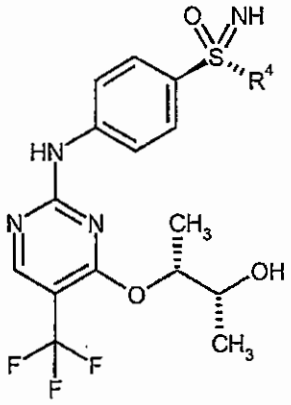
**Patent Claims**

1. Process for the preparation of compounds of the general formula (I)



(I),

in which

$R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring,

characterized by at least one of the following steps:

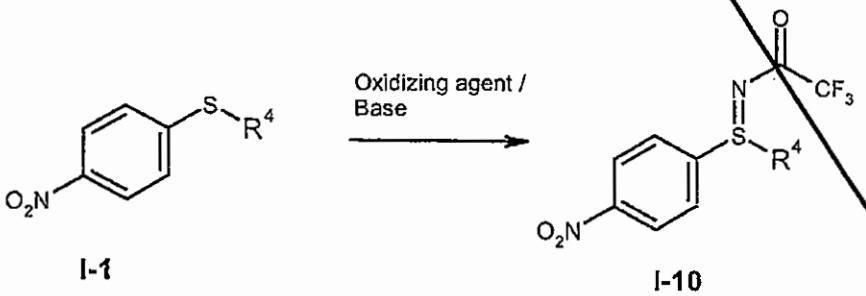
I.a). Alkylation of 4-nitrothiophenol in the presence of potassium carbonate in N-methyl-pyrrolidinone (NMP) to give a nitrophenyl-sulphide of the formula **(I-1)**



**I-1**

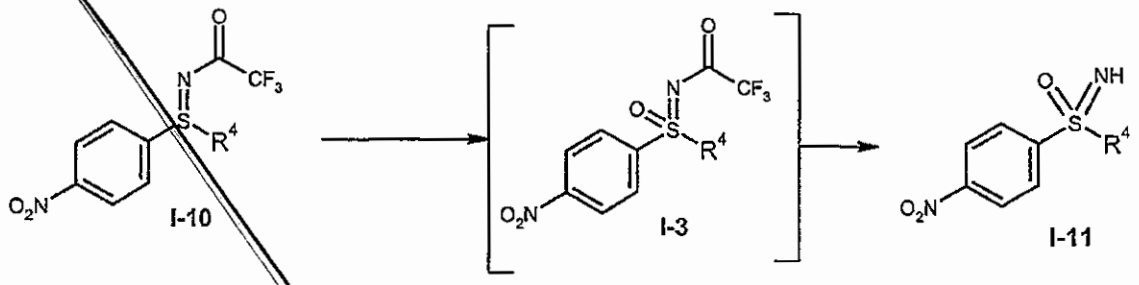
where X is Br, Cl, I, O-$SO_2$-$CH_3$ or O-$SO_2$-(4-methylphenyl),

I.b). Oxidative amination of the nitrophenyl-sulphide of the formula (I-1) to give a trifluoroacetate-protected nitrophenyl-sulphilimine of the formula **(I-10)**

