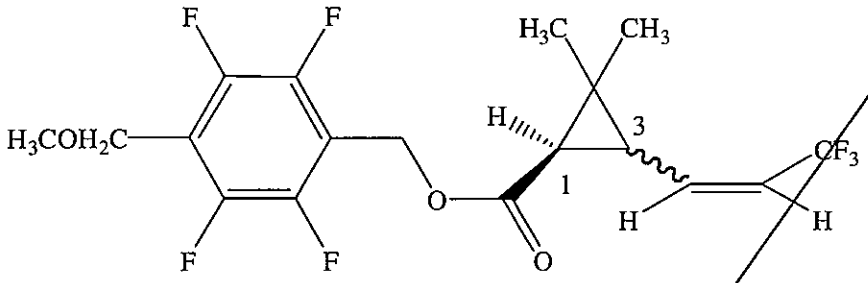
CLAIMS

What is claimed is:

1. A pyrethroid compound, which is a stereoisomer of 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate, characterized in that the structure of the compound is represented by formula (A)



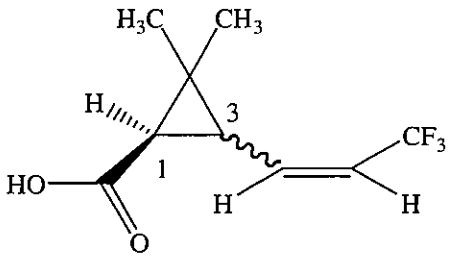
(A)

wherein the carbon-carbon double bond in carboxylic acid moiety is Z configuration, and the absolute stereo configuration at the 1-position of cyclopropane is R configuration, namely, the compound is 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate.

2. The pyrethroid compound according to claim 1, characterized in that the stereostructure of three-membered ring of chrysanthemic acid moiety in the compound is trans-configuration, namely, the compound is 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1R, trans-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate.

3. The pyrethroid compound according to claim 1, characterized in that the stereostructure of three-membered ring of chrysanthemic acid moiety in the compound is cis-configuration, namely, the compound is 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1R, cis-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate.

4. A synthesis process of the pyrethroid compound according to claim 1, characterized in that an esterification raction between 1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid represented by formula (B)



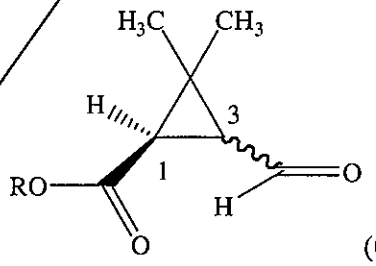
(B)

and 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl alcohol is performed at a molar ratio of 0.8~1.2:1 in the presence of sulfuric acid or *p*-toluenesulfonic acid in an organic solvent at 60-130□ to obtain the pyrethroid compound, wherein the molar ratio of catalyst sulfuric acid or *p*-toluenesulfonic acid to 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl alcohol is 0.01~ 0.1:1.

5. A synthesis process of the pyrethroid compound according to claim 1, characterized in that 1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid represented by formula (B) is acyl chloridized by a acyl chloridizing reagent to obtain 1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid chloride, followed by reacting with 2,3,5,6-tetrafluoro-4-methoxymethyl benzyl alcohol to obtain the pyrethroid compound .

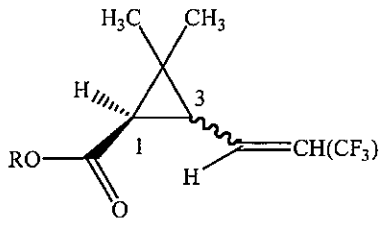
6. The synthesis process according to claim 4 or 5, characterized in that the compound represented by formula (B) is obtained by isolating 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethyl-cyclopropanecarboxylic acid by recrystallization, wherein the solvent used for recrystallization is methanol-water, the weight ratio of methanol to water is 0.1~10:1 and that of 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid to the solvent used for recrystallization is 0.05~0.1:1.

