

(72) KÖHLE, Harald, DE

(72) AMMERMAN, Eberhard, DE

(72) BAYER, Herbert, DE

(72) WAGNER, Oliver, DE

(72) RÖHL, Franz, DE

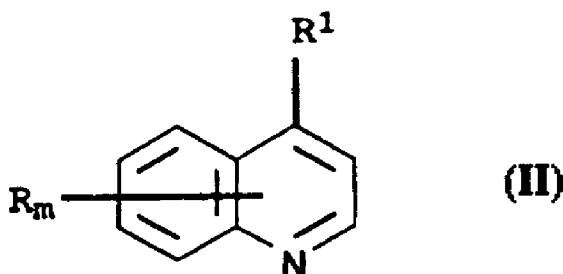
(71) BASF AKTIENGESELLSCHAFT, DE

(51) Int.Cl.⁶ A01N 43/42, A01N 47/20, A01N 43/48, A01N 43/64,
A01N 43/72

(30) 1995/04/08 (19513404.4) DE

(54) **COMPOSITIONS FONGICIDES SYNERGIQUES CONSTITUEES
DE DERIVES DE QUINOLEINE ET EN INHIBITEURS DE
CYTOCHROME B/C**

(54) **METHOD OF CONTROLLING HARMFUL FUNGI**



(57) L'invention concerne un procédé de lutte contre les champignons nuisibles qui se caractérise en ce que les champignons, leur espace vital ou des matériaux, des plantes, des graines, le sol, des surfaces ou des salles à protéger contre les champignons sont traités en même temps ou successivement, ensemble ou séparément, avec un principe actif (I) qui inhibe la respiration du complexe de cytochrome III et avec un principe actif de la formule (II), dans laquelle les indices et les substituants ont la signification suivante: m vaut un nombre entier de 1 à 6, les restes R pouvant être différents les uns des autres lorsque m est supérieur à 1; R désigne hydrogène, cyano, nitro, hydroxy, mercapto, amino, carboxyle, aminocarbonyle, aminothiocabonyle, sulfo, aminosulfonyle, halogène, alkyle, hydroxyalkyle, alcoxyalkyle, alcoxy, alcoxyalcoxy, alkylthio,

(57) A process for controlling harmful fungi is characterised in that the fungi, their biotope or materials, plants, seeds, ground, surfaces or rooms to be protected against fungi are treated separately or together, simultaneously or successively with an active substance (I) that inhibits the respiration of cytochrom complex III and with an active substance of formula (II), in which the indices and substituents have the following meanings: m is an integer from 1 to 6, whereas the rests R may differ from each other when m is larger than 1; R stands for hydrogen, cyano, nitro, hydroxy, mercapto, amino, carboxyl, aminocarbonyl, aminothiocabonyl, sulfo, aminosulphonyl, halogen, alkyl, hydroxyalkyl, alkoxyalkyl, alkoxy, alkoxyalkoxy, alkylthio, alkylamino, dialkylamino, alkylsulphonyl, alkylsulphoxyl, alkylsulphonyloxy, alkylcarbonyl,





(21) (A1) **2,215,514**
(86) 1996/03/25
(87) 1996/10/17

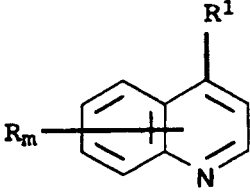
alkylamino, dialkylamino, alkylsulfonyl, alkylsulfoxyle, alkylsulfonyloxy, alkylcarbonyl, alkylcarbonyloxy, alkylcarbonylamino, alkoxycarbonyl, alkoxycarbonylamino, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, alkylaminosulfonyl, alcényl, alcényloxy, alcénylcarbonyloxy, alkinyle et alkinyloxy, ces groupes pouvant être entièrement ou partiellement halogénés; cycloalkyle, aryle, arylalkyle, arylalcoxy, arylloxy, arylthio, arylcarbonyl, arylcarbonyloxy, hétéroaryle, hétéroarylalkyle, hétéroarylalcoxy, hétéroarylloxy, hétéroarylthio, hétéroarylcarbonyl et hétéroarylcarbonyloxy, ces groupes pouvant être partiellement ou entièrement halogénés et/ou pouvant porter un à trois restes parmi les restes suivants: cyano, nitro, hydroxy, alkyle, halogénure d'alkyle, alcoxy, halogénure d'alcoxy ou alkylthio; R¹ désigne hydrogène, cyano, nitro, hydroxy, mercapto, amino, carboxyle, aminocarbonyl, aminothiocarbonyl, sulfo, aminosulfonyl, halogène, alkyle, hydroxyalkyle, alkoxyalkyle, alcoxy, alkoxyalcoxy, alkylthio, alkylamino, dialkylamino, alkylsulfonyl, alkylsulfoxyle, alkylsulfonyloxy, alkylcarbonyl, alkylcarbonyloxy, alkylcarbonylamino, alkoxycarbonyl, alkoxycarbonylamino, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, alkylaminosulfonyl, alcényl, alcényloxy, alcénylcarbonyloxy, alkinyle et alkinyloxy, ces groupes pouvant être entièrement ou partiellement halogénés; cycloalkyle, aryle, arylalkyle, arylalcoxy, arylthio, arylcarbonyl, arylcarbonyloxy, hétéroaryle, hétéroarylalkyle, hétéroarylalcoxy, hétéroarylloxy, hétéroarylthio, hétéroarylcarbonyl et hétéroarylcarbonyloxy, ces groupes pouvant être partiellement ou entièrement halogénés et/ou pouvant porter un à trois restes parmi les restes suivants: cyano, nitro, hydroxy, alkyle, halogénure d'alkyle, alcoxy, alcoxy halogéné ou alkylthio. L'invention concerne également des mélanges appropriés de ces composés.

alkylcarbonyloxy, alkylcarbonylamino, alkoxycarbonyl, alkoxycarbonylamino, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, alkylaminosulfonyl, dialkylaminosulphonyl, alkenyl, alkenyloxy, alkenylcarbonyloxy, alkinyl and alkinyloxy, whereas these groups may be partially or completely halogenated; cycloalkyl, aryl, arylalkyl, arylalkoxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroarylalkyl, heteroarylalkoxy, heteroarylloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, whereas these groups may be partially or completely halogenated and/or bear one to three of the following rests; cyano, nitro, hydroxy, alkyl, alkyl halide, alkoxy, alkoxy halide or alkylthio; R¹ stands for hydrogen, cyano, nitro, hydroxy, mercapto, amino, carboxyl, aminocarbonyl, aminothiocarbonyl, sulfo, aminosulphonyl, halogen, alkyl, hydroxyalkyl, alkoxyalkyl, alkoxy, alkoxyalkoxy, alkylthio, alkylamino, dialkylamino, alkylsulphonyl, alkylsulphoxyl, alkylsulphonyloxy, alkylcarbonyl, alkylcarbonyloxy, alkylcarbonylamino, alkoxycarbonyl, alkoxycarbonylamino, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, alkylaminosulphonyl, dialkylaminosulphonyl, alkenyl, alkenyloxy, alkenylcarbonyloxy, alkinyl and alkinyloxy, whereas these groups may be partially or completely halogenated; cycloalkyl, aryl, arylalkyl, arylalkoxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroarylalkyl, heteroarylalkoxy, heteroarylloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, whereas these groups may be partially or completely halogenated and/or bear one to three of the following rests: cyano, nitro, hydroxy, alkyl, alkyl halide, alkoxy, alkoxy halide or alkylthio. Also disclosed are appropriate mixtures therefor.





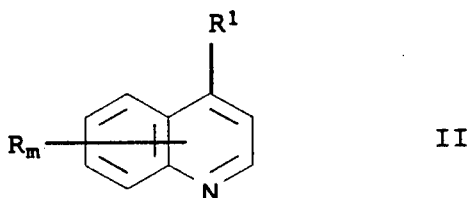
PCT
WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales Büro
INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