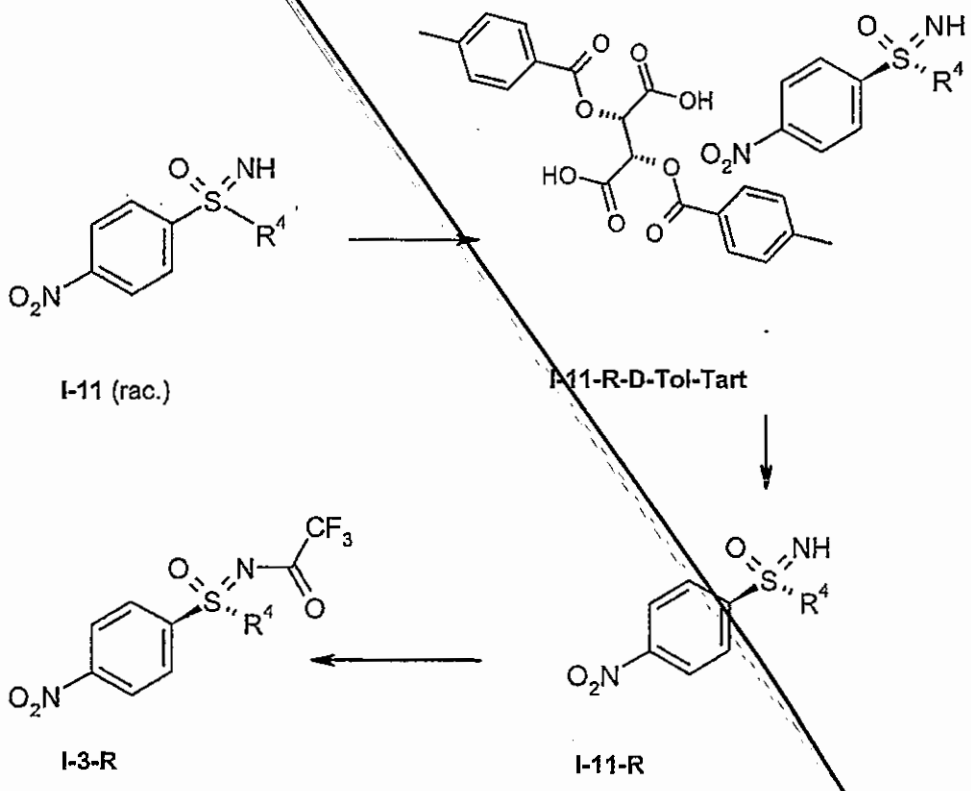



**I-1** **I-10**

I.c). Oxidation of the trifluoroacetate-protected nitrophenyl-sulphilimine of the formula (**I-10**) to give a trifluoroacetate-protected nitrophenyl-sulphoximine of the formula ( I-3) and subsequent deprotection to give a nitrophenyl-sulphoximine of the formula (**I-11**)

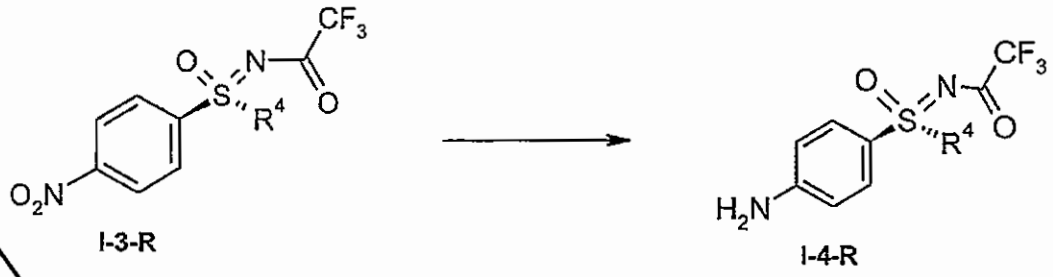



I.d). Racemate cleavage of a nitrophenyl-sulphoximine of the formula (**I-11**) with the help of (+)-di-O-p-toluoyl-D-tartaric acid



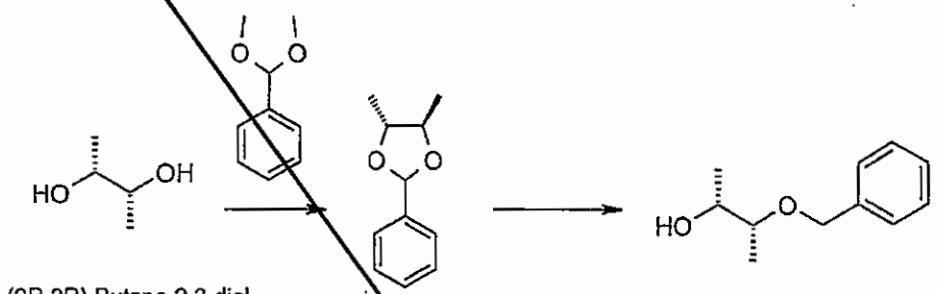

where the R enantiomer of the nitrophenyl-sulphoximine of the formula (**I-11-R**) is then released from the salts and the trifluoroacetate protective group is inserted again to form the R enantiomer of the trifluoroacetate-protected nitrophenyl-sulphoximine of the formula (**I-3-R**),

I.e). Hydrogenation of trifluoroacetate-protected nitrophenyl-sulphoximines of the formula (**I-3-R**) to give trifluoroacetate-protected anilino-sulphoximines of the formula (**I-4-R**) with an iron-doped palladium catalyst



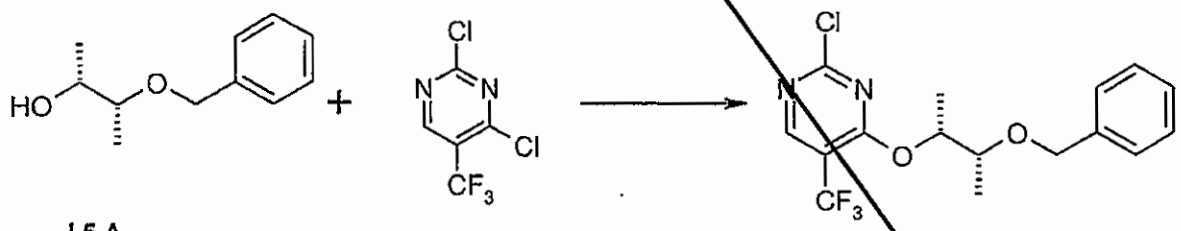
I-3-R I-4-R

I.f). Preparation of (2R,3R)-3-(benzyloxy)butan-2-ol **(I-5-A)** in a two-stage process via (4R,5R)-4,5-dimethyl-2-phenyl-1,3-dioxolane **(I-12-A)**, where the first stage is carried out with pyridinium p-toluenesulphonate in toluene and then a diisobutylaluminium hydride reduction takes place in toluene,



