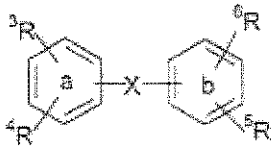
CLAIMS

1. A diphenyl derivative having the formula



(1)

where

X is a direct C-C bond between the rings a and b, CH_2, CHOH, CO, S, SO, SO_2, -N=N-, $-CR^7=CR^8-$ or a divalent $-C(O)-C^*=CH-O-$ radical which together with the two adjacent carbon atoms of the ring a on which it is located forms a pyranone ring, with the ring b being located on the C* atom of this radical,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

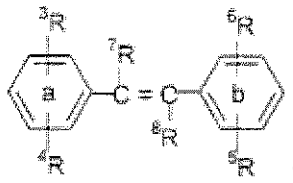
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (1), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

2. The diphenyl derivative as claimed in claim 1 having the formula



(5)

where

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

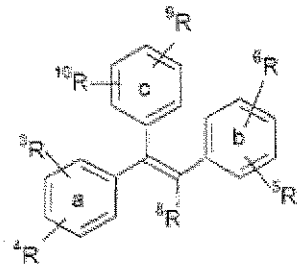
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (5), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

3. The diphenyl derivative as claimed in claim 1 having the formula



(10)

where

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2-CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

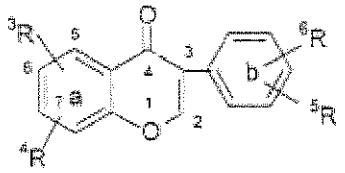
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (10), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

4. The diphenyl derivative as claimed in claim 1 having the formula



(14)

where

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an -OSO_2Y group

R^4, R^5 are each, independently of one another, an -N=N-$N(R^2)_2$ group or an -OSO_2Y group,

Y is OH or $N(R^1)_2$,

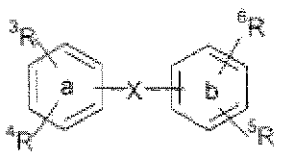
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (14), one or two -N=N-$N(R^2)_2$ groups and one or two -OSO_2Y groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

5. The diphenyl derivative as claimed in claim 1 having the formula



(18)

where

X is a direct C-C bond, CH_2, CHOH, CO, S, SO, SO_2 or -N=N-,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_1-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alky-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an -OSO_2Y group,

R^4, R^5 are each, independently of one another, an -N=N-$N(R^2)_2$ group or an -OSO_2Y group,

Y is OH or $N(R^1)_2$,

R^1 is hydrogen, methyl or ethyl and

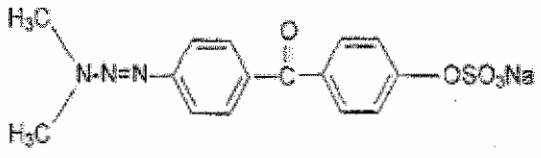
R^2 is methyl or ethyl,

with the proviso that, per total molecule (18), one or two -N=N-$N(R^2)_2$ groups and one or two -OSO_2Y groups are located on any ring carbons of aromatic rings,

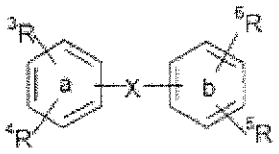
and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

6. The diphenyl derivative as claimed in any of claims 1 and 5 having the formula

4-(3,3-dimethyltriazenyl-1)-4'-sodiosulfooxybenzophenone



7. A process for preparing diphenyl derivatives as defined in any of claims 1 to 6, wherein aminophenyl derivatives of the formula



(2)

where

X is a direct C-C bond, CH_2, CHOH, CO, S, SO, SO_2, -N=N-, $-CR^7=CR^8-$ or a divalent -C(O)-C*=CH-O- radical which together with the two adjacent carbon atoms of the ring a on which it is located forms a pyranone ring, with the ring b being located on the C* atom of this radical,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-NH_2$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

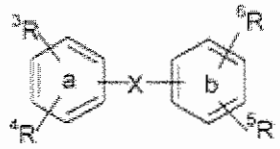
R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-NH_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$, and

R^1 is hydrogen, methyl or ethyl,

with the proviso that, per total molecule (2), one or two NH_2 groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

are diazotized by means of a diazotizing agent in the presence of strong acid at low temperature in aqueous-acidic solution to form diazonium salts of the formula



