ABSTRACT

A novel composition for the preparation of herbal mosquito repellent and the process thereof

The present invention discloses a novel composition for herbal mosquito repellent and process for the preparation of the same which repels mosquitoes, has a pleasant fragrance, and a long lasting effect. The herbal mosquito repellent comprise base materials that contain herbal ingredients that are safe and effective, pleasantly perfumed, do not irritate the skin and effectively repel mosquitoes. The herbal mosquito repellent essentially comprises extracts obtained by a process from aerial parts of *Myxopyrum smilacifolia* (Chaturamulla). The extracts are processed with suitable natural carrier base and can be used in the form of coils, incense sticks, lotion and ointments. The herbal mosquito repellent has no side effects and is suitable for external application.

13.8.2013

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WE CLAIM:

1. An herbal mosquito repellent incense stick comprising the aerial parts of *Myxopyrum smilacifolia* (Chaturamulla) with added essential oil for fragrance.
2. The herbal mosquito repellent as claimed in claim 1, wherein the herbal based mosquito repellent incense stick comprises aerial parts of *Myxopyrum smilacifolia* (Chaturamulla) in the range of 70-85% w/w, and essential oil 0.1-5% v/v for fragrance.
3. The herbal mosquito repellent formulation as claimed in claim 1, wherein the herbal formulation comprises plant part selected from the group comprising aerial parts only.
4. The herbal mosquito repellent formulation as claimed in claim 1, wherein the method of preparing herbal mosquito repellent incense stick comprises the steps of:
   (a) drying all the plant parts constituent;
   (b) making powder of the constituent ranging from 10 to 100 mesh size;
   (c) mixing all the constituent in specific proportion;
   (d) extracting with organic solvent at a temperature ranging from 25 to 70°C for 6-24 hours;
   (e) dipping blank/dummy incense sticks in solution of herbal extract for 2-30 minutes at temperature ranging from 25-35°C;
   (f) spraying essential oil on coated incense sticks and drying;
5. The herbal mosquito repellent formulation as claimed in claim 1, wherein the ratio of organic solvent ranges from 1 to 20% (v/v).
6. The herbal mosquito repellent formulation as claimed in claim 1, wherein the ingredient extracted from the plant *Myxopyrum smilacifolia* are terpenoids and phenols.
7. The herbal mosquito repellent formulation as claimed in claim 1, wherein the organic solvent is selected from the group comprising ethyl acetate, ethanol, isopropanol and butanol alone and in combination.

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8. The herbal mosquito repellent formulation as claimed in claim 1, wherein the herbal mosquito repellent incense stick is pleasantly perfumed and does not irritate the skin.
9. The herbal mosquito repellent formulation as claimed in claim 1, wherein the herbal mosquito repellent comprise of base materials that contain herbal ingredients that are safe and effective and designed for external application.

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Date: 12/08/2013 **Signature:**

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FIELD OF INVENTION:

The present invention in general relates to a novel herbal mosquito repellent composition. The present invention, in particular relates to an herbal mosquito repellent composition prepared from the extract of *Myxopyrum smilacifolia* (Chaturamulla that repels mosquitoes, has a pleasant fragrance, and long lasting effect and the process for the preparation thereof.

BACKGROUND AND PRIOR ART:

Mosquito menace is a global problem. Diseases like malaria, filariasis, dengue fever, yellow fever, Japanese encephalitis, Ross river virus, Burma forest virus, Murrcey Valley encephalitis etc, are known to spread through mosquitoes. Developing and least developed countries from Africa, Asia, and Latin America and rest of the world have been unsuccessfully attempting to control the mosquito menace and to eradicate the scourge of malaria and other diseases.