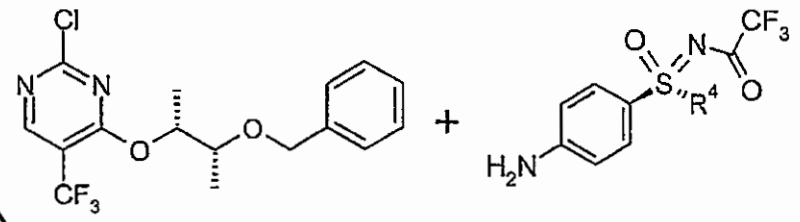
(2R,3R)-Butane-2,3-diol I-12-A I-5-A

I.g). Coupling of **(I-5-A)** with 2,4-dichloro-5-trifluoromethylpyrimidine to give 4-{[(2R,3R)-3-(benzyloxy)butan-2-yl]oxy}-2-chloro-5-(trifluoromethyl)pyrimidine **(I-7-A)** with Li bases in ethereal solvents

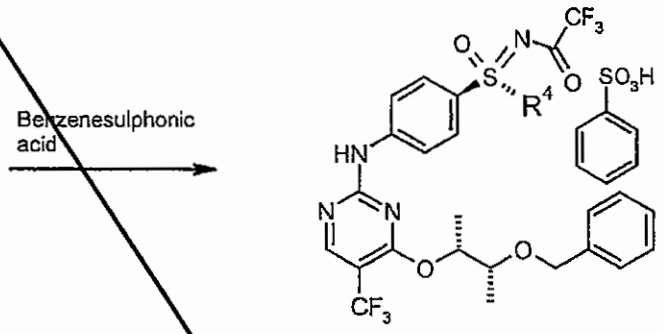


I-5-A 2,4-Dichloro-5-trifluoromethylpyrimidine I-7-A

I.h). Preparation of benzenesulphonic acid salts of doubly protected anilino-pyrimidines of the formula **(I-8-R-BSA)** by benzenesulphonic acid-catalysed coupling of **(I-7-A)** and **(I-4-R)**

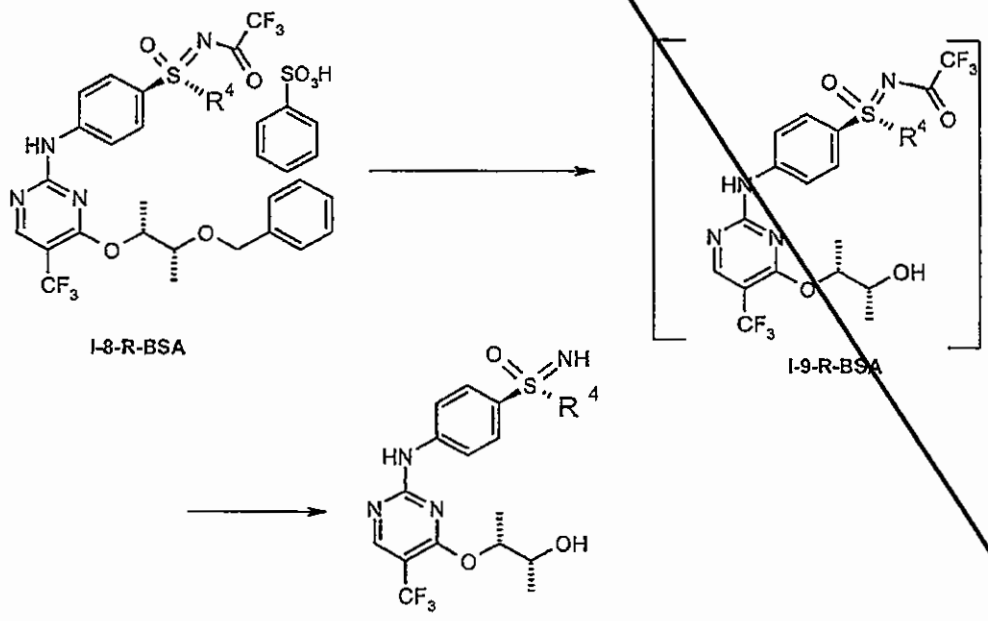


**I-7-A** **I-4-R**




**I-8-R-BSA**

I.i). Cleaving off of the protective groups in benzenesulphonic acid salts of doubly protected anilino-pyrimidines of the formula **(I-8-R-BSA)** by hydrogenation with palladium on activated carbon and hydrogen in methanol, and also by treatment with potassium carbonate in methanol to give compounds of the formula **(I)**



**I-8-R-BSA** **I-9-R-BSA**

**(I)**

2. Process according to Claim 1,

where, in step I.b) 1,3-dibromo-5,5-dimethylhydantoin is used as oxidizing agent and trifluoroacetamide is used as reagent.

