile pesticide 101

[0036] At step 407, the method may include producing a uniform blend of the volatile pesticide composition 100 based on the excipient 105, the semivolatile pesticide 101 and the vaporizing agent 103, which is suitable for field applications

[0037] FIG 5. A block diagram illustrates the volatile composition 100 deployments as per the field size. In some example, embodiment deployment of the volatile pesticide composition 100 deployed in the field as indicated.

[0038] The powder made in the volatile pesticide composition 100 is distributed in different vessels and placed around a vegetable or fruit or flower gardens of 20 ft * 20 ft = 4000 sq. ft. The vessel is containing the patented formulation around the 4000 sq. ft. area 8 at the periphery and one at the centre for 0.1 acres. The volatile composition 100 placed in the field and function for over a year as pesticide and insecticide in the gas phase and can repel the same.

ACKNOWLEDGEMENT

[0039] Inventors/Applicants acknowledge the support provided by CMR Institute of Technology, Bengaluru to this invention and agree to comply with any applicable policies based on their association with CMR Institute of Technology, Bengaluru.

[0040] This research is financially supported by Vision Group on Science and Technology (VGST), Government of Karnataka, India, Grant No. VGST/SMYSR/GRD-444/2014-2015.

We Claim,

1 A volatile pesticide composition 100 comprising:

A semivolatile pesticide 101 selected from a group consisting of neem seed powder, neem leave extract, neem bark extract and neem branch powder;

a vaporizing agent 103 selected from a group consisting of camphor, benzoin resin, piperidine, quercetin, genistein, naringin, sinomenine, glycyrrhet, citrin and nitrile glycoside; and

an excipients 105 selected from a group consisting of starch, cellulose, hydroxyl propyl cellulose, polypropyl pyrrolidone, and polyethene glycol and methylcellulose, Wherein,

the vaporizing agent 103 develops a Vander Waals interaction with semivolatile pesticide 101 results in the volatile formulation;

the volatile formulation increases the diffusion rate of semivolatile pesticide 101 in the air by a minimum of two-fold and up to 100 fold;

the concentration of semivolatile pesticide 101 in the air acts as a pesticide on pests and larvae of the pests fields.

2 A volatile pesticide composition 100 as claimed in claim 1, wherein the semivolatile pesticide 101 is selected from a group consisting of neem seed powder with a concentration in the range of 30% by weight to 90% by weight, neem leave extract with a concentration in the range of 30% by weight to 90% by weight, neem bark extract with a concentration in the range of 30% by weight to 90% by weight and neem branch powder with a concentration in the range of 30% by weight to 90% by weight.

3 A volatile pesticide composition 100 as claimed in claim 1, wherein the one of the vaporizing agent 103 is selected from a group consisting of camphor with a concentration in the range of 1% by weight to 20% by weight, benzoin resin with a concentration in the range of 1% by weight to 20% by weight, piperidin with a concentration in the range of 1% by weight to 20% by weight, quercetin with a concentration in the range of 1% by weight to 20% by weight, genistein with a concentration in the range of 1% by weight to 20% by weight, naringin with a concentration in the range of 1% by weight to 20% by weight, sinomenine with a concentration in the range of 1% by weight to 20% by weight with a concentration in the range of 1% by weight to 20% by weight, glycyrrhet with a concentration in the range of 1% by weight to 20% by weight, citrin with a concentration in the range of 1% by weight to20 % by weight and nitrile glycoside with a concentration in the range of 1% by weight to 20% by weight.

4 A volatile pesticide composition 100 as claimed in claim 1, wherein the one of the excipient 105 is selected from a group consisting of starch with a concentration in the range of 1% by weight to20 % by weight, cellulose with a concentration in the range of 1% by weight to 20 % by weight, hydroxyl propyl cellulose with a concentration in the range of 1% by weight to 20 % by weight, polypropyl pyrrolidone with a concentration in the range of 1% by weight to 20 % by weight, polyethylene glycol with a concentration in the range of 1% by weight to 20 % by weight and methylcellulose with a concentration in the range of 1% by weight to 20 % by weight.