The chemical based mosquito repellents available in the market contain some harmful and poisonous chemicals which are likely to cause a threat to human health. Researchers have proved that pyrethroids used in repellents lead to hyper excitation of nervous system and their prolonged use results in corneal damage, liver damage and asthma. About 12% of users are seriously affected by the use of repellents. The common problem is caused by the inhalation of its smoke. Its inhalation toxicity is high even at low concentration of 0.0044mg/litres/day. Studies conducted in US show that children ranging from 1-6 years in age are eating atleast 0.002157mg/kg/day of pallethrin used in liquidators due to food exposure which is affecting their health whereas its limiting quantity is 0.002152mg/kg/day (Sharma, 2001). This calls for the need to introduce the herbal based mosquito repellent that is more effective, safe and cost effective than the chemical based mosquito repellents.

References may be made to following technical article:

The article entitled "GC-Ms Analysis Of Some Bioactive Constituents of the Leaves of *Myxopyrum serratulum* A.W. Hill"talks about the *Myxopyrum serratulum* A.W. Hill which is one of the medicinally valuable plants belonging to

the family Oleaceae, commonly known as "Chaturamullai" in Tamil and "Chaturadharalata" in Sanskrit. Traditionally leaves are used as astringent, acrid, sweet, thermogenic, anodyne, febrifuge and tonic. They are useful in vitiated conditions of kapha and vata, cough, asthma, rheumatism, cephalalgia, nostalgia, consumption, fever, otopathy, neuropathy and cuts and wounds.

However, elimination or eradication of mosquitoes or mosquitoes larvae, as well as development of safer, less toxic, more effective, human-friendly mosquito repellents have not received adequate attention of research communities.
There are very few natural or herbal solutions for repelling mosquitoes reported in the literature. Some natural products which effectively repel mosquitoes are reported, but they require more frequent reapplication (at least every 2 hours) and higher concentration than DEET. Most of the mosquito repellent formulations available in the market are mainly prepared with active ingredients of synthetic origin. Safety of these constituents is doubtful, and especially their long term effects. Development of a new safe mosquito repellant from herbal source is therefore the need of the hour.

Thus in the view of the above prior art, the method is provided for the preparation of the herbal mosquito repellent which repels mosquitoes, has a pleasant fragrance, and long lasting effect and is not found with the composition essentially comprising the extracts obtained by process from aerial parts of *Myxopyrum smilacifolia* (Chaturamulla). The extracts are processed with suitable natural carrier base and can be used in the form of coils, incense sticks and ointments.

OBJECTS OF THE INVENTION:

The main object of the present invention is to provide an herbal mosquito repellent comprising medicinal plants and the process for the preparation of the same.

Another object of the present invention is to provide an herbal mosquito repellent composition comprising different aerial parts of medicinal plant.

Yet another object of the present invention is to provide the composition of an

herbal mosquito repellent which repels mosquitoes, has a pleasant fragrance and a long lasting effect.

Still another object of the present invention is to provide the herbal mosquito repellent formulation that is safe and effective, pleasantly perfumed, does not irritate the skin and effectively repels mosquitoes.

Yet another object of the present invention is to provide an herbal mosquito repellent formulation which is simple to prepare and suitable for external application.

Still another object of the present invention is to provide an herbal mosquito repellent formulation that provides a soothing fragrance with minimum release of smoke and ash.

Yet another object of the present invention is to provide an herbal mosquito repellent formulation which is cost effective.

SUMMARY OF THE INVENTION:

The present invention provides the novel formulation for an herbal mosquito repellent and the process for the preparation of the same. The herbal mosquito repellent repels mosquitoes, has a pleasant fragrance and a long lasting effect. The herbal mosquito repellent comprise base materials that contain herbal ingredients that are safe and effective, pleasantly perfumed, do not irritate the skin and effectively repel mosquitoes and a process for the preparation thereof. The formulation comprises a single medicinal plant mixed with a suitable fragrance. The herbal mosquito repellent has no side effects and is suitable for external application.

In a preferred embodiment of the present invention, the herbal mosquito repellent comprises essentially of extracts obtained by a process from the aerial parts of *Myxopyrum smilacifolia* (Chaturamulla).