3. Process according to Claim 1,

where, in step I.c), the oxidation takes place with potassium peroxomonosulphate (Oxone®).

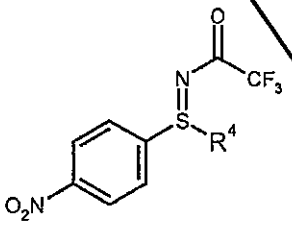
4. Process according to Claim 1,

where, in step I.d), the nitrophenyl-sulphoximine of the formula (I-11) is crystallized with (+)-di-O-p-toluoyl-D-tartaric acid in acetonitrile or propionitrile.

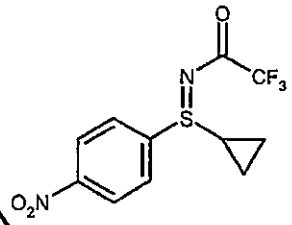
5. Process according to Claim 1,

where, in step I.g), the lithium base used is lithium hexamethyldisilazide and the ethereal solvent used is tetrahydrofuran.

6. Intermediates of the formula (I-10) and (I-10-A)



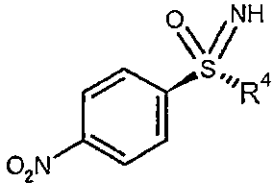
I-10



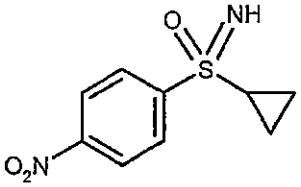
I-10-A

where $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

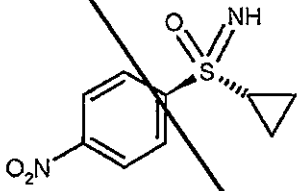
7. Intermediates of the formula (I-11-R), (I-11-A) and (I-11-A-R)



I-11-R



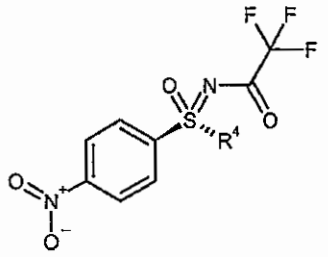
I-11-A



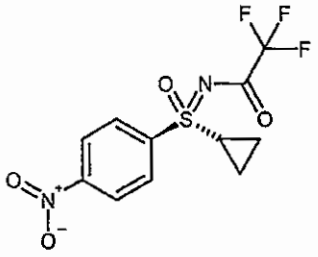
I-11-A-R

where $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

8. Intermediates of the formula of the formula **(I-3-R)** and **(I-3-A-R)**



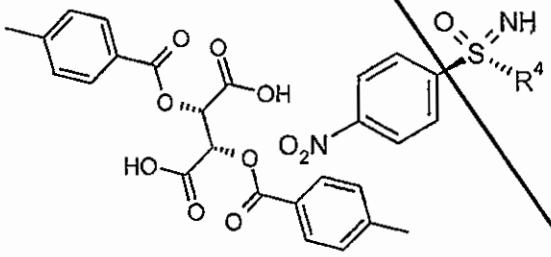
(I-3-R)



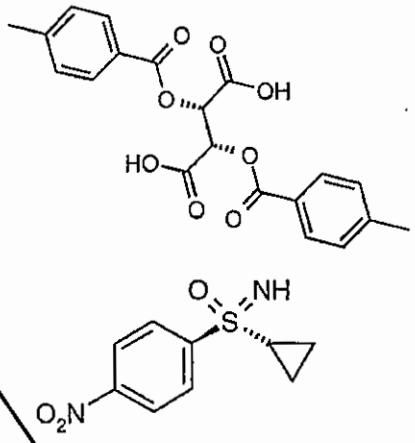
(I-3-A-R)

where $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

9. Salts of the formula **(I-11-R-D-Tol-Tart.)** of nitrophenyl-sulphoximines of the formula **(I-11-R)** with
(+)-di-O-p-toluoyl-D-tartaric acid and the salt of the formula **(I-11-A-R-D-Tol-Tart.)**