7. The synthesis process according to claim 6, characterized in that said 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid is obtained by reacting an aldehyde ester of formula (C)



(C) wherein R=CH_3,CH_2CH_3

with a wittig reagent $(C_6H_5)_3P^+$-CH_2CF_3- at a molar ratio of 0.8~1.2:1 in THF under 0~40 □ for 5~20 hours to form a compound of formula (D)



(D) wherein R=CH_3,CH_2CH_3,

followed by hydrolysis.

8. An use of the pyrethroid compound according to claim 1 in controlling sanitary pests.

9. The use according to claim 8, characterized in that said sanitary pests are mosquitoes, flies or blattella germanicas.

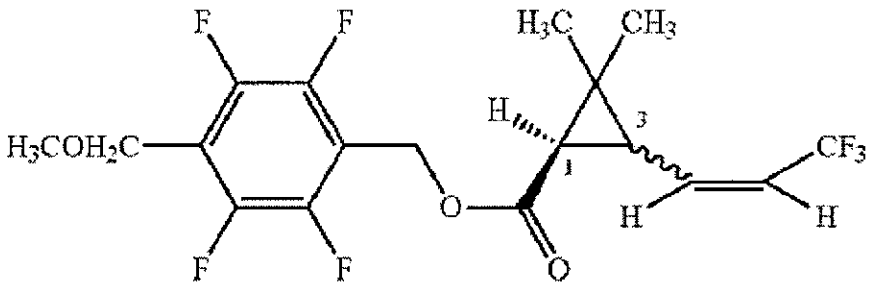
10. The use according to claim 8, characterized in that a pesticide incense coil, electric heating mosquito-repellent mat or electric heating liquid mosquito-repellent incense containing the compound is prepared, the compound is volatilizable under heating; or a ribbon-shaped paper containing the compound is prepared, the compound is volatilizable at room temperature.

CLAIMS

What is claimed is:

1. A pesticide comprising a pyrethroid compound, which is a stereoisomer of 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate, characterized in that the structure of the compound is represented by formula (A)

(A)



wherein the carbon-carbon double bond in carboxylic acid moiety is Z configuration, and the absolute stereo configuration at the 1-position of cyclopropane is R configuration, namely, the compound is 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate,
wherein the pesticide does not contain 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1S-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylate.

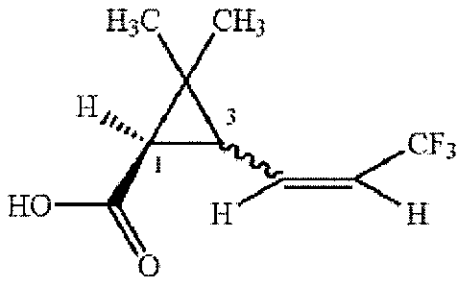
2. The pesticide comprising a pyrethroid compound according to claim **1**, characterized in that the stereostructure of three-membered ring of chrysanthemic acid moiety in the

compound is trans-configuration, namely, the compound is 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1R, trans-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate.

3. The pesticide comprising a pyrethroid compound according to claim **1**, characterized in that the stereostructure of three-membered ring of chrysanthemic acid moiety in the compound is cis-configuration, namely, the compound is 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl-1R, cis-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate.

4. A method of preparing the pyrethroid compound according to claim **1**, characterized in that an esterification reaction between 1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid represented by formula (B)

(B)



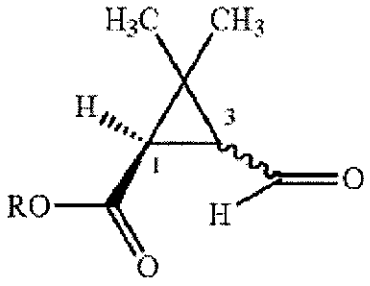
and 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl alcohol is performed at a molar ratio of 0.8 to 1.2:1 in the presence of sulfuric acid or p-toluenesulfonic acid in an organic solvent at 60-130° C. to obtain the pyrethroid compound, wherein a molar ratio of catalyst sulfuric acid or p-toluenesulfonic acid to 2,3,5,6-tetrafluoro-4-methoxymethylbenzyl alcohol is 0.01 to 0.1:1.

