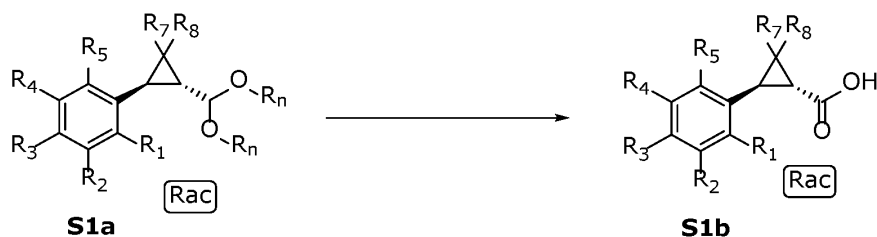


WE CLAIM

1. A process comprising oxidizing **S1a** to **S1b** with an oxidizing agent in the presence of a polar solvent

5



wherein

(a) **R₁**, **R₂**, **R₃**, **R₄**, and **R₅** are each independently H, F, Cl, Br, I, CN, NH₂, NO₂, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₁-C₆)haloalkyl, or (C₁-C₆)haloalkoxy, with the proviso that at least one of **R₂**, **R₃**, and **R₄** is not H;

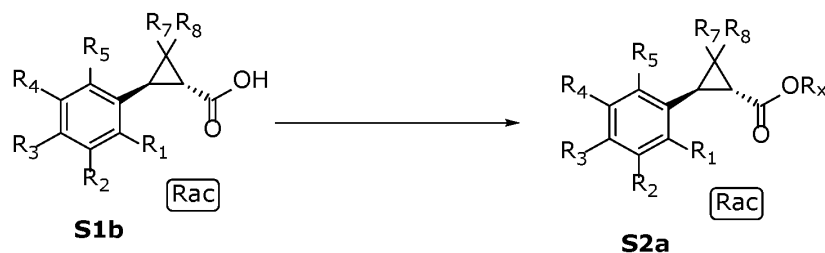
(b) **R₇** and **R₈** are each independently F, Cl, Br, or I; and

(c) (1) each **R_n** is independently a (C₁-C₆)alkyl, or

(2) both **R_n** form a (C₂-C₆)alkyl link between the two oxygen atoms.

15

2. A process comprising esterifying **S1b** to **S2a** in the presence of an acid and an (C₁-C₆)alcohol



wherein

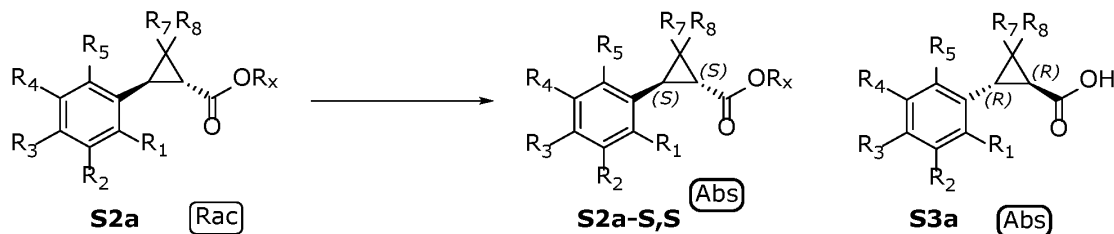
(a) **R₁**, **R₂**, **R₃**, **R₄**, and **R₅** are each independently H, F, Cl, Br, I, CN, NH₂, NO₂, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₁-C₆)haloalkyl, or (C₁-C₆)haloalkoxy, with the proviso that at least one of **R₂**, **R₃**, and **R₄** is not H;

(b) **R₇** and **R₈** are each independently F, Cl, Br, or I; and

(c) **R_x** is (C₁-C₆)alkyl or (C₁-C₆)hydroxyalkyl.

25

3. A process comprising hydrolyzing **S2a** to **S3a** using one or more carboxylic ester hydrolases in the presence of water and optionally an aqueous buffer



wherein

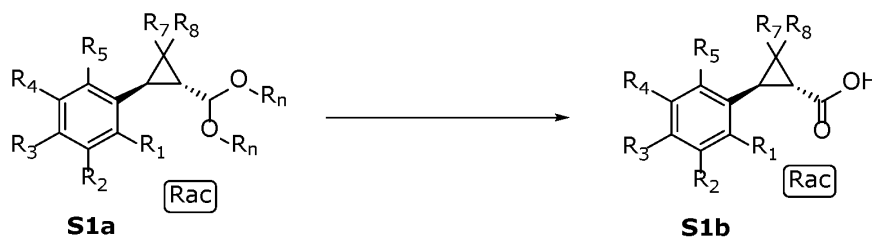
(a) **R₁**, **R₂**, **R₃**, **R₄**, and **R₅** are each independently H, F, Cl, Br, I, CN, NH₂, NO₂, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₁-C₆)haloalkyl, or (C₁-C₆)haloalkoxy, with the proviso that at least one of **R₂**, **R₃**, and **R₄** is not H;

(b) **R₇** and **R₈** are each independently F, Cl, Br, or I; and

(c) **R_x** is (C₁-C₆)alkyl or (C₁-C₆)hydroxyalkyl.