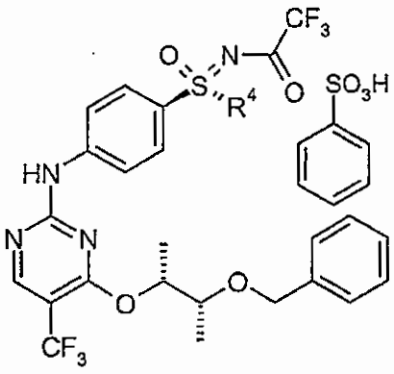
I-11-R-D-Tol-Tart



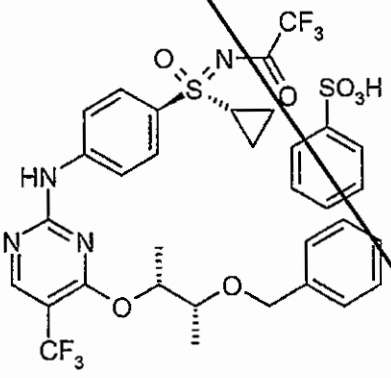
I-11-A-R-D-Tol-Tart

where $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

10. Intermediates of the formula **(I-8-R-BSA)** and **(I-8-A-R-BSA)**



I-8-R-BSA

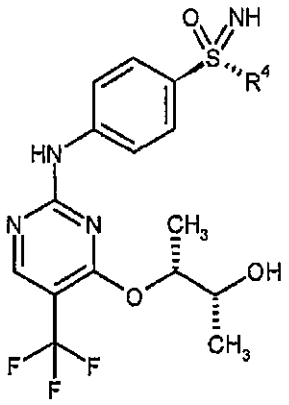


I-8-A-R-BSA

where $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

## Claims

1. A process for the preparation of a compound of general formula **(I)**



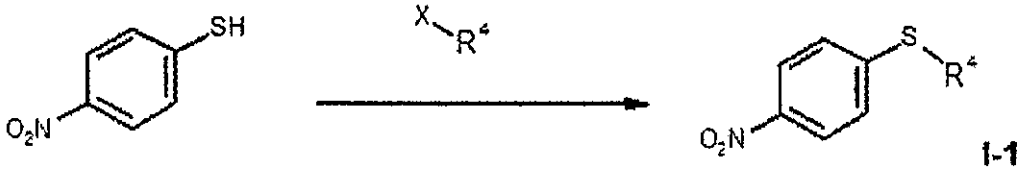
(I),

in which

$R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring,

the process comprising at least one of the following steps:

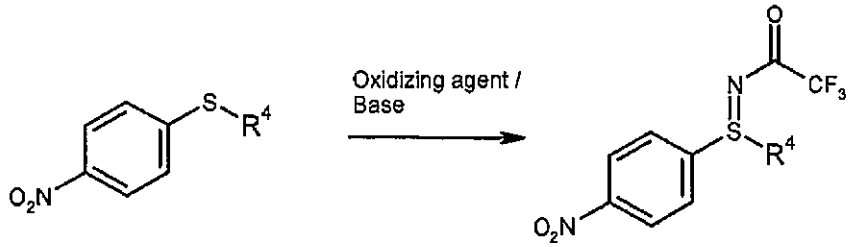
I.a). Alkylation of 4-nitrothiophenol in the presence of potassium carbonate in N-methyl-pyrrolidinone (NMP) to give a nitrophenyl-sulphide of formula **(I-1)**



**I-1**

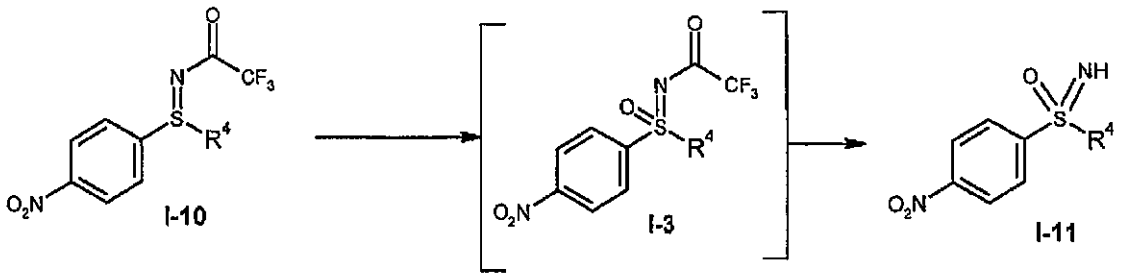
where X is Br, Cl, I, O-$SO_2$-$CH_3$ or O-$SO_2$-(4-methylphenyl),

I.b). Oxidative amination of the nitrophenyl-sulphide of formula **(I-1)** to give a trifluoroacetate-protected nitrophenyl-sulphilimine of formula **(I-10)**