(51) Internationale Patentklassifikation ⁶ : A01N 61/00, 47/20, 43/42, 37/50, 37/38, 35/10 // (A01N 43/42, 61:00, 43:66, 43:64, 43:48, 43:40, 43:36, 43:02, 37:50, 37:44, 37:38, 37:36, 37:18, 37:10, 35:10)	A1	(11) Internationale Veröffentlichungsnummer: WO 96/32015 (43) Internationales Veröffentlichungsdatum: 17. Oktober 1996 (17.10.96)
(21) Internationales Aktenzeichen: PCT/EP96/01298 (22) Internationales Anmeldedatum: 25. März 1996 (25.03.96) (30) Prioritätsdaten: 195 13 404.4 8. April 1995 (08.04.95) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): BASF AKTIENGESELLSCHAFT [DE/DE]; D-67056 Ludwigshafen (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): KÖHLE, Harald [DE/DE]; Am Büschel 13, D-67273 Bobenheim (DE). AMMER-MANN, Eberhard [DE/DE]; Von-Gagern-Strasse 2, D-64646 Heppenheim (DE). BAYER, Herbert [DE/DE]; D 3.4, D-68159 Mannheim (DE). WAGNER, Oliver [DE/DE]; Siemensstrasse 1, D-66450 Bexbach (DE). RÖHL, Franz [DE/DE]; Sebastian-Kneipp-Strasse 17, D-67105 Schifferstadt (DE). (74) Gemeinsamer Vertreter: BASF AKTIENGESELLSCHAFT; D-67056 Ludwigshafen (DE).	(81) Bestimmungsstaaten: AU, BG, BR, CA, CN, CZ, HU, JP, KR, MX, NO, NZ, PL, SG, SK, TR, UA, US, eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches Patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist. Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i>	
(54) Title: SYNERGISTIC FUNGICIDE COMPOSITIONS MADE OF QUINOLINE DERIVATIVES AND CYTOCHROM B/C INHIBITORS		
(54) Bezeichnung: SYNERGISTISCHE FUNGIZIDE ZUSAMMENSETZUNGEN AUS CHINOLINDERIVATEN UND CYTOCHROM B/C-INHIBITORS		
(57) Abstract A process for controlling harmful fungi is characterised in that the fungi, their biotope or materials, plants, seeds, ground, surfaces or rooms to be protected against fungi are treated separately or together, simultaneously or successively with an active substance (I) that inhibits the respiration of cytochrom complex III and with an active substance of formula (II), in which the indices and substituents have the following meanings: m is an integer from 1 to 6, whereas the rests R may differ from each other when m is larger than 1; R stands for hydrogen, cyano, nitro, hydroxy, mercapto, amino, carboxyl, aminocarbonyl, aminothiocarbonyl, sulfo, aminosulphonyl, halogen, alkyl, hydroxyalkyl, alkoxyalkyl, alkoxy, alkoxyalkoxy, alkylthio, alkylamino, dialkylamino, alkylsulphonyl, alkylsulphoxyl, alkylsulphonyloxy, alkylcarbonyl, alkylcarbonyloxy, alkylcarbonylamino, alkoxy carbonyl, alkoxy carbonylamino, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, alkylaminosulphonyl, dialkylaminosulphonyloxy, alkenyl, alkenyloxy, alkenylcarbonyloxy, alkenyl and alkenyloxy, whereas these groups may be partially or completely halogenated; cycloalkyl, aryl, arylalkyl, arylalkoxy, aryloxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroarylalkyl, heteroarylalkoxy, heteroaryloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, whereas these groups may be partially or completely halogenated and/or bear one to three of the following rests: cyano, nitro, hydroxy, alkyl, alkyl halide, alkoxy, alkoxy halide or alkylthio; R¹ stands for hydrogen, cyano, nitro, hydroxy, mercapto, amino, carboxyl, aminocarbonyl, aminothiocarbonyl, sulfo, aminosulphonyl, halogen, alkyl, hydroxyalkyl, alkoxyalkyl, alkoxy, alkoxyalkoxy, alkylthio, alkylamino, dialkylamino, alkylsulphonyl, alkylsulphoxyl, alkylsulphonyloxy, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, alkoxy carbonylamino, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, alkylaminosulphonyl, dialkylaminosulphonyloxy, alkenyl, alkenyloxy, alkenylcarbonyloxy, alkenyl and alkenyloxy, whereas these groups may be partially or completely halogenated; cycloalkyl, aryl, arylalkyl, arylalkoxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroarylalkyl, heteroarylalkoxy, heteroaryloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, whereas these groups may be partially or completely halogenated and/or bear one to three of the following rests: cyano, nitro, hydroxy, alkyl, alkyl halide, alkoxy, alkoxy halide or alkylthio. Also disclosed are appropriate mixtures therefor.		
 (II)		

Method of controlling harmful fungi

The present invention relates to a method of controlling harmful
5 fungi and to synergistic mixtures suitable for this purpose
which, in addition to an active compound IA or IB which inhibits
respiration at the cytochrome complex III, contain an active
compound of the formula II

10



15

where the index and the substituents have the following meanings:

m is an integer from 1 to 6, it being possible for the radicals
20 R to be different if m is greater than 1;

R is hydrogen, cyano, nitro, hydroxyl, mercapto, amino,
carboxyl, aminocarbonyl, aminothiocarbonyl, sulfo (SO₃H),
aminosulfonyl, halogen,

25

C₁-C₆-alkyl, hydroxy-C₁-C₆-alkyl, C₁-C₆-alkoxy-
C₁-C₆-alkyl, C₁-C₆-alkoxy, C₁-C₆-alkoxy-C₁-C₆-alkoxy,
C₁-C₆-alkylthio, C₁-C₆-alkylamino, di-C₁-C₆-alkylamino,
C₁-C₆-alkylsulfonyl, C₁-C₆-alkylsulfoxyl, C₁-C₆-alkyl-
30 sulfonyloxy, C₁-C₆-alkylcarbonyl, C₁-C₆-alkylcarbonyloxy,
C₁-C₆-alkylcarbonylamino, C₁-C₆-alkoxycarbonyl,
C₁-C₆-alkoxycarbonylamino, C₁-C₆-alkylaminocarbonyl,
di-C₁-C₆-alkylaminocarbonyl, C₁-C₆-alkylaminothiocarbonyl,
di-C₁-C₆-alkylaminothiocarbonyl, C₁-C₆-alkylaminosulfonyl,
35 di-C₁-C₆-alkylaminosulfonyl, C₂-C₆-alkenyl, C₂-C₆-alkenyl-
oxy, C₂-C₆-alkenylcarbonyloxy, C₂-C₆-alkynyl and
C₂-C₆-alkynyloxy, it being possible for these groups to be
partially or completely halogenated;

40 C₃-C₆-cycloalkyl, aryl, aryl-C₁-C₆-alkyl, aryl-C₁-C₆-alkoxy,
aryloxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl,
heteroaryl-C₁-C₆-alkyl, heteroaryl-C₁-C₆-alkoxy,
heteroaryloxy, heteroarylthio, heteroarylcarbonyl and
heteroarylcarbonyloxy, it being possible for these groups to
45 be partially or completely halogenated and/or to carry one to
three of the following radicals: cyano, nitro, hydroxyl,

2

C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

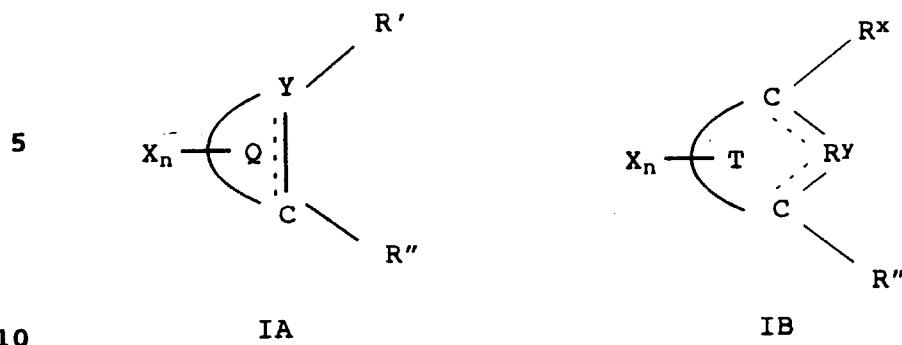
5 R¹ is hydrogen, cyano, nitro, hydroxyl, mercapto, amino, carboxyl, aminocarbonyl, aminothiocarbonyl, sulfo (SO₃H), aminosulfonyl, halogen,

10 C₁-C₆-alkyl, hydroxy-C₁-C₆-alkyl, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₁-C₆-alkoxy, C₁-C₆-alkoxy-C₁-C₆-alkoxy, C₁-C₆-alkylthio, C₁-C₆-alkylamino, di-C₁-C₆-alkylamino, C₁-C₆-alkylsulfonyl, C₁-C₆-alkylsulfoxyl, C₁-C₆-alkylsulfonyloxy, C₁-C₆-alkylcarbonyl, C₁-C₆-alkylcarbonyloxy, C₁-C₆-alkylcarbonylamino, C₁-C₆-alkoxycarbonyl, C₁-C₆-alkoxycarbonylamino, C₁-C₆-alkylaminocarbonyl, 15 di-C₁-C₆-alkylaminocarbonyl, C₁-C₆-alkylaminothiocarbonyl, di-C₁-C₆-alkylaminothiocarbonyl, C₁-C₆-alkylaminosulfonyl, di-C₁-C₆-alkylaminosulfonyl, C₂-C₆-alkenyl, C₂-C₆-alkenyl-oxy, C₂-C₆-alkenylcarbonyloxy, C₂-C₆-alkynyl and C₂-C₆-alkynyloxy, it being possible for these groups to be 20 partially or completely halogenated;

25 C₃-C₆-cycloalkyl, aryl, aryl-C₁-C₆-alkyl, aryl-C₁-C₆-alkoxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroaryl-C₁-C₆-alkyl, heteroaryl-C₁-C₆-alkoxy, heteroaryloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, it being possible for these groups to be partially or completely halogenated and/or to carry one to three of the following radicals: cyano, nitro, hydroxyl, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or 30 C₁-C₄-alkylthio.