5 A volatile pesticide composition 100, the method comprising:

fetching a semivolatile pesticide 101, a vaporizing agent 103, an excipients 105;

the semivolatile pesticide 101 from extracted from neem seeds, neem bark, neem leaves, and neem branches by physical distillation process or suitable chemical methods.

mixing of the semivolatile pesticide 101 with vaporizing agent 103, and it provides the adequate surface area to promote the volatilization of the semivolatile pesticide 101;

producing a uniform blend of the volatile pesticide composition 100 based on the excipient 105, the semivolatile pesticide 101 and the vaporizing agent 103, which is suitable for field applications.

6 The method as claimed in claim 5, wherein the semivolatile pesticide 101 is selected from a group consisting of neem seed powder with a concentration in the range of 30% by weight to 90% by weight, neem leave extract with a concentration in the range of 30% by weight to 90% by weight, neem bark extract with a concentration in the range of 30% by weight to 90% by weight and neem branch powder with a concentration in the range of 30% by weight to 90% by weight.

7 The method as claimed in claim 5, wherein the one of the vaporizing agent 103 is selected from a group consisting of camphor with a concentration in the range of 1% by weight to 20% by weight, benzoin resin with a concentration in the range of 1% by weight to 20% by weight, piperidin with a concentration in the range of 1% by weight to 20% by weight, quercetin with a concentration in the range of 1% by weight to 20% by weight, genistein with a concentration in the range of 1% by weight to 20% by weight, naringin with a concentration in the range of 1% by weight to 20% by weight, sinomenine with a concentration in the range of 1% by weight to 20% by weight with a concentration in the range of 1% by weight to 20% by weight, glycyrrhet with a concentration in the range of 1% by weight to 20% by weight, citrin with a concentration in the range of 1% by weight to20 % by weight and nitrile glycoside with a concentration in the range of 1% by weight to 20%.

8 The method as claimed in claim 5, wherein the one of the excipient 105 selected from a group consisting of starch with a concentration in the range of 1% by weight to20 % by weight, cellulose with a concentration in the range of 1% by weight to 20 % by weight, hydroxyl propyl cellulose with a concentration in the range of 1% by weight to 20 % by weight, polypropyl pyrrolidone with a concentration in the range of 1% by weight to 20 % by weight, polyethylene glycol with a concentration in the range of 1% by weight to 20 % by weight and methylcellulose with a concentration in the range of 1% by weight to 20 % by weight.

Dated on this 23rd day of March 2021

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ABSTRACT

A VOLATILE PESTICIDE COMPOSITION AND A METHOD OF PRODUCTION THEREOF

The present invention relates to a volatile pesticide composition 100 and a method of production. The method production of volatile pesticide composition 100 may include fetching a semivolatile pesticide 101, a vaporizing agent 103, and an excipients 105. The method also comprises semivolatile pesticide extraction from the neem seed powder, neem leaves, neem branches, and neem bark. The method may include the vaporizing agent 103, which offers an adequate surface area to promote the volatilization of the semivolatile pesticide 101. The method of producing a uniform blend of the volatile pesticide composition 100 based on the excipient 105, the semivolatile pesticide 101 and the vaporizing agent 103 is suitable for field applications to control the various pests without damaging to humans, environment, and pollination causing flies.