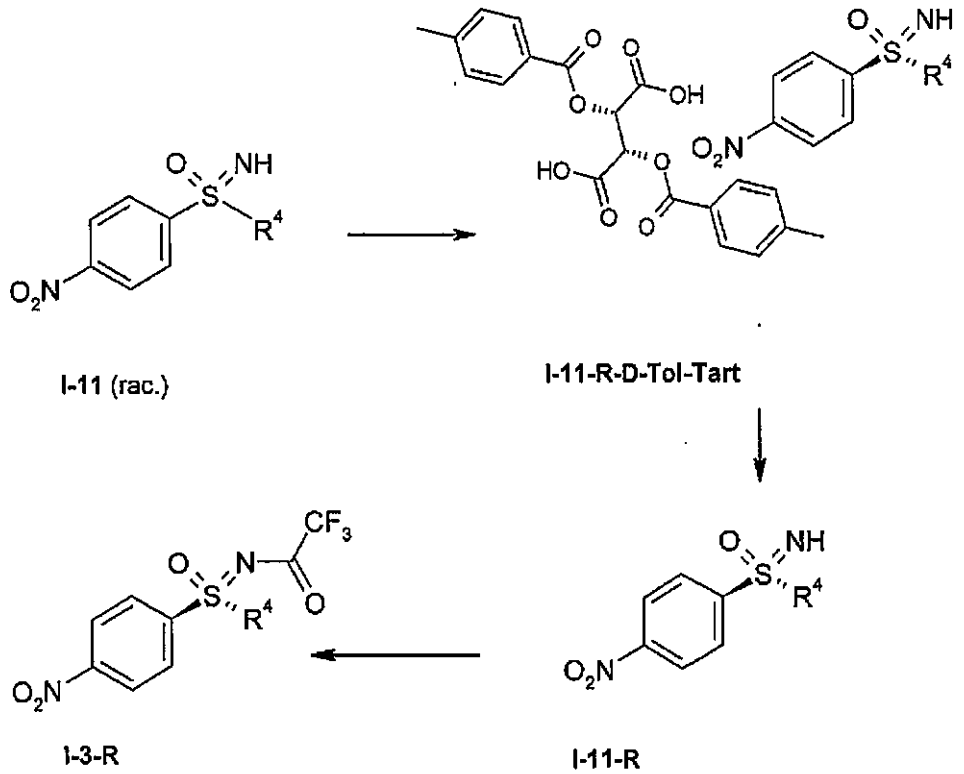



**I-1** **I-10**

I.c). Oxidation of the trifluoroacetate-protected nitrophenyl-sulphilimine of formula **(I-10)** to give a trifluoroacetate-protected nitrophenyl-sulphoximine of formula **(I-3)** and subsequent deprotection to give a nitrophenyl-sulphoximine of formula **(I-11)**

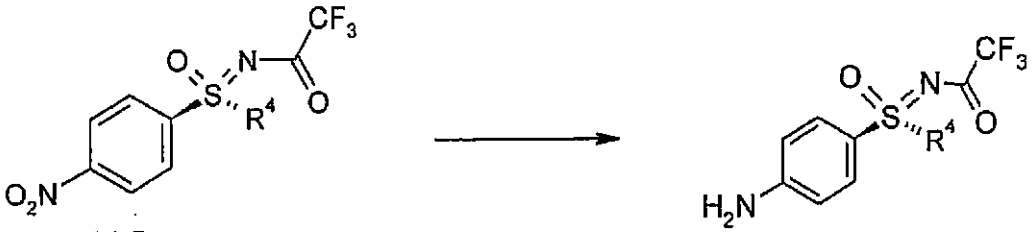



I.d). Racemate cleavage of a nitrophenyl-sulphoximine of formula **(I-11)** with the help of (+)-di-O-p-toluoyl-D-tartaric acid



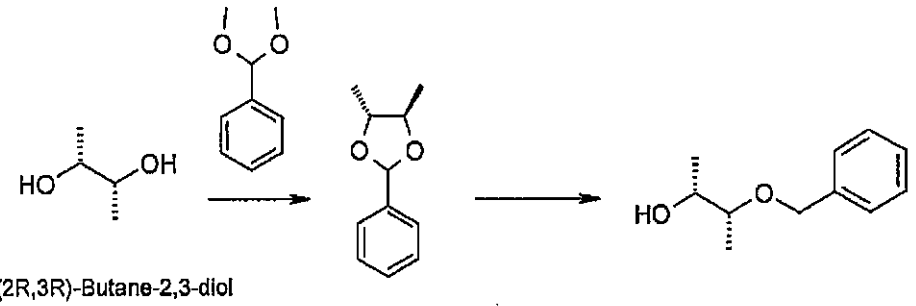

where the R enantiomer of the nitrophenyl-sulphoximine of formula **(I-11-R)** is then released from the salts and the trifluoroacetate protective group is inserted again to form the R enantiomer of the trifluoroacetate-protected nitrophenyl-sulphoximine of formula **(I-3-R)**,

I.e). Hydrogenation of trifluoroacetate-protected nitrophenyl-sulphoximines of formula **(I-3-R)** to give trifluoroacetate-protected anilino-sulphoximines of formula **(I-4-R)** with an iron-doped palladium catalyst