5. A method of preparing the pyrethroid compound according to claim **1**, characterized in that 1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid represented by formula (B) is acyl chloridized by an acyl chloridizing reagent to obtain 1R-(Z)-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid chloride, followed by reacting with 2,3,5,6-tetrafluoro-4-methoxymethyl benzyl alcohol to obtain the pyrethroid compound.

6. The method according to claim **4**, characterized in that the compound represented by formula (B) is obtained by isolating 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid by recrystallization, wherein a solvent used for recrystallization is methanol-water, a weight ratio of methanol to water is 0.1 to 10:1 and that of 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid to the solvent used for recrystallization is 0.05 to 0.1:1.

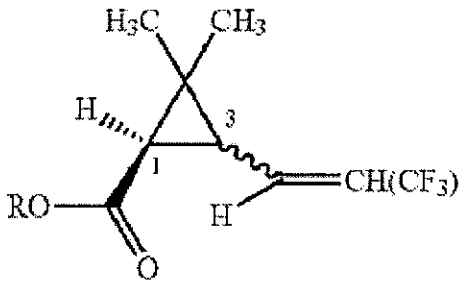
7. The method according to claim **6**, characterized in that said 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid is obtained by reacting an aldehyde ester of formula (C)

(C)



wherein R═CH_3,CH_2CH_3 with a wittig reagent $(C_6H_5)_3P^+$—CH_2CF_3— at a molar ratio of 0.8 to 1.2:1 in THF under 0-40° C. for 5-20 hours to form a compound of formula (D)

(D)



wherein R═CH_3,CH_2CH_3, followed by hydrolysis.

8. A method of controlling sanitary pests comprising exposing the pests to the pesticide according to claim **1**.

9. The method according to claim **8**, characterized in that said sanitary pests are mosquitoes, flies, or blattella germanicas.

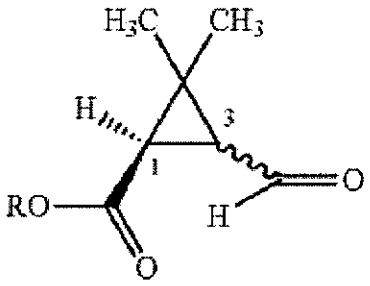
10. The method according to claim **8**, characterized in that a pesticide incense coil, electric heating mosquito-repellent mat, or electric heating liquid mosquito-repellent incense containing the compound according to claim **1** is prepared, and the compound is volatilizable under heating.

11. The method according to claim **5** characterized in that the compound represented by formula (B) is obtained by isolating 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid by recrystallization, wherein a solvent used for recrystallization is methanol-water, a weight ratio of methanol to water is 0.1 to 10:1 and that of 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropane carboxylic acid to the solvent used for recrystallization is 0.05 to 0.1:1.

12. The method according to claim **11** characterized in that said 1R-3-(3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclo-

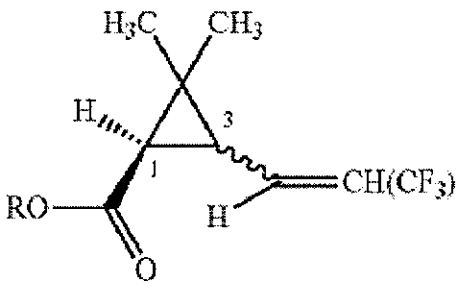
propane carboxylic acid is obtained by reacting an aldehyde ester of formula (C)

(C)



wherein R═CH_3,CH_2CH_3 with a wittig reagent $(C_6H_5)_3P^+$—CH_2CF_3— at a molar ratio of 0.8 to 1.2:1 in THF under 0-40° C. for 5-20 hours to form a compound of formula (D)

(D)



wherein R═CH_3,CH_2CH_3, followed by hydrolysis.

13. The method according to claim **8** wherein a ribbon-shaped paper containing the compound according to claim **1** is prepared, and the compound is volatilized at room temperature.