4. A process comprising the steps of

(A) oxidizing **S1a** to **S1b** with an oxidizing agent in the presence of a polar solvent



wherein

(a) **R₁**, **R₂**, **R₃**, **R₄**, and **R₅** are each independently H, F, Cl, Br, I, CN, NH₂, NO₂, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₁-C₆)haloalkyl, or (C₁-C₆)haloalkoxy, with the proviso that at least one of **R₂**, **R₃**, and **R₄** is not H;

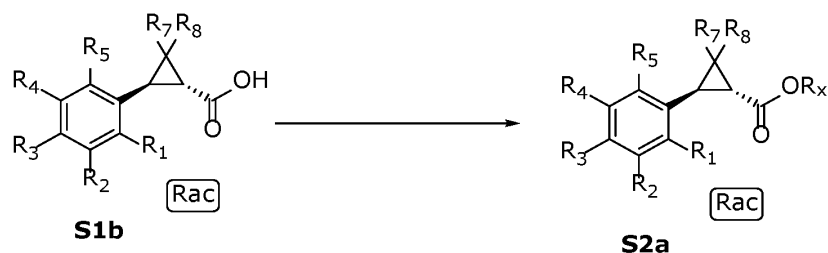
(b) **R₇** and **R₈** are each independently F, Cl, Br, or I; and

(c) **(1)** each **R_n** is independently a (C₁-C₆)alkyl, or

(2) both **R_n** form a (C₂-C₆)alkyl link between the two oxygen atoms

followed by

(B) esterifying **S1b** to **S2a** in the presence of an acid and an (C₁-C₆)alcohol



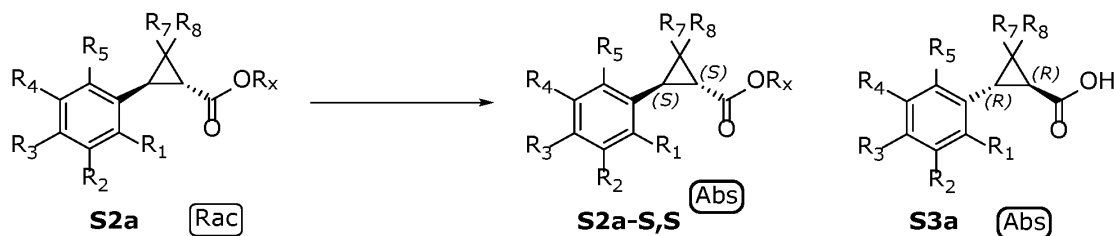
wherein

R₁, R₂, R₃, R₄, R₅, R₇, and R₈ are as above in **(A)**; and

R_x is (C₁-C₆)alkyl or (C₁-C₆)hydroxyalkyl;

5 followed by

(C) hydrolyzing **S2a** to **S3a** using one or more carboxylic ester hydrolases in the presence of water and optionally an aqueous buffer

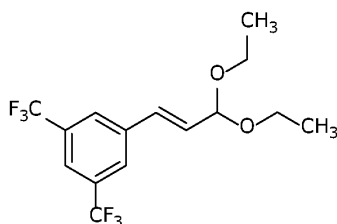


wherein

10 **R₁, R₂, R₃, R₄, R₅, R₇, R₈, and R_x** are as above in **(B)**.

5. A molecule useful for the production of arylcyclopropyl carboxylic acids said molecule selected from the group consisting of

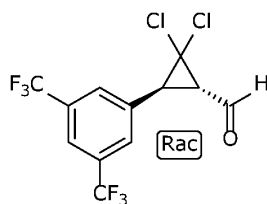
(a)



15

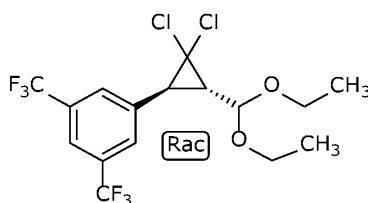
(E)-1-(3,3-diethoxyprop-1-en-1-yl)-3,5-bis(trifluoromethyl)benzene;

(b)



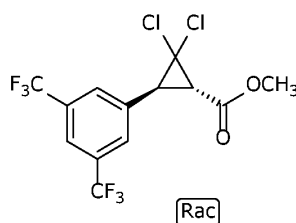
***trans-rac*-1-(3-(3,5-bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carbaldehyde;**