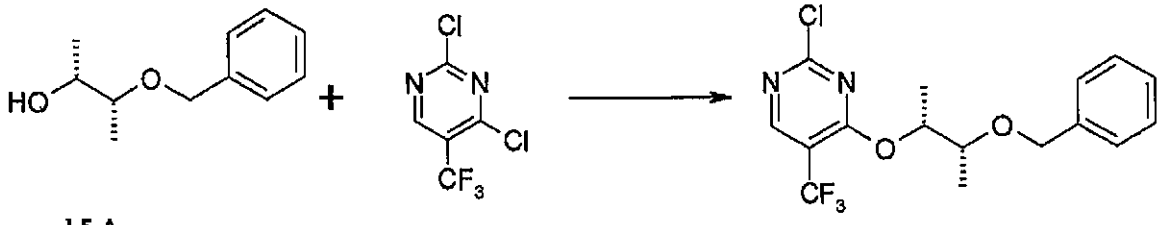
I-3-R I-4-R

I.f). Preparation of (2R,3R)-3-(benzyloxy)butan-2-ol **(I-5-A)** in a two-stage process via (4R,5R)-4,5-dimethyl-2-phenyl-1,3-dioxolane **(I-12-A)**, where the first stage is carried out with pyridinium p-toluenesulphonate in toluene and then a diisobutylaluminium hydride reduction takes place in toluene,



(2R,3R)-Butane-2,3-diol I-12-A I-5-A

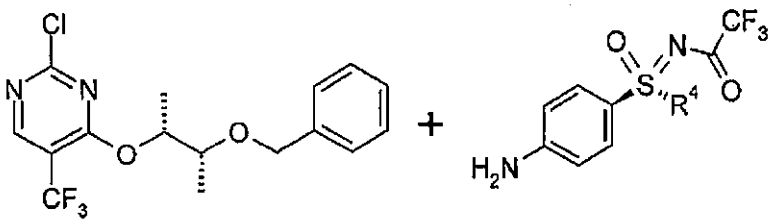
I.g). Coupling of **(I-5-A)** with 2,4-dichloro-5-trifluoromethylpyrimidine to give 4-{[(2R,3R)-3-(benzyloxy)butan-2-yl]oxy}-2-chloro-5-(trifluoromethyl)pyrimidine **(I-7-A)** with Li bases in ethereal solvents



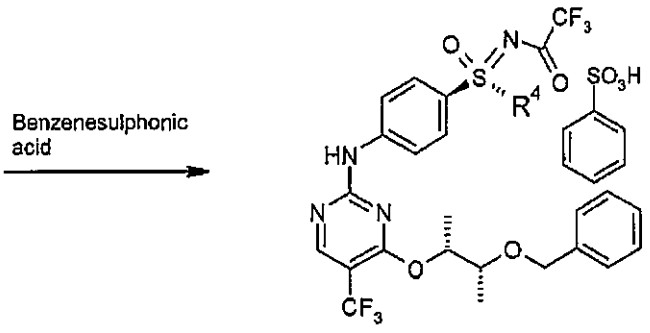
I-5-A 2,4-Dichloro-5-trifluoromethylpyrimidine I-7-A

I.h). Preparation of benzenesulphonic acid salts of doubly protected anilino-pyrimidines

of formula **(I-8-R-BSA)** by benzenesulphonic acid-catalysed coupling of **(I-7-A)** and **(I-4-R)**



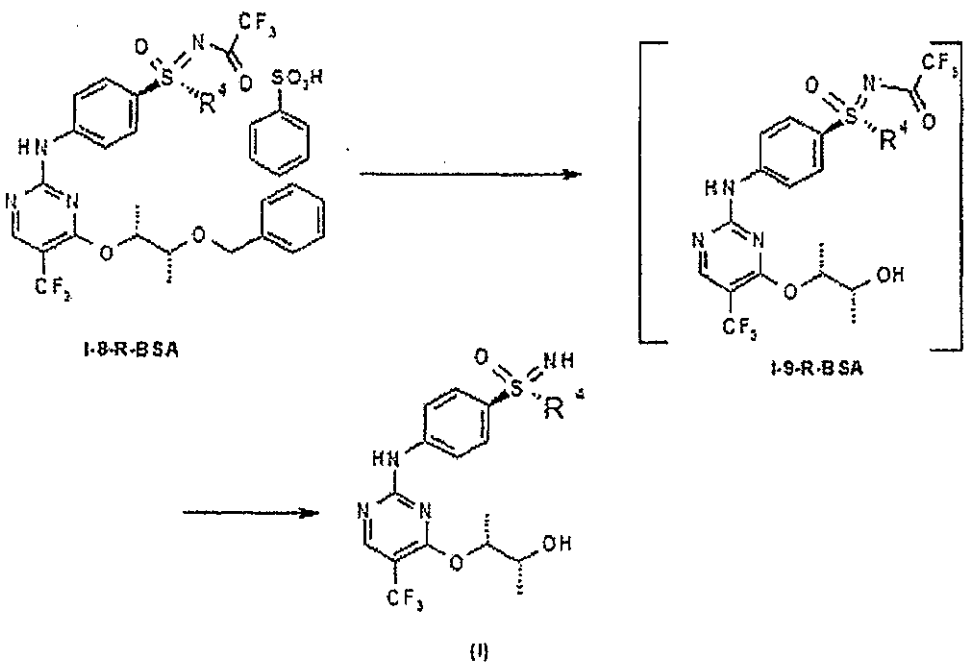
**I-7-A** **I-4-R**




**I-8-R-BSA** ;

and/or

I.i). Cleaving off of the protective groups in benzenesulphonic acid salts of doubly protected anilino-pyrimidines of formula **(I-8-R-BSA)** by hydrogenation with palladium on activated carbon and hydrogen in methanol, and also by treatment with potassium carbonate in methanol to give compounds of the formula **(I)**