It is known from the literature that active compounds which inhibit the cytochrome bc₁ complex (cytochrome complex III) can be employed as fungicides [cf. U. Brandt, U. Haase, H. Schagger, 35 G. von Jagow: Spezifität and Wirkmechanismus der Strobilurine [Specificity and mechanism of action of the strobilurins], Dechema-Monographie Vol. 129, 27-38, VCH Verlagsgesellschaft Weinheim, 1993; J.M. Clough: Natural Product Reports, 1993, 565-574; F. Röhl, H. Sauter: Biochem. Soc. Trans. 22, 635 40 (1993)].

Examples of such active compounds are compounds of the formula IA or IB



where is a double or single bond and the index and the substituents have the following meanings:

15 R' is $-\text{C}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{C}[\text{CO}_2\text{CH}_3]=\text{NOCH}_3$, $-\text{C}[\text{CONHCH}_3]=\text{NOCH}_3$,
 $-\text{C}[\text{CO}_2\text{CH}_3]=\text{CHCH}_3$, $-\text{C}[\text{CO}_2\text{CH}_3]=\text{CHCH}_2\text{CH}_3$, $-\text{C}[\text{COCH}_3]=\text{NOCH}_3$,
 $-\text{C}[\text{COCH}_2\text{CH}_3]=\text{NOCH}_3$, $-\text{N}(\text{OCH}_3)-\text{CO}_2\text{CH}_3$, $-\text{N}(\text{CH}_3)-\text{CO}_2\text{CH}_3$,
 $-\text{N}(\text{CH}_2\text{CH}_3)-\text{CO}_2\text{CH}_3$,

20 R'' is a C-organic radical which is bonded directly or via an oxy, mercapto, amino or alkylamino group, or

together with a group X and the ring Q or T to which they are bonded, are an unsubst. or subst. bicyclic, partially or
 25 completely unsaturated system which, in addition to carbon ring members, can contain heteroatoms from the group consisting of oxygen, sulfur and nitrogen,

R^x is $-\text{OC}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{OC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_3$, $-\text{OC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_2\text{CH}_3$,
 30 $-\text{SC}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{SC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_3$, $-\text{SC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_2\text{CH}_3$,
 $-\text{N}(\text{CH}_3)\text{C}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{N}(\text{CH}_3)\text{C}[\text{CO}_2\text{CH}_3]=\text{NOCH}_3$,
 $-\text{CH}_2\text{C}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{CH}_2\text{C}[\text{CO}_2\text{CH}_3]=\text{NOCH}_3$,
 $-\text{CH}_2\text{C}[\text{CONHCH}_3]=\text{NOCH}_3$,

35 R^y is oxygen, sulfur, $=\text{CH}-$ or $=\text{N}-$,

n is 0, 1, 2 or 3, it being possible for the radicals X to be different if $n > 1$;

40 X is cyano, nitro, halogen, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy, C_1 - C_4 -alkylthio or,

in the case where $n > 1$, a C_3 - C_5 -alkylene, C_3 - C_5 -alkenylene, oxy- C_2 - C_4 -alkylene, oxy- C_1 - C_3 -alkylenoxy, oxy-
 45 C_2 - C_4 -alkenylene, oxy- C_2 - C_4 -alkenyleneoxy or butadienediyl group bonded to two adjacent C atoms of the phenyl ring, it being possible for these chains in turn to carry one to three

4

of the following radicals: halogen, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio,

5 Y is =C- or -N-,

Q is phenyl, pyrrolyl, thienyl, furyl, pyrazolyl, imidazolyl, oxazolyl, isoxazolyl, thiazolyl, thiadiazolyl, triazolyl, pyridinyl, 2-pyridonyl, pyrimidinyl or triazinyl,

10

T is phenyl, oxazolyl, thiazolyl, thiadiazolyl, oxadiazolyl, pyridinyl, pyrimidinyl or triazinyl.

Active compounds I (or IA and IB) of this type are described, for
15 example, in the following specifications:

EP-A 178 826, EP-A 203 606, EP-A 203 608, EP-A 206 523,
EP-A 212 859, EP-A 226 917, EP-A 229 974, EP-A 242 070,
EP-A 242 081, EP-A 243 012, EP-A 243 014, EP-A 251 082,
20 EP-A 253 213, EP-A 254 426, EP-A 256 667, EP-A 260 794,
EP-A 260 832, EP-A 267 734, EP-A 273 572, EP-A 274 825,
EP-A 278 595, EP-A 280 185, EP-A 291 196, EP-A 299 694,
EP-A 307 101, EP-A 307 103, EP-A 310 954, EP-A 312 221,
EP-A 312 243, EP-A 329 011, EP-A 331 966, EP-A 335 519,
25 EP-A 336 211, EP-A 337 211, EP-A 341 845, EP-A 350 691,
EP-A 354 571, EP-A 363 818, EP-A 370 629, EP-A 373 775,
EP-A 374 811, EP-A 378 308, EP-A 378 755, EP-A 379 098,
EP-A 382 375, EP-A 383 117, EP-A 384 211, EP-A 385 224,
EP-A 385 357, EP-A 386 561, EP-A 386 681, EP-A 389 901,
30 EP-A 391 451, EP-A 393 428, EP-A 393 861, EP-A 398 692,
EP-A 400 417, EP-A 402 246, EP-A 405 782, EP-A 407 873,
EP-A 409 369, EP-A 414 153, EP-A 416 746, EP-A 420 091,
EP-A 422 597, EP-A 426 460, EP-A 429 968, EP-A 430 471,
EP-A 433 233, EP-A 433 899, EP-A 439 785, EP-A 459 285,
35 EP-A 460 575, EP-A 463 488, EP-A 463 513, EP-A 464 381,
EP-A 468 684, EP-A 468 695, EP-A 468 775, EP-A 471 261,
EP-A 472 224, EP-A 472 300, EP-A 474 042, EP-A 475 158,
EP-A 477 631, EP-A 480 795, EP-A 483 851, EP-A 483 985,
EP-A 487 409, EP-A 493 711, EP-A 498 188, EP-A 498 396,
40 EP-A 499 823, EP-A 503 436, EP-A 508 901, EP-A 509 857,
EP-A 513 580, EP-A 515 901, EP-A 517 301, EP-A 528 245,
EP-A 532 022, EP-A 532 126, EP-A 532 127, EP-A 535 980,
EP-A 538 097, EP-A 544 587, EP-A 546 387, EP-A 548 650,
EP-A 564 928, EP-A 566 455, EP-A 567 828, EP-A 571 326,
45 EP-A 579 071, EP-A 579 124, EP-A 579 908, EP-A 581 095,
EP-A 582 902, EP-A 582 925, EP-A 583 806, EP-A 584 625,
EP-A 585 751, EP-A 590 610, EP-A 596 254,

WO-A 90/07,493, WO-A 92/13,830, WO-A 92/18,487, WO-A 92/18,494,
WO-A 92/21,653, WO-A 93/07,116, WO-A 93/08,180, WO-A 93/08,183,
WO-A 93/15,046, WO-A 93/16,986, WO-A 94/00,436, WO-A 94/05,626,
WO-A 94/08,948, WO-A 94/08,968, WO-A 94/10,159, WO-A 94/11,334,
5 JP-A 02/121,970, JP-A 04/182,461, JP-A 05/201,946,
JP-A 05/201,980, JP-A 05/255,012, JP-A 05/294,948,
JP-A 06/025,133, JP-A 06/025,142, JP-A 06/056,756,
FR-A 2 670 781,
GB-A 2 210 041, GB-A 2 218 702, GB-A 2 238 308, GB-A 2 249 092,
10 GB-A 2 253 624, GB-A 2 255 092,
DE-A 39 05 911, DE Pat. Appl. 43 05 502.8,
DE Pat. Appl. 43 10 143.7, DE Pat. Appl. 43 18 397.2, DE Pat.
Appl. 43 34 709.6, DE Pat. Appl. 44 03 446.6, DE Pat. Appl. 44 03
447.4, DE Pat. Appl. 44 03 448.2, DE Pat. Appl. 44 10 424.3, DE
15 Pat. Appl. 44 21 180.5, DE Pat. Appl. 44 21 182.1, DE Pat. Appl.
44 15 483.6, DE Pat. Appl. 44 23 615.8, DE Pat. Appl. 44 23 612.3
and DE Pat. Appl. 44 41 674.1.

In the use of these active compounds it is seen, however, that
20 their action is only temporary, ie. after some time renewed
growth of the fungus occurs.

In addition, compounds II having fungicidal action are known from
the literature [cf. Monatshefte für Chemie, 125, 51 f. and 723 f.
25 (1994); Farm Chemicals Handbook Vol. 79 (1993); The Agrochemicals
Handbook, 2. Ed., Royal Society of Chemistry (1987)]. The
preparation of these compounds is additionally described in
Houben-Weyl, Vol. E7a, 290-491.

30 It is an object of the present invention to eliminate the
disadvantages in the use of the compounds IA and IB.

We have found that harmful fungi can be fundamentally better
controlled if, in addition to an active compound IA or IB which
35 inhibits respiration at the cytochrome complex III, a further
active compound of the formula II is used.