<FIG.5>

Dated on this 23rd day of March 2021

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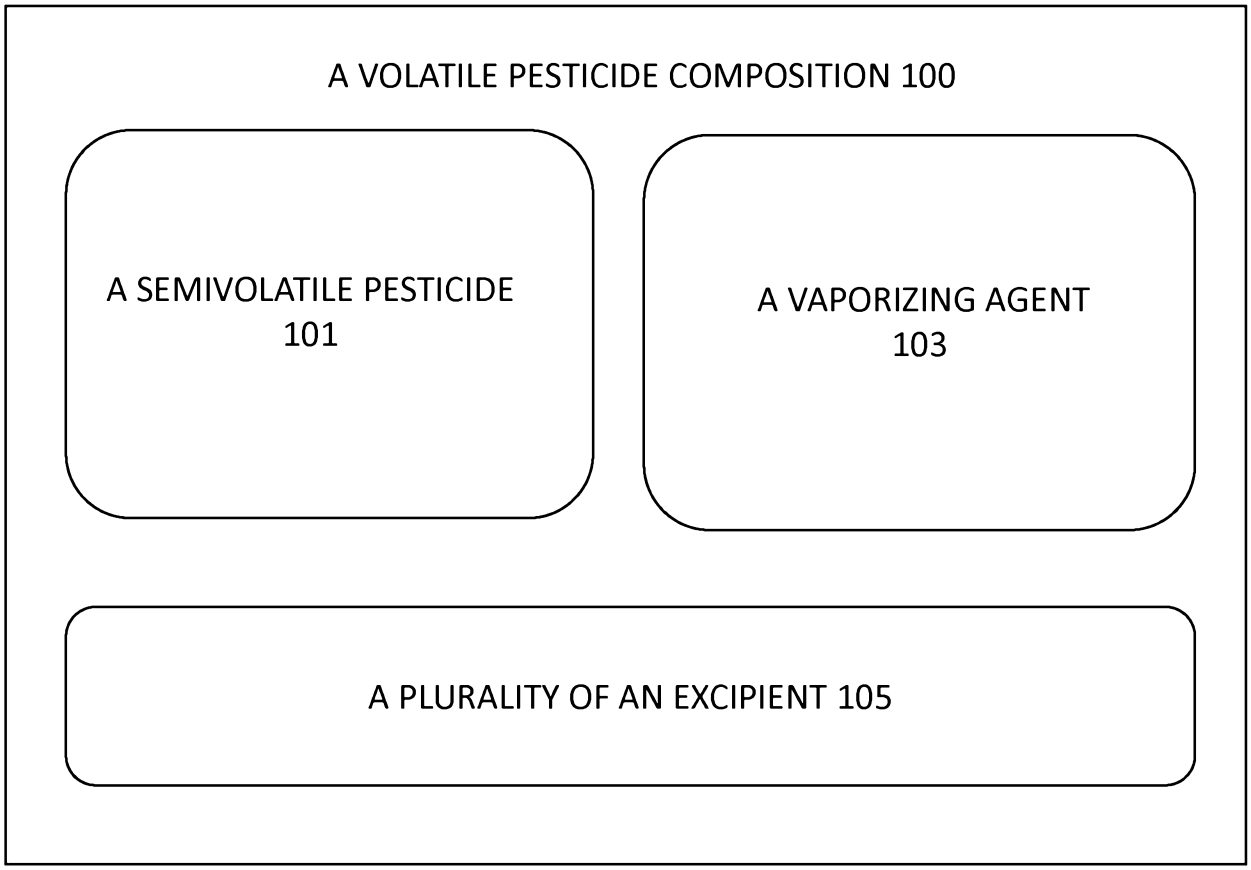

FIG. 1

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Table 1

A VOLATILE PESTICIDE COMPOSITION	% BY WEIGHT
Neem powder	80
Camphor	6
Benzoin resin	4
Cellulose	2
Polyvinyl pyrrolidone	8

Table 2

A VOLATILE PESTICIDE COMPOSITION	% BY WEIGHT
Neem powder	55
Camphor	15
Benzoin resin	8
Cellulose	12
Polyvinyl pyrrolidone	10

FIG. 2A

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Table 1

A VOLATILE PESTICIDE COMPOSITION	% BY WEIGHT
Neem powder	65
Camphor	10
Benzoin resin	5
Cellulose	3
Methyl cellulose	17

Table 2

A VOLATILE PESTICIDE COMPOSITION	% BY WEIGHT
Neem powder	75
Camphor	9
Benzoin resin	2
Hydroxy propyl cellulose	3
Methylcellulose	11

FIG. 2B

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SIGNATURE OF THE APPLICANT

Table 1

A VOLATILE PESTICIDE COMPOSITION	% BY WEIGHT
Neem powder	62
Camphor	15
Benzoin resin	7
Cellulose	5
Polyvinyl pyrrolidone	13

Table 2

A VOLATILE PESTICIDE COMPOSITION	% BY WEIGHT
Neem powder	70
Camphor	10
Benzoin resin	8
Cellulose	3
Polyvinyl pyrrolidone	9