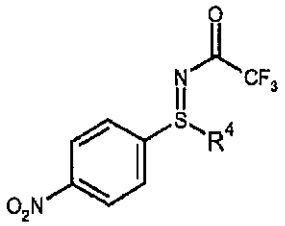

2. A process according to Claim 1, wherein in step I.b) 1,3-dibromo-5,5-dimethylhydantoin is used as an oxidizing agent and trifluoroacetamide is used as a reagent.

3. A process according to Claim 1, wherein in step I.c) oxidation takes place with potassium peroxomonosulphate (Oxone®).

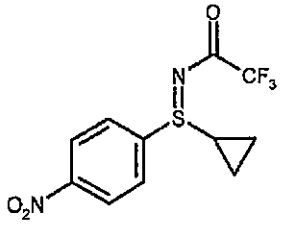
4. A process according to Claim 1, wherein in step I.d) the nitrophenyl-sulphoximine of formula **(I-11)** is crystallized with (+)-di-O-p-toluoyl-D-tartaric acid in acetonitrile or propionitrile.

5. A process according to Claim 1, wherein in step I.g) the lithium base is lithium hexamethyldisilazide and the ethereal solvent is tetrahydrofuran.

6. An intermediate of formula **(I-10)** or **(I-10-A)**



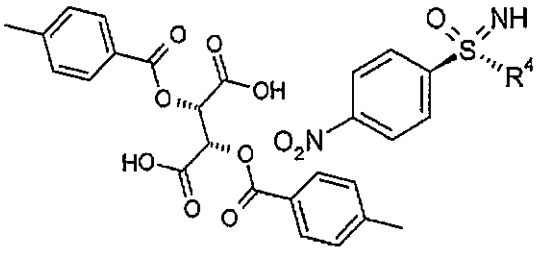
I-10



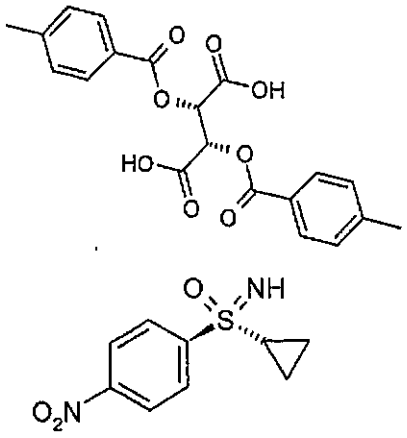
I-10-A

wherein $R^4$ is a $C_3$-$C_7$-cycloalkyl ring.

7. A salt of formula **(I-11-R-D-Tol-Tart.)** or a salt of formula **(I-11-A-R-D-Tol-Tart.)**



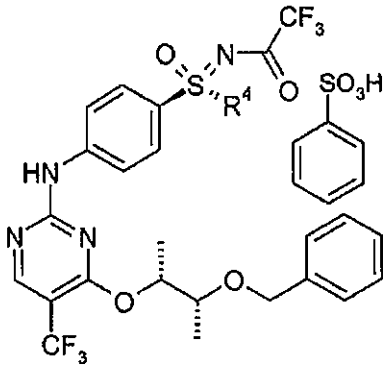
I-11-R-D-Tol-Tart



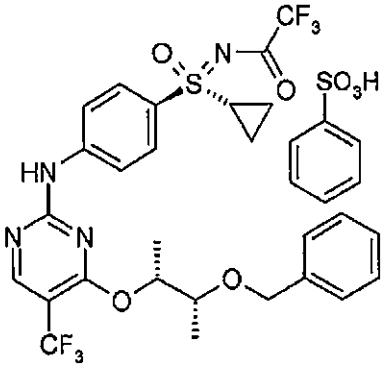
I-11-A-R-D-Tol-Tart

wherein $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

8. An intermediate of formula **(I-8-R-BSA)** or **(I-8-A-R-BSA)**



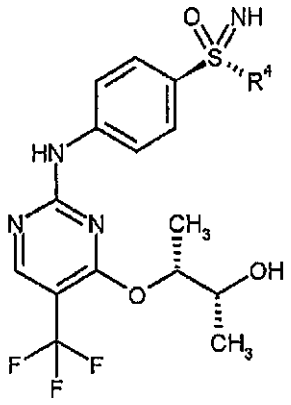
I-8-R-BSA



I-8-A-R-BSA

wherein $R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring.

9. A compound of general formula (I)




(I),

in which

$R^4$ is a $C_1$-$C_6$-alkyl group or a $C_3$-$C_7$-cycloalkyl ring,

prepared by the process of any one of Claims 1 to 5.