In a preferred embodiment of the present invention, the herbal mosquito repellent comprises aerial parts of *Myxopyrum smilacifolia* (Chaturamulla) 70-85% w/w, in suitable carrier base fortified with any essential oil of choice ranging from 0.1-5% v/v for fragrance.

In another embodiment of the present invention the herbal mosquito repellent contains herbal ingredients that are safe and effective, pleasantly perfumed, do not irritate the skin and effectively repel mosquitoes.

In yet another embodiment of the present invention, the herbal mosquito repellent comprises the composition mainly selected from the plant part such as the aerial parts.

In another embodiment of the present invention the herbal mosquito repellent composition uses suitable bases and essential oil in the formulation.

In another embodiment of the present invention, the method for preparing the herbal mosquito repellent comprises the steps of:

a. Powdering the herbal blend of the aerial parts of the medicinal plant;
b. Collecting the aerial parts and shade drying and powering it,
c. Mixing the powdered herbal blend with water and a natural binder to form a dough like paste which is used to prepare the incense stick (agarbatti) or coils,
d. Extracting the powder with organic solvents alone or in combination ranging from 10 to 50%.
e. After decantation/ filtration the extract thus obtained can also be used to formulate blank incense stick (agarbatti.)

DESCRIPTION OF THE PREFERRED EMBODIMENTS:

Accordingly the present invention relates to an herbal mosquito repellent which repels mosquitoes, has a pleasant fragrance, and a long lasting effect. The herbal mosquito repellent comprise base materials that contain herbal ingredients that are safe and effective, pleasantly perfumed, do not irritate the skin and effectively repel mosquitoes and a process for the preparation thereof. The formulation comprises aerial parts of medicinal plant parts and essential oil for fragrance. The medicinal plant/ herb used for the preparation of the incense stick/ agarbatti

formulation essentially include extracts obtained by a process from aerial parts of *Myxopyrum smilacifolia* (Chaturamulla) and fortified with essential oils for fragrance. The extracts obtained by the process are mixed with suitable carrier base and are also used to formulate blank incense stick (agarbatti).

The blank/dummy incense stick (agarbatti) is made by coating the bamboo sticks with a fuel and oxidizer mixture that facilitates combustion. Charcoal or wood powder forms the fuel for the combustion. Gums such as Gum Arabic or Gum Tragacanth are used to bind the mixture together while an oxidizer such as sodium nitrate or potassium nitrate sustains the burning of the agarbatti. The herbal incense stick (herbal agarbatti) has no side effects and is suitable for external application.

Myxopyrum smilacifolia (Chaturamulla) that belongs to family Oleaceae) is a large scandent shrub that is widely distributed throughout Kerala and in evergreen forests at altitudes of 600 to 900m. Its roots are useful in scabies and prurigo in children. The leaves are astringent, acrid, sweet, thermogenic, anodyne, febrifuge and tonic. They are useful in vitiated conditions of kapha and vata, cough, asthma, rheumatism, cephalgia, nostalgia, consumption, fever, otopathy, neuropathy and cuts and wounds.

In the present invention, the method for preparing the herbal mosquito repellent comprises the steps in which all the constituents are first cleaned, dried and powdered to the size ranging from 10 to 100 mesh size. The powder of specific part of the herbal plant and wood powder (saw dust) is mixed in specific proportions with the sticky pulp of green Adusa (*Adhatoda vasica*) leaves or gums like gum Arabic or gum Tragacanth that are used to bind the mixture together while an oxidizer such as sodium nitrate or potassium nitrate which is added to sustain the burning of the incense.

Fragrant materials are combined into the base prior to the formation as in the case of powdered incense materials or after formation as in the case of essential oils. Besides this, a small amount of waste cardboard pulp or wood powder (saw dust) and charcoal are also added to help with easy burning. The dough like mixture is

then rolled around bamboo sticks that are left to dry in the sun. Alternatively, the dough can also be rolled to formulate mosquito coils.