FIG. 2C

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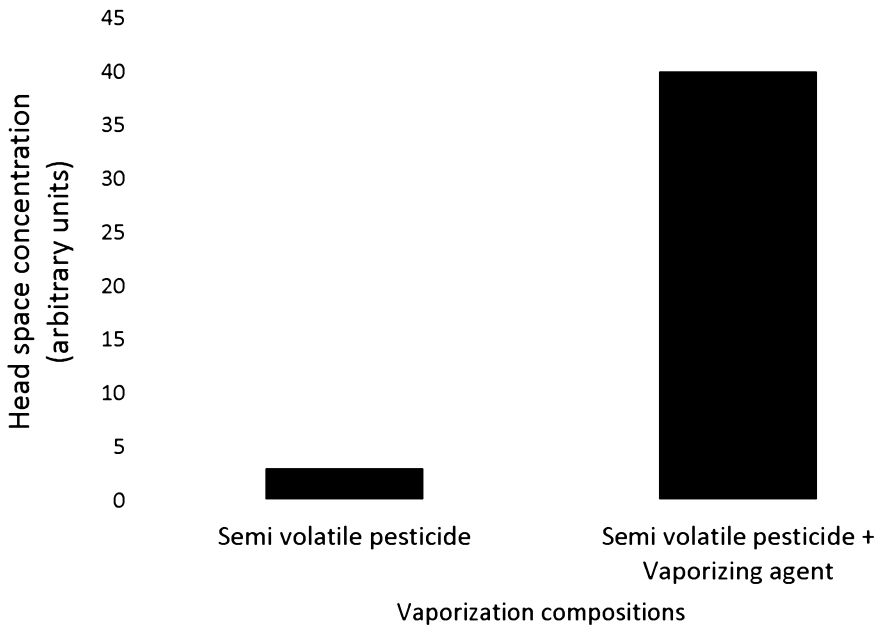
Graph 1