(c)



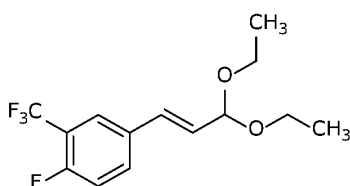
***trans-rac*-1-(2,2-dichloro-3-(diethoxymethyl)cyclopropyl)-3,5-bis(trifluoromethyl)benzene;**

(d)



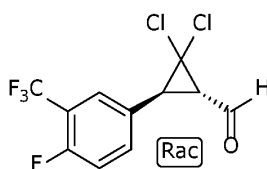
***trans-rac*-methyl 3-(3,5-bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carboxylate;**

(e)



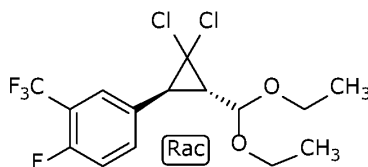
(*E*)-4-(3,3-diethoxyprop-1-en-1-yl)-1-fluoro-2-(trifluoromethyl)benzene;

(f)



***trans-rac*-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carbaldehyde.**

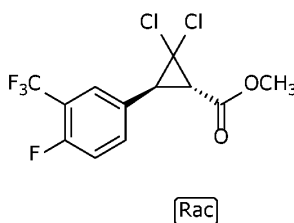
(g)



5

***trans-rac*-4-(2,2-dichloro-3-(diethoxymethyl)cyclopropyl)-1-fluoro-2-(trifluoromethyl)benzene;**

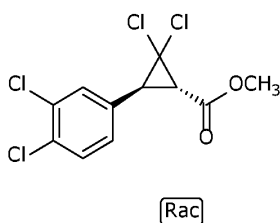
(h)



10

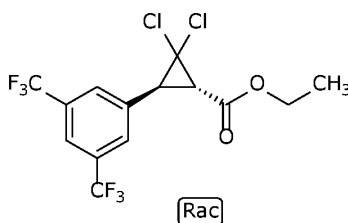
***trans-rac*-methyl 2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxylate;**

(i)



***trans-rac*-methyl 2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxylate;**

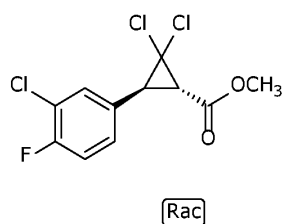
(j)



15

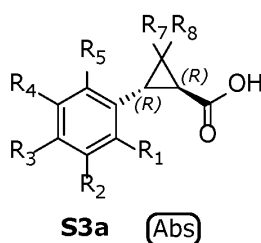
***trans-rac*-ethyl 3-(3,5-bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carboxylate; and**

(k)



trans-rac-methyl 2,2-dichloro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxylate.

- 5 **6.** An enantiomerically enriched preparation of **S3a**, wherein the enantiomeric excess of the **S3a** (*R,R*)-enantiomer is greater than 80%, greater than 90%, or greater than 95%



wherein

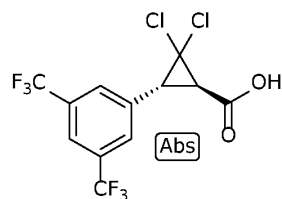
- 10 **(a)** **R₁**, **R₂**, **R₃**, **R₄**, and **R₅** are each independently H, F, Cl, Br, I, CN, NH₂, NO₂, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₁-C₆)haloalkyl, or (C₁-C₆)haloalkoxy, with the proviso that at least one of **R₂**, **R₃**, and **R₄** is not H; and
- (b)** **R₇** and **R₈** are each independently F, Cl, Br, or I.

- 15 **7.** The preparation of claim **6**, wherein the enantiomeric excess of the **S3a** (*R,R*)-enantiomer is greater than 96%, greater than 97%, or greater than 98%.

8. A pesticidal formulation comprising the enantiomerically enriched preparation of claims **6** or **7**.

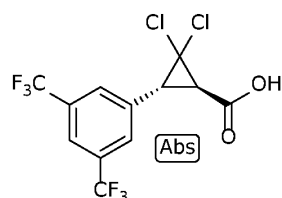
20

- 9.** A preparation according to claims **6** or **7**, wherein **R₂** and **R₄** are CF₃; **R₁**, **R₃**, and **R₅** are H; and **R₇** and **R₈** are Cl



(1*R*,3*R*)-3-(3,5-bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carboxylic acid.

- 5 **10.** A pesticidal formulation according to claim **8**, wherein **R₂** and **R₄** are CF₃; **R₁**, **R₃**, and **R₅** are H; and **R₇** and **R₈** are Cl



(1*R*,3*R*)-3-(3,5-bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carboxylic acid.

10