Alternatively the dried powder of aerial parts of the herbal plant is extracted with organic solvents alone or in combination ranging from 10 to 50%. The solvent is selected from ethyl acetate, ethanol, isopropanol and butanol. After decantation/ filtration, the extract thus obtained can also be used to formulate blank herbal/dummy incense stick (agarbatti) for external use.

The ratio of solid powder of herbal mixture to solvent ranges from 1 to 20 (Powder: Solvent). The blank/dummy incense sticks are dipped in the solution of the herbal extract and soaked for a time period ranging from 2-60 minutes at a temperature ranging from 25-35°C. The specific quantity of any essential oil of choice is sprayed on herbal incense sticks (herbal agarbattis) for a fragrance that can then be used directly. Alternatively, the plant extract can also be used to formulate herbal ointment or lotion.

The following examples depict the presently preferred embodiments of the invention for the purpose of illustrating the practice thereof and not by way of limitation of the scope of the invention. In the examples, all proportions are by weight, unless otherwise noted.

Example: 1

Composition of the mixture (w/w) for the preparation of herbal mosquito repellent formulation 1 as described in detailed description

Myxopyrum smilacifolia (aerial parts)	70 % w/w
Cardboard pulp	30% w/w
Essential oil	0.1%v/v

Aerial parts of the herbal plant were cleaned, dried and powdered to 20 mesh size. The powder of specific part of different herbs were mixed in specific proportions and pulverized in a mixer-grinder for 5 minutes. The dried powder of different herbs was mixed in a specific proportion with the sticky pulp of green Adusa (*Adhatoda vasica*) leaves to bind the mixture together while an oxidizer such as sodium nitrate which was added to sustain the burning of the incense. Essential oil

was added for fragrance into the base. A known amount of waste cardboard pulp was added to help with easy burning. The dough like mixture was then rolled around bamboo sticks that were left to dry in the sun. Alternatively, the dough can also be rolled to formulate mosquito coils. The dried powdered herb was extracted by soaking overnight in an organic solvent ethyl acetate for a time period of 12 hours. The ratio of solid powder of herbal mixture to solvent was 1:20 (Powder: Solvent). The blank/dummy incense sticks were dipped in the solution of herbal extract and soaked for 10 minutes at a temperature of 25°C. The specific quantity of essential oil was sprayed on the herbal incense sticks for a fragrance that could then be used directly. Alternatively, the plant extract can also be used to formulate herbal ointment or lotion.

Example: 2

Composition of the mixture (w/w) for the preparation of herbal mosquito repellent formulation 2 as described in the detailed description.

Myxopyrum smilacifolia (aerial parts)	73 % w/w
Charcoal	27%w/w
Essential oil	0.2%v/v

All the aerial parts of the herbal plant were cleaned, dried and powdered to 50 mesh size. The powder of specific part of different herbs were mixed in specific proportions and pulverized in a mixer-grinder for 15 minutes. The dried powder of different herbs was mixed in specific proportion with gum Arabic to bind the mixture together while an oxidizer such as potassium nitrate was added to sustain the burning of the incense. Essential oil was added for fragrance into the base. A known amount of charcoal was added to help with easy burning. The dough like mixture is then rolled around bamboo sticks that are left to dry in the sun. Alternatively, the dough can also be rolled to formulate mosquito coils.

Alternatively, the dried powdered herb are extracted by soaking overnight in an organic solvent ethyl acetate and ethanol in a ratio of 4 : 1 at a temperature of 32°C for a time period of 18 hours. The ratio of solid powder of herbal mixture to solvent was 1:15 (Powder: Solvent). The blank/dummy incense sticks were dipped in the solution of herbal extract and soaked for 20 minutes at a temperature of 30°C. The specific quantities of essential oil were sprayed on herbal incense

sticks for a fragrance that could then be used directly. Alternatively, the plant extract can also be used to formulate herbal ointment or lotion.

