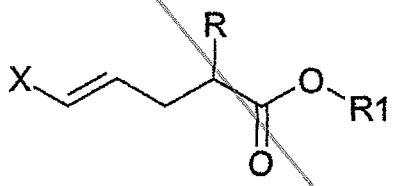
Claims

1. A polypeptide or recombinant protein having esterase activity and exhibiting an amino acid sequence that is at least 98% identical to the amino acid sequence of SEQ. ID. No. 1.

2. A polypeptide or recombinant protein which exhibits at least 98% identity to the amino acid sequence shown in SEQ ID No. 1 and has activity for racemate resolution of 2-alkyl-5-halopent-4-enecarboxylic esters of the formula (I)



(I)

in which R is a C_1-C_6-alkyl radical, R_1 is C_1-C_4-alkyl and X is chlorine, bromine or iodine.

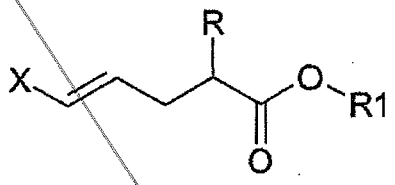
3. A polypeptide or recombinant protein having esterase activity according to claims 1-2, which exhibits an amino acid sequence modified by a modification selected from the group consisting of mutation, deletion, insertion, extension and fusion.

4. A nucleotide sequence which codes for a polypeptide or recombinant protein according to claims 1 -3.

5. A nucleotide sequence comprising the sequence shown in SEQ ID No. 2.

6. A nucleotide sequence obtainable by isolating mRNA from an organism followed by amplification of a nucleic acid fragment using a first primer comprising the nucleotide sequence GGGCAGCCAGCCTCGC and a second primer comprising the nucleotide sequence GGGCAGCCAGCCTCGC.

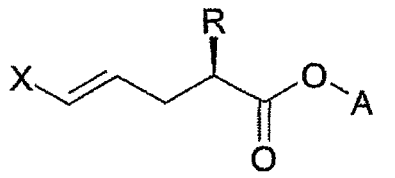
7. The use of a polypeptide or a recombinant protein according to claims 1-3 for racemic resolution of 2-alkyl-5-halopent-4-enecarboxylic esters of the formula (I)



(I)

in which R is a C_1-C_6-alkyl radical, R_1 is C_1-C_4-alkyl and X is chlorine, bromine or iodine.

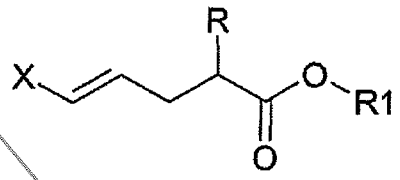
8. A method for preparing enantiomerically enriched 2-alkyl-5-halopent-4-enecarboxylic acids or esters thereof of the formula (II)



(II)

in which R is a C_1-C_6-alkyl radical, A is equal to H, R_1, where R_1 may be C_1-C_4-alkyl, or R_2, where R_2 is an alkyl group, but is not equal to R_1, and X is chlorine, bromine or iodine, which comprises a mixture of

enantiomers of a 2-alkyl-5-halopent-4-enecarboxylic ester of the formula (I)



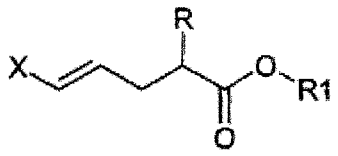
(I)

in which R, R_1 and X are as defined above,
being converted by means of a polypeptide or a recombinant esterase according to claims 1-3 in the presence of water or an alcohol of the formula R_2OH, where R_2 is an alkyl group which is not equal to R_1, as nucleophile, and

a) either the remaining enantiomerically enriched 2-alkyl-5-halopent-4-enecarboxylic ester of the formula (II) with A equal to R_1 being isolated or
b) if an alcohol is employed as nucleophile, the resulting enantiomerically enriched 2-alkyl-5-halopent-4-enecarboxylic ester of the formula (II) with A equal to R_2 being isolated, or
c) if water is employed as nucleophile, the resulting 2-alkyl-5-halopent-4-enecarboxylic acid of the formula (II) with A equal to H being isolated.

Claims

1. A polypeptide or recombinant protein which exhibits at least 98% identity to the amino acid sequence shown in SEQ ID No. 1 and has activity for racemate resolution of 2-alkyl-5-halopent-4- enecarboxylic esters of the formula (I)



(I)

in which R is a C_1-C_6-alkyl radical, R_1 is C_1-C_4- alkyl and X is chlorine, bromine or iodine.

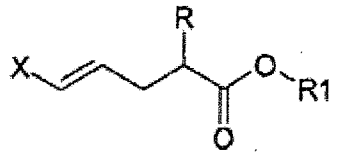
2. A polypeptide or recombinant protein having esterase activity according to claim 1, which exhibits an amino acid sequence modified by a modification selected from the group consisting of mutation, deletion, insertion, extension and fusion.

3. A nucleotide sequence which codes for a polypeptide or recombinant protein according to any of claims 1-2.

4. A nucleotide sequence comprising the sequence shown in SEQ ID No. 2.

5. A nucleotide sequence according to claim 3 or claim 4 obtainable by isolating mRNA from pig liver, using a suitable kit, then generating cDNA by reverse transcription based on the mRNA extract followed by amplification of a nucleic acid fragment using a first primer comprising the nucleotide sequence GGGCAGCCAGCCTCGC and a second primer comprising the nucleotide sequence GGGCAGCCAGCCTCGC.

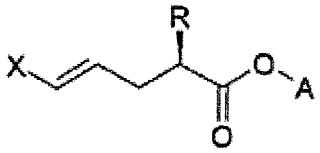
6. The use of a polypeptide or a recombinant protein according to any of claims 1-2 for racemic resolution of 2-alkyl-5-halopent-4-enecarboxylic esters of the formula (I)



(I)

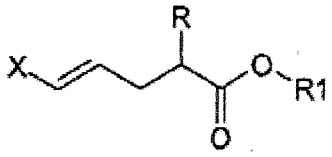
in which R is a C_1-C_6-alkyl radical, R_1 is C_1-C_4-alkyl and X is chlorine, bromine or iodine.

7. A method for preparing enantiomerically enriched 2-alkyl-5-halopent-4-enecarboxylic acids or esters thereof of the formula (II)



(II)

in which R is a C_1-C_6-alkyl radical, A is equal to H, R_1, where R_1 may be C_1-C_4-alkyl, or R_2, where R_2 is an alkyl group, but is not equal to R_1, and X is chlorine, bromine or iodine, which comprises a mixture of enantiomers of a 2-alkyl-5-halopent-4-enecarboxylic ester of the formula (I)



(I)

in which R, R_1 and X are as defined above,

being converted by means of a polypeptide or a recombinant esterase according to any of claims 1-2 in the presence of water or an alcohol of the formula R_2OH, where R_2 is an alkyl group which is not equal to R_1, as nucleophile, and

a) either the remaining enantiomerically enriched 2-alkyl-5-halopent-4-enecarboxylic ester of the formula (II) with A equal to R_1 being isolated or

b) if an alcohol is employed as nucleophile, the resulting enantiomerically enriched 2-alkyl-5- halopent-4-enecarboxylic ester of the formula (II) with A equal to R_2 being isolated, or

c) if water is employed as nucleophile, the resulting 2-alkyl-5-halopent-4-enecarboxylic acid of the formula (II) with A equal to H being isolated.