(3)

where

X is a direct C-C bond, CH_2, CHOH, CO, S, SO, SO_2, -N=N-, $-CR^7=CR^8-$ or a divalent -C(O)-C*=CH-O- radical which together with the two adjacent carbon atoms of the ring a on which it is located forms a pyranone ring, with the ring b being located on the C* atom of this radical,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N_2^+An^-$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N_2^+$ An^- group or an $-OSO_2Y$ group,

An^- is a halogen anion or ½ sulfate (SO_4^{2-}) anion,

Y is OH or $N(R^1)_2$, and

R^1 is hydrogen, methyl or ethyl,

with the proviso that, per total molecule (3), one or two diazonium groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and the diazonium salts (3) obtained are then reacted with dialkylamines of the formula

$$H\ N(R^2)_2 \quad (4)$$

where R^2 is methyl or ethyl,
in the presence of acid binding agents,
optionally followed by preparation of the salts from the compounds obtained and optionally followed by setting-free of the hydroxyl and/or acid groups from these salts.

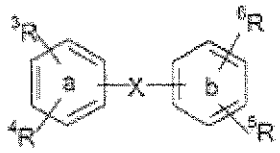
8. A medicament containing at least one diphenyl derivatives as defined in any of claims 1 to 6 or its salts, solvates, and solvates of these salts, optionally together with one or more pharmacologically acceptable auxiliaries or supports.

9. Use of at least one diphenyl derivative as defined in any one of claims 1 to 6 or its salts, solvates and solvates of these salts in the manufacture of a medicament for treating any one of the following tumors of the skin, breast, prostate and testicle or the target organs dependent on sex hormones in human beings and animals.

CLAIMS

1. A diphenyl derivative containing (i) at least a dialkyltriazenyl group, (ii) at least one sulfooxy group and/or at least one sulfamoyloxy group per molecule, and its salts, solvates and solvates of these salts.

2. The diphenyl derivative as claimed in claim 1 having the formula



(1)

where

X is a direct C-C bond between the rings a and b, CH_2, CHOH, CO, S, SO, SO_2, -N=N-, $-CR^7=CR^8-$ or a divalent $-C(O)-C^*=CH-O-$ radical which together with the two adjacent carbon atoms of the ring a on which it is located forms a pyranone ring, with the ring b being located on the C* atom of this radical,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

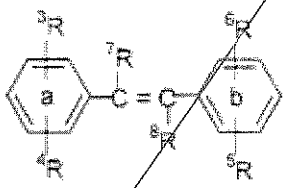
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (1), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

3. The diphenyl derivative as claimed in either claim 1 or 2 having the formula



(5)

where

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

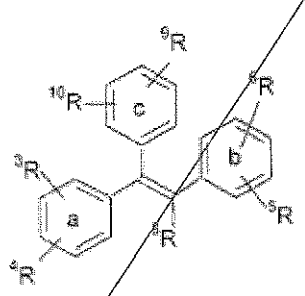
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (5), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

4. The diphenyl derivative as claimed in either claim 1 or 2 having the formula



(10)

where

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2$-CH_2-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-

alkoxy, halogen, nitro, cyano, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

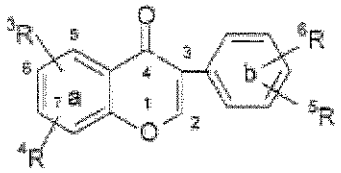
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (10), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

5. The diphenyl derivative as claimed in either claim 1 or 2 having the formula



(14)

where

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group

R^4, R^5 are each, independently of one another, an $-N=N-N(R^2)_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$,

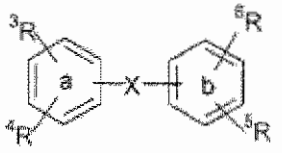
R^1 is hydrogen, methyl or ethyl and

R^2 is methyl or ethyl,

with the proviso that, per total molecule (14), one or two $-N=N-N(R^2)_2$ groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

6. The diphenyl derivative as claimed in either claim 1 or 2 having the formula



(18)

where

X is a direct C-C bond, CH_2, CHØH, CO, S, SO, SO_2 or -N=N-,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_1-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alky-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an -OSO_2Y group,

R^4, R^5 are each, independently of one another, an -N=N-$N(R^2)_2$ group or an -OSO_2Y group,