The process according to the invention is probably based on the
fact that the fungus, on inhibition of respiration at the
40 cytochrome complex III, utilizes a secondary route of alternative
respiration such that complete destruction does not occur. This
would mean that the active compounds of the formula II are
suitable for inhibiting alternative respiration. The combination
of the inhibition of both respiration via the cytochrome complex
45 III and alternative respiration could therefore be responsible
for the fact that the fungus is completely destroyed.

6

By means of the combination of appropriate active compounds according to the invention, a more effective control of the fungal pest is achieved, as by the combination of the active compounds IA or IB and II lower application rates of the
5 individual active compounds are necessary (synergism).

Fundamentally all active compounds described in the specifications mentioned at the outset are suitable in the inventive method for inhibiting respiration at the cytochrome
10 complex III, where in particular the compounds mentioned in the examples given there are to be taken into account. Of particular importance in this case are compounds IA and IB in which R' is one of the following groups:

- 15 unsubst. or subst. aryloxy, unsubst. or subst. hetaryloxy, unsubst. or subst. aryloxymethylene, unsubst. or subst. hetaryloxymethylene, unsubst. or subst. arylolethylene, unsubst. or subst. hetarylolethylene, or a group
- 20 $R^{\alpha}R^{\beta}C=NOCH_2-$ or $R^{\gamma}ON=CR^{\delta}CR^{\epsilon}=NOCH_2$ where the radicals R^{α} , R^{β} , R^{γ} , R^{δ} and R^{ϵ} in general and in particular have the meanings described in the following specifications:

- EP-A 370 629, EP-A 414 153, EP-A 426 460, EP-A 460 575,
25 EP-A 463 488, EP-A 472 300, EP-A 498 188, EP-A 498 396, EP-A 515 901, EP-A 585 751,
WO-A 90/07,493, WO-A 92/13,830, WO-A 92/18,487, WO-A 92/18,494, WO-A 93/15,046, WO-A 93/16,986, WO-A 94/08,948, WO-A 94/08,968, JP-A 05/201,946, JP-A 05/255,012, JP-A 05/294,948,
30 JP-A 06/025,133, JP-A 06/025,142,
DE Pat. Appl. 44 03 447., DE Pat. Appl. 44 03 448., DE Pat. Appl. 44 21 180.5 and DE Pat. Appl. 44 21 182.1;

- particularly preferred "unsubst. or subst. aryloxy, or unsubst.
35 or subst. hetaryloxy" radicals correspond in general and in particular to the meanings described in the following specifications:

- EP-A 178 826, EP-A 242 070, EP-A 242 081, EP-A 253 213,
40 EP-A 254 426, EP-A 256 667, EP-A 260 794, EP-A 280 185, EP-A 307 103, EP-A 341 845, EP-A 382 375, EP-A 393 861, EP-A 398 692, EP-A 405 782, EP-A 430 471, EP-A 468 684, EP-A 468 695, EP-A 477 631, EP-A 483 985, EP-A 498 188, EP-A 513 580, EP-A 515 901,
45 WO-A 93/15,046, WO-A 94/10,159,
GB-A 2 253 624,

JP-A 04/182,461 and
DE Pat. Appl. 44 23 612.3;

particularly preferred "unsubst. or subst. aryloxymethylene, or
5 unsubst. or subst. hetaryloxymethylene" radicals correspond in
general and in particular to the meanings described in the
following specifications:

EP-A 178 826, EP-A 226 917, EP-A 253 213, EP-A 254 426,
10 EP-A 278 595, EP-A 280 185, EP-A 299 694, EP-A 335 519,
EP-A 350 691, EP-A 363 818, EP-A 373 775, EP-A 378 308,
EP-A 385 224, EP-A 386 561, EP-A 398 692, EP-A 400 417,
EP-A 407 873, EP-A 472 224, EP-A 477 631, EP-A 498 188,
EP-A 498 396, EP-A 513 580, EP-A 515 901, EP-A 579 124,
15 WO-A 93/08,180, WO-A 93/15,046, WO-A 94/00,436,
JP-A 04/182,461,
DE Appl. No. 43 05 502., DE Appl. No. 44 10 424.. and
DE Pat. Appl. 44 15 483.6;

20 particularly preferred "unsubst. or subst. aryloethenylene or
unsubst. or subst. hetaryloethenylene" radicals correspond in
general and in particular to the meanings described in the
following specifications:

25 EP-A 178 826, EP-A 203 606, EP-A 253 213, EP-A 254 426,
EP-A 280 185, EP-A 378 755, EP-A 398 692, EP-A 402 246,
EP-A 474 042, EP-A 475 158, EP-A 477 631, EP-A 487 409,
EP-A 498 188, EP-A 498 396, EP-A 513 580, EP-A 515 901,
EP-A 528 245, EP-A 544 587,
30 WO-A 93/15,046, WO-A 94/11,334,
FR-A 2 670 781 and DE Pat. Appl. 44 23 615.8;

particularly preferred active compounds of the formula IA in
which R' is $-C[CO_2CH_3]=CHOCH_3$ correspond in general and in
35 particular to the compounds described in the following
specifications:

EP-A 178 826, EP-A 203 606, EP-A 226 917, EP-A 242 070,
EP-A 242 081, EP-A 256 667, EP-A 260 794, EP-A 278 595,
40 EP-A 299 694, EP-A 307 103, EP-A 335 519, EP-A 341 845,
EP-A 350 691, EP-A 370 629, EP-A 373 775, EP-A 378 308,
EP-A 378 755, EP-A 382 375, EP-A 385 224, EP-A 386 561,
EP-A 393 861, EP-A 402 246, EP-A 405 782, EP-A 407 873,
EP-A 414 153, EP-A 426 460, EP-A 430 471, EP-A 463 488,
45 EP-A 468 695, EP-A 472 224, EP-A 474 042, EP-A 475 158,
EP-A 483 985, EP-A 487 409, EP-A 515 901, EP-A 528 245,
EP-A 544 587,

8

WO-A 90/07,493, WO-A 92/18,487, WO-A 92/18,494, WO-A 93/08,180,
WO-A 93/16,986, WO-A 94/00,463, WO-A 94/08,948, WO-A 94/08,968,
WO-A 94/10,159, WO-A 94/11,334,
FR-A 2 670 781,
5 JP-A 06/025,133,
DE Appl. No. 44 03 447..., DE Appl. No. 44 10 424.. and DE Pat.
Appl. 44 21 180.5;

particularly preferred active compounds of the formula IA in
10 which R' is $-C[CO_2CH_3]=NOCH_3$ correspond in general and in
particular to the compounds described in the following
specifications:

EP-A 253 213, EP-A 254 426, EP-A 299 694, EP-A 363 818,
15 EP-A 378 308, EP-A 385 224, EP-A 386 561, EP-A 400 417,
EP-A 407 873, EP-A 460 575, EP-A 463 488, EP-A 468 684,
EP-A 472 300, EP-A 515 901,
WO-A 94/00,436, WO-A 94/08,948, WO-A 94/10,159, WO-A 94/11,334,
JP-A 05/201,946, JP-A 05/255,012, JP-A 05/294,948,
20 DE Appl. No. 44 03 447..., DE Appl. No. 44 10 424.. and
DE Pat. Appl. 44 21 180.5;

particularly preferred active compounds of the formula IA in
which R' is $-C[CONHCH_3]=NOCH_3$ correspond in general and in
25 particular to the compounds described in the following
specifications:

EP-A 398 692, EP-A 463 488, EP-A 477 631, EP-A 515 901,
EP-A 579 124, EP-A 585 751,
30 WO-A 92/13,830, WO-A 93/08,180, WO-A 94/08,948, WO-A 94/10,159,
WO-A 94/11,334,
GB-A 2 253 624,
JP-A 04/182,461, JP-A 05/201,946, JP-A 05/255,012,
JP-A 05/294,948,
35 DE Appl. No. 43 05 502..., DE Appl. No. 44 03 448..., DE Appl. No.
44 10 424..., DE Pat. Appl. No. 44 23 615.8 and DE Pat. Appl. 44
21 182.1;

particularly preferred active compounds of the formula IA in
40 which R' is $-C[CO_2CH_3]=CHCH_3$ or $-C[CO_2CH_3]=CHCH_2CH_3$ correspond in
general and in particular to the compounds described in the
following specifications:

9

EP-A 280 185, EP-A 463 488, EP-A 501 901, EP-A 513 580,
EP-A 515 901,
DE Appl. No. 44 03 447..., DE Appl. No. 44 10 424..., DE Pat. Appl.
No. 44 21 180.5 and DE Pat. Appl. No. 44 15 483.6;

5

particularly preferred active compounds of the formula IA in
which R' is $-\text{C}[\text{COCH}_3]=\text{NOCH}_3$ or $-\text{C}[\text{COCH}_2\text{CH}_3]=\text{NOCH}_3$ correspond in
general and in particular to the compounds described in
EP-A 498 188;

10

particularly preferred active compounds of the formula IA in
which R' is $-\text{N}(\text{OCH}_3)\text{CO}_2\text{CH}_3$, $-\text{N}(\text{CH}_3)-\text{CO}_2\text{CH}_3$ or $-\text{N}(\text{CH}_2\text{CH}_3)-\text{CO}_2\text{CH}_3$
correspond in general and in particular to the compounds
described in the following specifications:

15

EP-A 498 396, WO-A 93/15,046, JP-A 06/025,142, JP-A 06/056,756,
DE Pat. Appl. 44 23 612.3 and DE Pat. Appl. 44 41 674.1;

particularly preferred active compounds of the formula IB in
20 which R^x is $-\text{OC}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{OC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_3$,
 $-\text{OC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_2\text{CH}_3$, $-\text{SC}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{SC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_3$,
 $-\text{SC}[\text{CO}_2\text{CH}_3]=\text{CHCH}_2\text{CH}_3$, $-\text{N}(\text{CH}_3)\text{C}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$,
 $-\text{N}(\text{CH}_3)\text{C}[\text{CO}_2\text{CH}_3]=\text{NOCH}_3$, $-\text{CH}_2\text{C}[\text{CO}_2\text{CH}_3]=\text{CHOCH}_3$, $-\text{CH}_2\text{C}[\text{CO}_2\text{CH}_3]=\text{NOCH}_3$ or
 $-\text{CH}_2\text{C}[\text{CONHCH}_3]=\text{NOCH}_3$ correspond in general and in particular to
25 the compounds described in the following specifications:

EP-A 212 859, EP-A 331 966, EP-A 383 117, EP-A 384 211,
EP-A 389 901, EP-A 409 369, EP-A 464 381, EP-A 471 261,
EP-A 503 436, EP-A 546 387, EP-A 548 650, EP-A 579 908 and
30 EP-A 584 625.

Examples of particularly suitable active compounds I are compiled
in the following Tables.

35 Table 1.1A

Compounds of the formula IA in which Q is phenyl, R' is
 $-\text{C}(\text{CO}_2\text{CH}_3)=\text{CHOCH}_3$, n has the value 0, R'' is unsubst. or subst.
(het)aryloxymethylene, where the unsubst. or subst. (het)aryl
40 group has the following meaning

45

10

No.	unsubst. or subst. (het)aryl	Reference
I.1A-1	2-CH ₃ -C ₆ H ₄	EP-A 226 917
I.1A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 226 917
I.1A-3	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 386 561
I.1A-4	2-CH ₂ CH ₂ CH ₃ , 6-CF ₃ -pyrimidin-4-yl	EP-A 407 873
I.1A-5	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 226 917

10

Table 1.1B

Compounds of the formula IA in which R' is -C(CO₂CH₃)=CHOCH₃, Q is phenyl, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has the following meaning

No.	unsubst. or subst. (Het)aryl	Reference
I.1B-1	C ₆ H ₅	EP-A 178 826
I.1B-2	6-[2-CN-C ₆ H ₄ -O]-pyrimidin-4-yl	EP-A 382 375

20

Table 1.1C

25

Compounds of the formula IA in which R' is -C(CO₂CH₃)=CHOCH₃, Q is phenyl, n has the value 0, R'' is unsubst. or subst. (het)arylethylene, where the unsubst. or subst. (het)aryl group has the following meaning

30

No.	unsubst. or subst. (Het)aryl	Reference
I.1C-1	1-(2,4-Cl ₂ -C ₆ H ₃), 5-CF ₃ -pyrazol-4-yl	EP-A 528 245
I.1C-2	1-(4-Cl-C ₆ H ₄)-pyrazol-4-yl	EP-A 378 755
I.1C-3	3-CF ₃ -C ₆ H ₄	EP-A 203 606
I.1C-4	3-Cl-C ₆ H ₄	EP-A 203 606
I.1C-5	4-C ₆ H ₅ -C ₆ H ₄	EP-A 203 606

35

40

Table 1.1D

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHOCH₃, n has the value 0, R'' is CH₂ON=CR^αR^β, where R^α and R^β have the following meanings

45

11

No.	R ^α	R ^β	Reference
I.1D-1	CH ₃	4-Cl-C ₆ H ₄	EP-A 370 629
I.1D-2	CH ₃	3-CF ₃ -C ₆ H ₄	EP-A 370 629
I.1D-3	CH ₃	4-OCH ₂ CH ₃ -pyrimidin-2-yl	WO-A 92/18,487

Table 1.1E

- 10 Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHOCH₃, n has the value 0, R'' is CH₂ON=CR^γCR^δ=NOR^ε, where R^γ, R^δ and R^ε have the following meanings

No.	R ^γ	R ^δ	R ^ε	Reference
I.1E-1	CH ₃	CH ₃	CH ₃	DE Appl. No. 44 03 447.4
I.1E-2	CH ₃	CH ₃	CH ₂ CH ₃	DE Appl. No. 44 03 447.4
I.1E-3	CH ₃	C ₆ H ₅	CH ₃	DE Appl. No. 44 03 447.4
I.1E-4	CH ₃	C ₆ H ₅	CH ₂ CH ₃	DE Appl. No. 44 03 447.4
I.1E-5	CH ₃	4-Cl-C ₆ H ₄	CH ₃	DE Appl. No. 44 21 180.5
I.1E-6	CH ₃	4-Cl-C ₆ H ₄	CH ₂ CH ₃	DE Appl. No. 44 21 180.5

25

Table 1.2A

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst.

- 30 (het)aryloxymethylene, where the unsubst. or subst. (het)aryl group has the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.2A-1	2-CH ₃ -C ₆ H ₄	EP-A 253 213
I.2A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 400 417
I.2A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 400 417
I.2A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	EP-A 400 417
I.2A-5	2-Cl, 5-CH ₃ -C ₆ H ₃	EP-A 400 417
I.2A-6	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 386 561

Table 1.2B

45

Compounds of the formula IA in which Q is phenyl, R' is

12

$-\text{C}(\text{CO}_2\text{CH}_3)=\text{NOCH}_3$, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has the following meaning

5	No.	unsubst. or subst. (het)aryl	Reference
	I.2B-1	C_6H_5	EP-A 253 213
	I.2B-2	6-[2-CN- C_6H_4 -O]-pyrimidin-4-yl	EP-A 468 684

10 Table 1.2C

Compounds of the formula IA in which Q is phenyl, R' is $-\text{C}(\text{CO}_2\text{CH}_3)=\text{NOCH}_3$, n has the value 0, R'' is $\text{CH}_2\text{ON}=\text{CR}^\alpha\text{R}^\beta$, where R^α and R^β have the following meanings

15

	No.	R ^α	R ^β	Reference
	I.2C-1	CH_3	4-Cl- C_6H_4	EP-A 463 488
	I.2C-2	CH_3	3-Cl- C_6H_4	EP-A 463 488
20	I.2C-3	CH_3	4-CF ₃ - C_6H_4	EP-A 463 488
	I.2C-4	CH_3	3-CF ₃ - C_6H_4	EP-A 463 488
	I.2C-5	CH_3	4-CH ₃ - C_6H_4	EP-A 463 488
25	I.2C-6	CH_3	4-OCH ₂ CH ₃ -pyrimidin-2-yl	EP-A 472 300
	I.2C-7	CH_3	3,5-Cl ₂ - C_6H_3	EP-A 463 488

Table 1.2D

30

Compounds of the formula IA in which Q is phenyl, R' is $-\text{C}(\text{CO}_2\text{CH}_3)=\text{NOCH}_3$, n has the value 0, R'' is $\text{CH}_2\text{ON}=\text{CR}^\gamma\text{CR}^\delta=\text{NOR}^\epsilon$, where R^γ, R^δ and R^ε have the following meanings

35	No.	R ^γ	R ^δ	R ^ε	Reference
	I.2D-1	CH_3	CH_3	CH_3	DE Appl. No. 44 03 447.4
	I.2D-2	CH_3	CH_3	CH_2CH_3	DE Appl. No. 44 03 447.4
	I.2D-3	CH_3	C_6H_5	CH_3	DE Appl. No. 44 03 447.4
40	I.2D-4	CH_3	C_6H_5	CH_2CH_3	DE Appl. No. 44 03 447.4
	I.2D-5	CH_3	4-Cl- C_6H_4	CH_3	DE Appl. No. 44 21 180.5
	I.2D-6	CH_3	4-Cl- C_6H_4	CH_2CH_3	DE Appl. No. 44 21 180.5

45

Table 1.3A

Compounds of the formula IA in which Q is phenyl, R' is

13

-C(CONHCH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxymethylene, where the unsubst. or subst. (het)aryl group has the following meaning

5	No.	unsubst. or subst. (het)aryl	Reference
	I.3A-1	2-CH ₃ -C ₆ H ₄	EP-A 477 631
	I.3A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 477 631
	I.3A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 477 631
10	I.3A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	EP-A 477 631
	I.3A-5	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 579 124
	I.3A-6	1-[4-Cl-C ₆ H ₄]-pyrazol-3-yl	DE Appl. No. 43 05 502.8
15	I.3A-7	1-[2,4-Cl ₂ -C ₆ H ₃]-pyrazol-3-yl	DE Appl. No. 43 05 502.8

Table 1.3B

Compounds of the formula IA in which Q is phenyl, R' is
 20 -C(CONHCH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has the following meaning

25	No.	unsubst. or subst. (het)aryl	Reference
	I.3B-1	C ₆ H ₅	EP-A 398 692
	I.3B-2	6-[2-CN-C ₆ H ₄ -O]-pyrimidin-4-yl	GB-A 2 253 624