Graph 2

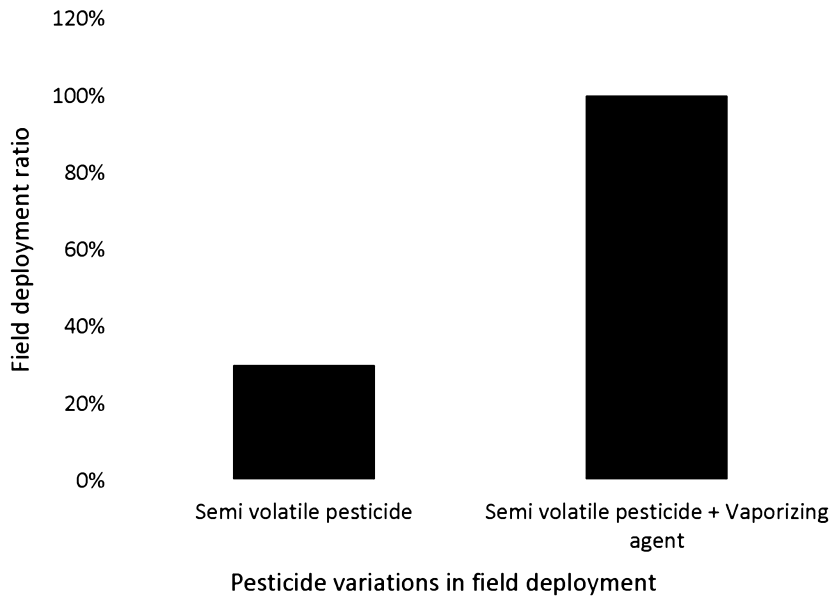


FIG.3

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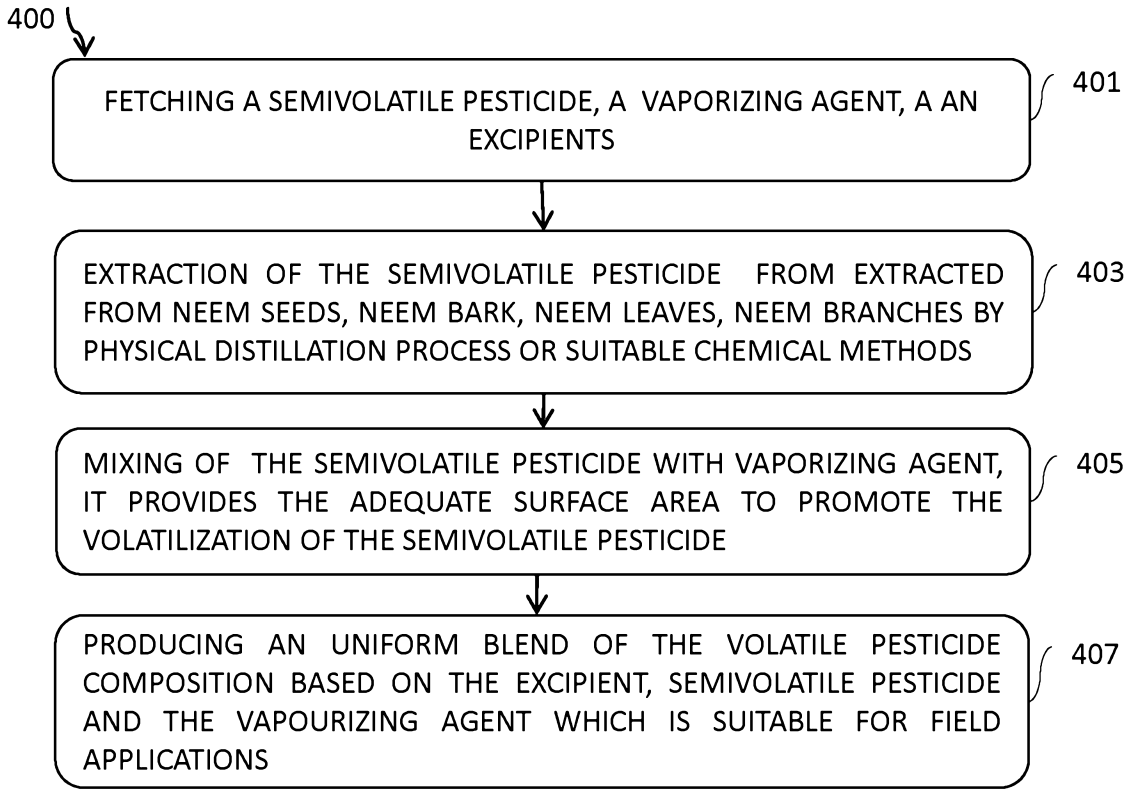

FIG. 4

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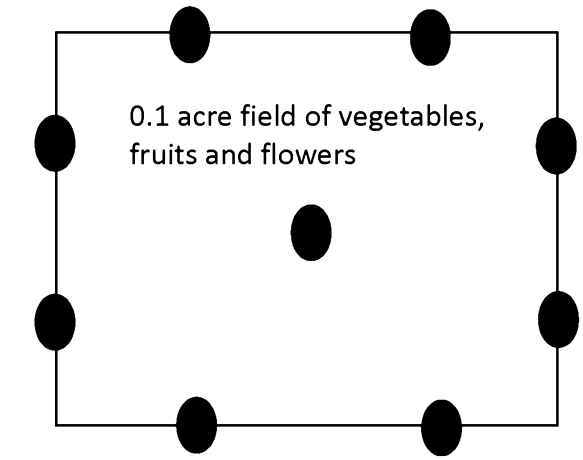

FIG. 5

S.No.	Parameter	Conventional pesticide spraying	Volatile pesticide composition
1	Cost	Expensive	Cheap
2	Environmental toxicity	needs to sprayed periodically. Sprayed, mixes with water bodies, aquatic life toxicity	No spraying, only placed in field, lasts for up to 2 years, no toxicity, pesticides and vaporizing agent are natural origin, non-toxic to human, animals or honeybee
3	Safety to farming families	Not safe, the pesticide ridden water, enters food chain and dangerous farming families	No harm whatsoever to environment the concentration in air is only parts per trillion to parts per billion and no way impacts farmers health

FIG. 6

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