Example: 3

Composition of the mixture (w/w) for the preparation of herbal mosquito repellent formulation 3 as described in the detailed description.

Myxopyrum smilacifolia (aerial parts)	75 % w/w
Charcoal	25% w/w
Essential oil	0.3%v/v

All the aerial parts of the herbal plant were cleaned, dried and powdered to 100 mesh size. The powder of specific part of different herbs were mixed in specific proportions and pulverized in a mixer-grinder for 20 minutes. The dried powder of different herbs was mixed in specific proportion with gum Tragacanth to bind the mixture together while an oxidizer such as sodium nitrate is added to sustain the burning of the incense. Essential oil was added for fragrance into the base. A known amount of charcoal was added to help with easy burning. The dough like mixture was then rolled around bamboo sticks that were left to dry in the sun. Alternatively, the dough can also be rolled to formulate mosquito coils.

Alternatively, the dried powdered herb was extracted by soaking overnight in an organic solvent isopropanol and butanol in a ratio of 1 : 1 at a temperature 35°C for a time period of 24 hours. The ratio of solid powder of herbal mixture to solvent was 1:10 (Powder: Solvent). The blank/dummy incense sticks were dipped in the solution of herbal extract and soaked for 30 minutes at a temperature of 35°C. The specific quantities of essential oil were sprayed on herbal incense sticks for a fragrance that could then be used directly. Alternatively, the plant extract can also be used to formulate herbal ointment or lotion.

Example 4:

Composition of the mixture (w/w) for the preparation of herbal mosquito repellent formulation 4 as described in detailed description.

Myxopyrum smilacifolia (aerial parts)	80 % w/w
Charcoal	20% w/w
Essential oil	0.4%v/v

All the aerial parts of the herbal plant were cleaned, dried and powdered to 100 mesh size. The powder of specific part of different herbs were mixed in specific proportions and pulverized in a mixer-grinder for 25 minutes. The dried powder of different herbs were mixed in specific proportion with sticky pulp of green Adusa (*Adhatoda vasica*) to bind the mixture together while an oxidizer such as potassium nitrate was added to sustain the burning of the incense. Essential oil was added for fragrance into the base. A known amount of waste cardboard pulp was added to help with easy burning. The dough like mixture was then rolled around bamboo sticks that were left to dry in the sun. Alternatively, the dough can also be rolled to formulate mosquito coils.

Alternatively, the dried powdered herb was extracted by soaking overnight in organic solvent comprising ethyl acetate and isopraponol in a ratio of 2: 3 at a temperature 40°C for a time period of 24 hours. The ratio of solid powder of herbal mixture to solvent was 1:10 (Powder: Solvent). The blank/dummy incense sticks were dipped in the solution of the herbal extract and soaked for 50 minutes at a temperature of 35°C. The specific quantities of essential oil were sprayed on herbal incense sticks for a fragrance that could then be used directly. Alternatively, the plant extract can also be used to formulate herbal ointment or lotion.

Example 5

Evaluation of acceptability and effectiveness of herbal mosquito repellent

The overall acceptability of herbal mosquito repellent is shown in Table 1 and was measured in terms of following 5 parameters in the scale of poor (P), average (A), fair (F), good (G) and excellent (E).

Table 1: Overall acceptability of Herbal Mosquito Repellent

Product	Repels mosquitoes	Pleasant Fragrance	Low smoke release
Chemical based mosquito repellent	F	F	P
Herbal mosquito repellent	E	E	G

The composition of herbal mosquito repellent used in the form of incense sticks as obtained in example 3 was the most effective which repels mosquitoes, has a pleasant fragrance, long lasting effect and is convenient to use.

Numerous modifications and adaptations of the system of the present invention will be apparent to those skilled in the art and thus it is intended by the appended claims to cover all such modifications and adaptations which fall within the true spirit and scope of this invention.