Table 1.3C

Compounds of the formula IA in which Q is phenyl, R' is
 30 -C(CONHCH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryl-ethenylene, where the unsubst. or subst. (het)aryl group has the following meaning

35	No.	unsubst. or subst. (het)aryl	Reference
	I.3C-1	1-[2,4-Cl ₂ -C ₆ H ₃], 5-CF ₃ -pyrazol-4-yl	DE Appl. No. 44 23 615.8

40

Table 1.3D

Compounds of the formula IA in which Q is phenyl, R' is
 -C(CONHCH₃)=NOCH₃, n has the value 0, R'' is CH₂ON=CR^aR^b, where R^a
 45 and R^b have the following meanings

14

No.	R ^a	R ^b	Reference
I.3D-1	CH ₃	4-Cl-C ₆ H ₄	EP-A 463 488
I.3D-2	CH ₃	3-Cl-C ₆ H ₄	EP-A 463 488
I.3D-3	CH ₃	4-CF ₃ -C ₆ H ₄	EP-A 585 751
I.3D-4	CH ₃	3-CF ₃ -C ₆ H ₄	EP-A 585 751
I.3D-5	CH ₃	4-CH ₃ -C ₆ H ₄	EP-A 463 488
I.3D-6	CH ₃	3,5-Cl ₂ -C ₆ H ₃	EP-A 463 488
I.3D-7	CH ₃	2-OCH ₂ CH ₃ -pyrimidin-2-yl	WO-A 92/13,830

Table 1.3E

- 15 Compounds of the formula IA in which Q is phenyl, R' is -C(CONHCH₃)=NOCH₃, n has the value 0, R'' is CH₂ON=CR^γCR^δ=NOR^ε, where R^γ, R^δ and R^ε have the following meanings

No.	R ^γ	R ^δ	R ^ε	Reference
I.3E-1	CH ₃	CH ₃	CH ₃	DE Pat. Appl. 44 21 182.1
I.3E-2	CH ₃	CH ₃	CH ₂ CH ₃	DE Pat. Appl. 44 21 182.1
I.3E-3	CH ₃	C ₆ H ₅	CH ₃	DE Pat. Appl. 44 21 182.1
I.3E-4	CH ₃	C ₆ H ₅	CH ₂ CH ₃	DE Pat. Appl. 44 21 182.1
I.3E-5	CH ₃	4-Cl-C ₆ H ₄	CH ₃	DE Pat. Appl. 44 21 182.1
I.3E-6	CH ₃	4-Cl-C ₆ H ₄	CH ₂ CH ₃	DE Pat. Appl. 44 21 182.1

30 Table 1.4A

- Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxymethylene, where the unsubst. or subst. (het)aryl group has the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.4A-1	2-CH ₃ -C ₆ H ₄	EP-A 280 185
I.4A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 513 580
I.4A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 513 580
I.4A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	EP-A 513 580
I.4A-5	2-Cl, 5-CH ₃ -C ₆ H ₃	EP-A 513 580

15

I.4A-6	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 513 580
I.4A-7	1-[4-Cl-C ₆ H ₄]-pyrazol-3-yl	DE Pat. Appl. 44 15 483.6

5 Table 1.4B

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has
10 the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.4B-1	C ₆ H ₅	EP-A 513 580

15

Table 1.4C

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHCH₃, n has the value 0, R'' is CH₂ON=CR^YCR^δ=NOR^ε, where
20 R^Y, R^δ and R^ε have the following meanings

No.	R ^Y	R ^δ	R ^ε	Reference
I.4C-1	CH ₃	CH ₃	CH ₃	DE Pat. Appl. 44 21 180.5
I.4C-2	CH ₃	CH ₃	CH ₂ CH ₃	DE Pat. Appl. 44 21 180.5
I.4C-3	CH ₃	C ₆ H ₅	CH ₃	DE Pat. Appl. 44 21 180.5
I.4C-4	CH ₃	C ₆ H ₅	CH ₂ CH ₃	DE Pat. Appl. 44 21 180.5
I.4C-5	CH ₃	4-Cl-C ₆ H ₄	CH ₃	DE Pat. Appl. 44 21 180.5
I.4C-6	CH ₃	4-Cl-C ₆ H ₄	CH ₂ CH ₃	DE Pat. Appl. 44 21 180.5

25

30

Table 1.5A

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHCH₂CH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxymethylene, where the unsubst. or subst. (het)aryl
35 group has the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.5A-1	2-CH ₃ -C ₆ H ₄	EP-A 513 580
I.5A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 513 580
I.5A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 513 580
I.5A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	EP-A 513 580

40

16

I.5A-5	2-Cl, 5-CH ₃ -C ₆ H ₃	EP-A 513 580
I.5A-6	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 513 580

5 Table 1.5B

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHCH₂CH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has
 10 the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.5B-1	C ₆ H ₅	EP-A 513 580

15

Table 1.5C

Compounds of the formula IA in which Q is phenyl, R' is -C(CO₂CH₃)=CHCH₂CH₃, n has the value 0, R'' is CH₂ON=CR^YCR^δ=NOR^ε,
 20 where R^Y, R^δ and R^ε have the following meanings

No.	R ^Y	R ^δ	R ^ε	Reference
I.5C-1	CH ₃	CH ₃	CH ₃	DE Pat. Appl. 44 21 180.5
I.5C-2	CH ₃	CH ₃	CH ₂ CH ₃	DE Pat. Appl. 44 21 180.5
I.5C-3	CH ₃	C ₆ H ₅	CH ₃	DE Pat. Appl. 44 21 180.5
I.5C-4	CH ₃	C ₆ H ₅	CH ₂ CH ₃	DE Pat. Appl. 44 21 180.5
I.5C-5	CH ₃	4-Cl-C ₆ H ₄	CH ₃	DE Pat. Appl. 44 21 180.5
I.5C-6	CH ₃	4-Cl-C ₆ H ₄	CH ₂ CH ₃	DE Pat. Appl. 44 21 180.5

25

30

Table 1.6A

Compounds of the formula IA in which Q is phenyl, R' is -C(COCH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxymethylene, where the unsubst. or subst. (het)aryl
 35 group has the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.6A-1	2-CH ₃ -C ₆ H ₄	EP-A 498 188
I.6A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 498 188
I.6A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 498 188

40

45

17

I.6A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	EP-A 498 188
I.6A-5	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 498 188

5 Table 1.6B

Compounds of the formula IA in which Q is phenyl, R' is -C(COCH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has
10 the following meaning

	No.	unsubst. or subst. (het)aryl	Reference
	I.6B-1	C ₆ H ₅	EP-A 498 188
15	I.6B-2	6-[2-CN-C ₆ H ₄ -O]-pyrimidin-4-yl	EP-A 498 188

Table 1.7A

Compounds of the formula IA in which Q is phenyl, R' is
20 -C(COCH₂CH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxymethylene, where the unsubst. or subst. (het)aryl group has the following meaning

	No.	unsubst. or subst. (het)aryl	Reference
25	I.7A-1	2-CH ₃ -C ₆ H ₄	EP-A 498 188
	I.7A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	EP-A 498 188
	I.7A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	EP-A 498 188
30	I.7A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	EP-A 498 188
	I.7A-5	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	EP-A 498 188

Table 1.7B

35 Compounds of the formula IA in which Q is phenyl, R' is -C(COCH₂CH₃)=NOCH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxy, where the unsubst. or subst. (het)aryl group has the following meaning

40	No.	unsubst. or subst. (het)aryl	Reference
	I.7B-1	C ₆ H ₅	EP-A 498 188
	I.7B-2	6-[2-CN-C ₆ H ₄ -O]-pyrimidin-4-yl	EP-A 498 188

45 Table 1.8A

18

Compounds of the formula IA in which Q is phenyl, R' is -N(OCH₃)-CO₂CH₃, n has the value 0, R'' is unsubst. or subst. (het)aryloxymethylene, where the unsubst. or subst. (het)aryl group has the following meaning

No.	unsubst. or subst. (het)aryl	Reference
I.8A-1	2-CH ₃ -C ₆ H ₄	WO-A 93/15,046
I.8A-2	2,5-(CH ₃) ₂ -C ₆ H ₃	WO-A 93/15,046
I.8A-3	2,4-(CH ₃) ₂ -C ₆ H ₃	WO-A 93/15,046
I.8A-4	2,3,5-(CH ₃) ₃ -C ₆ H ₂	WO-A 93/15,046
I.8A-5	2-Cl, 5-CH ₃ -C ₆ H ₃	WO-A 93/15,046
I.8A-6	2-CH ₃ , 4-C[CH ₃]=NOCH ₃ -C ₆ H ₃	WO-A 93/15,046
I.8A-7	2-CH ₃ , 4-C[CH ₃]=NOCH ₂ CH ₃ -C ₆ H ₃	WO-A 93/15,046
I.8A-8	2-CH ₃ , 4-C[CH ₂ CH ₃]=NOCH ₃ -C ₆ H ₃	WO-A 93/15,046
I.8A-9	2-CH ₃ , 4-C[CH ₂ CH ₃]=NOCH ₂ CH ₃ -C ₆ H ₃	WO-A 93/15,046
I.8A-10	1-[4-Cl-C ₆ H ₄]-pyrazol-3-yl	DE Pat. Appl. 44 23 612.3