Y is OH or $N(R^1)_2$,

R^1 is hydrogen, methyl or ethyl and

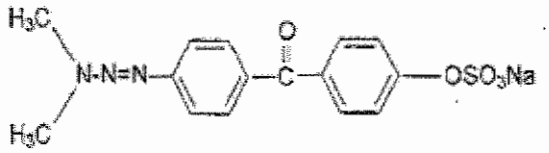
R^2 is methyl or ethyl,

with the proviso that, per total molecule (18), one or two -N=N-$N(R^2)_2$ groups and one or two -OSO_2Y groups are located on any ring carbons of aromatic rings,

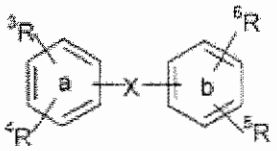
and also its salts, free acids, solvates and the solvates of these salts and the solvates of these free acids.

7. The diphenyl derivative as claimed in any of claims 1, 2 and 6 having the formula

4-(3,3-dimethyltriazenyl-1)-4'-sodiosulfooxybenzophenone



8. A process for preparing diphenyl derivatives as defined in any of claims 1 to 7, wherein aminophenyl derivatives of the formula



(2)

where

X is a direct C-C bond, CH_2, CHOH, CO, S, SO, SO_2, -N=N-, $-CR^7=CR^8-$ or a divalent $-C(O)-C^*=CH-O-$ radical which together with the two adjacent carbon atoms of the ring a on which it is located forms a pyranone ring, with the ring b being located on the C* atom of this radical,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-NH_2$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

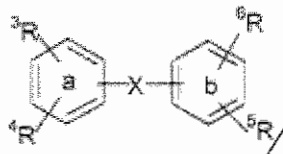
R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-NH_2$ group or an $-OSO_2Y$ group,

Y is OH or $N(R^1)_2$, and

R^1 is hydrogen, methyl or ethyl,

with the proviso that, per total molecule (2), one or two NH_2 groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

are diazotized by means of a diazotizing agent in the presence of strong acid at low temperature in aqueous-acidic solution to form diazonium salts of the formula



(3)

where

X is a direct C-C bond, CH_2, CHOH, CO, S, SO, SO_2, -N=N-, $-CR^7=CR^8-$ or

a divalent $-C(O)-C^*=CH-O-$ radical which together with the two adjacent carbon atoms of the ring a on which it is located forms a pyranone ring, with the ring b being located on the C* atom of this radical,

R^3, R^6 are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkyl-S-, C_1-C_4-alkyl-SO-, C_1-C_4-alkyl-SO_2-, halogen, nitro, cyano or an $-OSO_2Y$ group,

R^4, R^5 are each, independently of one another, an $-N_2^+An^-$ group or an $-OSO_2Y$ group,

R^7 is hydrogen, methyl, ethyl or a phenyl radical which is substituted by the

radicals R^9, R^{10} and is bound directly to the R^7-bearing carbon atom,

R^8 is hydrogen, ethyl, CN, NO_2, $-CH_2CH_2$-halogen or CH_2CH_2OH,

R^9, R^{10} are each, independently of one another, hydrogen, hydroxyl, C_1-C_4-alkyl, C_1-C_4-alkoxy, halogen, nitro, cyano, an $-N_2^+$ An^- group or an $-OSO_2Y$ group,

An^- is a halogen anion or ½ sulfate (SO_4^{2-}) anion,

Y is OH or $N(R^1)_2$, and

R^1 is hydrogen, methyl or ethyl,

with the proviso that, per total molecule (3), one or two diazonium groups and one or two $-OSO_2Y$ groups are located on any ring carbons of aromatic rings,

and the diazonium salts (3) obtained are then reacted with dialkylamines of the formula

$$H\,N(R^2)_2 \quad (4)$$

where R_2 is methyl or ethyl,

in the presence of acid binding agents,

optionally followed by preparation of the salts from the compounds obtained and optionally followed by setting-free of the hydroxyl and/or acid groups from these salts.

9. A medicament containing at least one diphenyl derivatives as defined in any of claims 1 to 7 or its salts, solvates, and solvates of these salts, optionally together with one or more pharmacologically acceptable auxiliaries or supports.

10. Use of at least one diphenyl derivative as defined in any one of claims 1 to 7 or its salts, solvates and solvates of these salts in the manufacture of a medicament for treating any one of the following tumors of the skin, breast, prostate and testicle or the target organs dependent on sex hormones in human beings and animals.