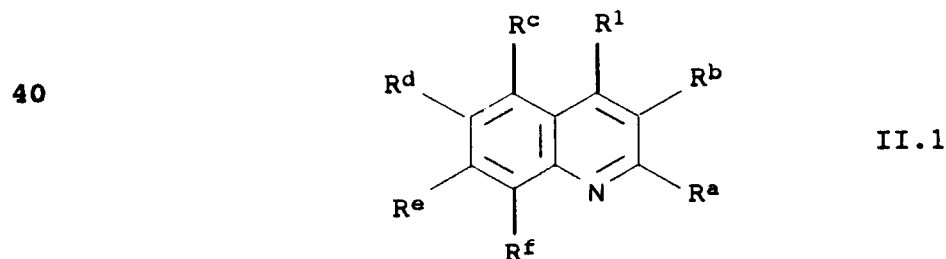
Table 1.8B

25

Compounds of the formula IA in which Q is phenyl, R' is -N(OCH₃)-CO₂CH₃, n has the value 0, R'' is CH₂ON=CR^αR^β, where R^α and R^β have the following meanings

No.	R ^α	R ^β	Reference
I.8B-1	CH ₃	3,5-Cl ₂ -C ₆ H ₃	WO-A 93/15,046

With respect to their use in the mixtures according to the invention, compounds of the formula II.1 are particularly preferred



45

where the substituents have the following meanings:

19

R^a is hydrogen or C₁-C₄-alkyl;

R^b is hydrogen, halogen or C₁-C₄-alkyl;

5 R¹ is hydrogen;

R^c is hydrogen, nitro, sulfoxyl, halogen, C₁-C₄-alkyl,
C₁-C₄-alkylcarbonyl or C₁-C₄-alkylcarbonyloxy;

10 R^d is hydrogen;

R^e is hydrogen, nitro or halogen;

15 R^f is hydrogen, hydroxyl, carboxyl, halogen, C₁-C₄-alkyl,
C₁-C₄-alkoxy, C₁-C₄-alkylcarbonyl, C₁-C₄-alkylcarbonyloxy or
C₂-C₄-alkenylcarbonyloxy.

Preferred compounds II.1 are further those in which at least one
of the radicals R¹ and R^a to R^f are hydroxyl.

20

Particularly preferred compounds II.1 are those in which R^f is
hydroxyl.

Examples of particularly suitable active compounds of the formula
25 II are compiled in the following Table:

30

35

40

45

No.	R ^a	R ^b	R ¹	R ^c	R ^d	R ^e	R ^f	Ref.
II.01	H	H	H	H	H	H	OH	Bull. Chem. Soc. Jpn. 27, 430 (1954)
II.02	H	H	H	H	H	H	CH ₃	J. Am. Chem. Soc. 73, 5622 (1951)
II.03	H	H	H	H	H	H	H	J. Am. Chem. Soc. 52, 3685 (1930)
II.04	CH ₃	H	H	Br	H	Br	OH	CH-A 235 225 (1942)
II.05	H	H	H	NO ₂	H	H	OH	Arch. Pharm. 291, 168 (1958)
II.06	H	H	H	Cl	H	H	OCOC ₂ H ₅	Similarly to Indian J. Pharm. 32, 31 (1970)
II.07	H	H	H	COCH ₃	H	H	OH	Pharmazie 40, 307 (1985)
II.08	H	H	H	CH ₃	H	H	OH	J. Prakt. Chem. 323, 979 (1981)
II.09	CH ₃	H	H	SO ₃ H	H	H	OH	J. Am. Chem. Soc. 70, 410 (1948)
II.10	CH ₃	H	H	H	H	Cl	OH	J. Heterocycl. Chem. 9, 659, (1972)
II.11	H	H	H	SO ₃ H	H	I	OH	Arch. Pharm. 231, 706 (1893)
II.12	H	H	H	H	H	NO ₂	OH	Xiangtan Daxue Ziran Kexue Xuebao 14, 55 (1992)
II.13	H	H	H	NO ₂	H	Br	OH	Arch. Pharm. 291, 168 (1958)
II.14	H	H	H	I	H	I	OH	J. Am. Chem. Soc. 58, 1314 (1936)
II.15	H	H	H	Br	H	Br	OH	Bull. Chem. Soc. Jpn. 64, 68 (1991)
II.16	H	H	H	Cl	H	Cl	OH	Chem. Ber. 52, 190 (1919)

No.	R ^a	R ^b	R ¹	R ^c	R ^d	R ^e	R ^f	Ref.
II.17	CH ₃	H	H	H	H	H	OH	Anal. Chem. 24, 1033 (1952)
II.18	H	H	H	Cl	H	H	OH	Acta Pharm. Int. 2, 149 (1951)
II.19	H	H	H	Cl	H	Br	OCOCH=CH ₂	DE-A 21 05 174
II.20	H	Cl	H	H	H	Cl	CO ₂ H	DE-A 37 06 792
II.21	H	CH ₃	H	H	H	Cl	CO ₂ H	DE-A 39 30 167

Preferably, in the preparation of the mixtures the pure active compounds IA or IB and II are employed to which, as required, further compounds active against pests (eg. insects, arachnids or 5 nematodes) or harmful fungi or alternatively herbicidal or growth-regulating active compounds or fertilizers can be admixed.

The mixtures of the compounds IA or IB and II and the simultaneous joint or separate use of the compounds IA or IB and 10 II are distinguished by an outstanding action against a broad spectrum, in particular, of phytopathogenic fungi. In some cases, they are systemically active (ie. they can be absorbed by the treated plant when used for crop protection without loss of action and if appropriate transported within the plant) and can 15 therefore also be employed as foliar and soil fungicides.

They are of particular importance for the control of a plurality of fungi on various crop plants such as cotton, vegetable plants (eg. cucumbers, beans and cucurbits), barley, grass, oats, 20 coffee, corn, fruit plants, rice, rye, soybeans, vines, wheat, decorative plants, sugar cane and a plurality of seeds. In particular, they are suitable for controlling the following phytopathogenic fungi: *Erysiphe graminis* (powdery mildew) on cereals, *Erysiphe cichoracearum* and *Sphaerotheca fuliginea* on 25 cucurbits, *Podosphaera leucotricha* on apples, *Puccinia* species on cereals, *Rhizoctonia* species on cotton and grass, *Ustilago* species on cereals and sugar cane, *Venturia inaequalis* (scab) on apples, *Helminthosporium* species on cereals, *Septoria nodorum* on wheat, *Botrytis cinerea* (gray mold) on strawberries and vines, 30 *Cercospora arachidicola* on groundnuts, *Pseudocercospora* *herpotrichoides* on wheat and barley, *Pyricularia oryzae* on rice, *Phytophthora infestans* on potatoes and tomatoes, *Plasmopara viticola* on vines, *Alternaria* species on vegetables and fruits, and *Fusarium* and *Verticillium* species.

35

They can additionally be used in the protection of materials (eg. wood preservation), for example against *Paecilomyces variotii*.

The compounds IA or IB and II can be applied simultaneously, 40 together or separately, or successively, the sequence in the case of separate application in general having no effect on the control result.

The compounds IA or IB and II are customarily used in a weight 45 ratio of from 5:1 to 1:50, preferably 2:1 to 1:20, in particular 1:1 to 1:10 (I:II).

23

Depending on the nature of the desired effect, the application rates of the mixtures according to the invention are from 0.015 to 10 kg/ha, preferably 0.1 to 7 kg/ha, in particular 0.2 to 3 kg/ha.

5

The application rates here for the compounds IA and IB are from 0.005 to 3 kg/ha, preferably 0.02 to 2 kg/ha, in particular 0.05 to 1 kg/ha.

- 10 The application rates for the compounds II are in general from 0.05 to 10 kg/ha, preferably 0.1 to 5 kg/ha, in particular 0.2 to 2 kg/ha.

- 15 In the treatment of seed, in general application rates of mixture of from 0.001 to 0.1 g/kg of seed, preferably 0.002 to 0.05 g/kg of seed, in particular 0.005 to 0.5 g/kg of seed, are used.

- If harmful fungi which are pathogenic to plants are to be controlled, the joint or separate application of the compounds IA
20 or IB and II or of the mixtures of the compounds IA or IB and II is carried out by spraying or dusting the seeds, the plants or the soils before or after the sowing of the plants or before or after the germination of the plants.

- 25 The fungicidal synergistic mixtures or the compounds IA or IB and II according to the invention can be prepared, for example, in the form of directly sprayable solutions, powder and suspensions or in the form of high-percentage aqueous, oily or other suspensions, dispersions, emulsions, oil dispersions, pastes,
30 dusting compositions, broadcasting compositions or granules and applied by spraying, atomizing, dusting, broadcasting or watering. The application form is dependent on the intended use; in each case it should guarantee a dispersion of the mixture according to the invention which is as fine and uniform as
35 possible.

- The formulations are prepared in a manner known per se, eg. by addition of solvents and/or carriers. Inert additives such as emulsifiers or dispersants are customarily admixed to the
40 formulations.

- Suitable surface-active substances are the alkali metal, alkaline earth metal and ammonium salts of aromatic sulfonic acids, eg. lignosulfonic, phenolsulfonic, naphthalenesulfonic and
45 dibutyl-naphthalenesulfonic acid, and also of fatty acid alkyl- and alkylarylsulfonates, alkyl, lauryl ether and fatty alcohol sulfates, as well as salts of sulfated hexa-, hepta- and

24

octadecanols or fatty alcohol glycol ethers, condensation products of sulfonated naphthalene and its derivatives with formaldehyde, condensation products of naphthalene or of the naphthalenesulfonic acids with phenol and formaldehyde,
5 polyoxyethylene octylphenyl ethers, ethoxylated isooctyl-, octyl- or nonylphenol, alkylphenyl or tributylphenyl polyglycol ethers, alkylaryl polyether alcohols, isotridecyl alcohol, fatty alcohol-ethylene oxide condensates, ethoxylated castor oil, polyoxyethylene or polyoxypropylene alkyl ethers, lauryl alcohol
10 polyglycol ether acetate, sorbitol esters, lignin-sulfite waste liquors or methylcellulose.

Powder, broadcasting and dusting compositions can be prepared by mixing or joint grinding of the compounds IA or IB and II or of
15 the mixtures of the compounds IA or IB and II with a solid carrier.

Granules (eg. coated, impregnated or homogeneous granules) are customarily prepared by binding the active compound or the active
20 compounds to a solid support.

Fillers or solid carriers used are, for example, mineral earths such as silicic acids, silica gels, silicates, talc, kaolin, limestone, lime, chalk, bole, loess, clay, dolomite, diatomaceous
25 earth, calcium sulfate and magnesium sulfate, magnesium oxide, ground synthetic substances, and also fertilizers such as ammonium sulfate, ammonium phosphate, ammonium nitrate, ureas and vegetable products such as cereal flour, tree bark, wood and nutshell meal, cellulose powder and other solid carriers.

30 The formulations in general contain from 0.1 to 95% by weight, preferably 0.5 to 90% by weight, of one of the compounds IA or IB and II or the mixture of the compounds IA or IB and II. The active compounds are employed here in a purity of 90% to 100%,
35 preferably 95% to 100% (according to ¹H-NMR spectrum or HPLC).

The compounds IA or IB and II or the mixtures or the corresponding formulations are used by treating the harmful fungi, their habitat or the materials, plants, seeds, soils,
40 surfaces or spaces to be protected from fungal attack with a fungicidally effective amount of the mixture or of the compounds IA or IB and II applied separately. Treatment can be carried out before or after attack by the harmful fungi.

45 The synergistic action of the mixtures according to the invention was shown by the following experiments:

25

Laboratory experiments:

Spore germination test:

5 Suspensions of fungal spores (*Botrytis cinerea*, 10^6 spores / ml) in microtiter plates were incubated at 18°C for 24 h after addition of test solution. After 48 h and 72 h, the germination was assessed under the microscope by estimation of the growth in comparison with untreated controls.

10

Assessment was carried out in % in comparison with the untreated control.

15	Active compound II [ppm]	Action after 48 h			Action after 72 h		
		solo ^a	+ I.2A-1 ^b	Colby ^c	solo ^a	+ I.2A-1 ^b	Colby ^c
	II.01 [10]	100	52	56	98	67	70
20	II.03 [10]	85	41	47	90	56	64
	II.04 [1.0]	42	1	23	55	4	39
	II.05 [0.1]	28	2	15	33	17	24
	II.06 [1.0]	61	14	34	75	44	53
25	II.07 [0.3]	99	53	55	101	69	72
	II.10 [10]	87	25	48	88	49	63
	II.12 [3.3]	67	2	37	60	14	43
30	II.13 [0.3]	81	28	45	82	49	59
	II.14 [3.3]	25	3	14	26	7	19
	II.15 [1.0]	50	5	28	62	23	45
	II.16 [1.0]	7	0	4	24	3	17
35	II.17 [10]	85	30	47	86	50	62
	II.18 [1.0]	75	25	42	81	47	58

^a % action of the compound II

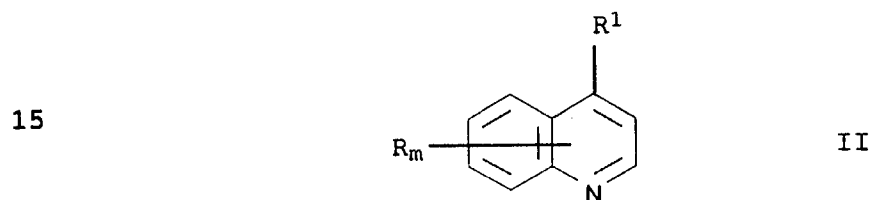
40 ^b % action of the mixture of II with 1 ppm of the compound I.2A-1

^c % of expected value calculated according to Colby

45

We claim:

1. A method of controlling harmful fungi, which comprises
 5 treating the fungi, their habitat or the materials, plants, seeds, soil, surfaces or spaces to be protected from fungal attack simultaneously, together or separately, or successively, with an active compound I, which inhibits
 10 respiration at the cytochrome complex III, and treating with an active compound of the formula II



20 where the index and the substituents have the following meanings:

- m is an integer from 1 to 6, it being possible for the radicals R to be different if m is greater than 1;
- 25 R is hydrogen, cyano, nitro, hydroxyl, mercapto, amino, carboxyl, aminocarbonyl, aminothiocarbonyl, sulfo, aminosulfonyl, halogen,
- 30 C₁-C₆-alkyl, hydroxy-C₁-C₆-alkyl, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₁-C₆-alkoxy, C₁-C₆-alkoxy-C₁-C₆-alkoxy, C₁-C₆-alkylthio, C₁-C₆-alkylamino, di-C₁-C₆-alkylamino, C₁-C₆-alkylsulfonyl, C₁-C₆-alkylsulfoxyl, C₁-C₆-alkylsulfonyloxy, C₁-C₆-alkylcarbonyl, C₁-C₆-alkylcarbonyloxy, C₁-C₆-alkylcarbonylamino, C₁-C₆-alkoxycarbonyl,
- 35 C₁-C₆-alkoxycarbonylamino, C₁-C₆-alkylaminocarbonyl, di-C₁-C₆-alkylaminocarbonyl, C₁-C₆-alkylaminothiocarbonyl, di-C₁-C₆-alkylaminothiocarbonyl, C₁-C₆-alkylaminosulfonyl, di-C₁-C₆-alkylaminosulfonyl, C₂-C₆-alkenyl, C₂-C₆-alkenyl-oxy, C₂-C₆-alkenylcarbonyloxy, C₂-C₆-alkynyl and
- 40 C₂-C₆-alkynyloxy, it being possible for these groups to be partially or completely halogenated;
- 45 C₃-C₆-cycloalkyl, aryl, aryl-C₁-C₆-alkyl, aryl-C₁-C₆-alkoxy, aryloxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroaryl-C₁-C₆-alkyl, heteroaryl-C₁-C₆-alkoxy, heteroaryloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, it being

2

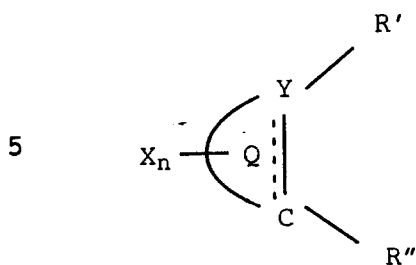
possible for these groups to be partially or completely halogenated and/or to carry one to three of the following radicals: cyano, nitro, hydroxyl, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

R¹ is hydrogen, cyano, nitro, hydroxyl, mercapto, amino, carboxyl, aminocarbonyl, aminothiocabonyl, sulfo, aminosulfonyl, halogen,

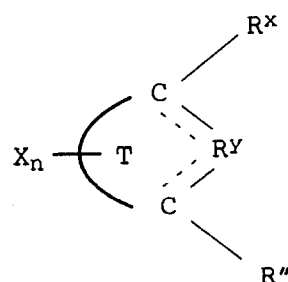
C₁-C₆-alkyl, hydroxy-C₁-C₆-alkyl, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₁-C₆-alkoxy, C₁-C₆-alkoxy-C₁-C₆-alkoxy, C₁-C₆-alkylthio, C₁-C₆-alkylamino, di-C₁-C₆-alkylamino, C₁-C₆-alkylsulfonyl, C₁-C₆-alkylsulfoxyl, C₁-C₆-alkylsulfonyloxy, C₁-C₆-alkylcarbonyl, C₁-C₆-alkylcarbonyloxy, C₁-C₆-alkylcarbonylamino, C₁-C₆-alkoxycarbonyl, C₁-C₆-alkoxycarbonylamino, C₁-C₆-alkylaminocarbonyl, di-C₁-C₆-alkylaminocarbonyl, C₁-C₆-alkylaminothiocabonyl, di-C₁-C₆-alkylaminothiocabonyl, C₁-C₆-alkylaminosulfonyl, di-C₁-C₆-alkylaminosulfonyl, C₂-C₆-alkenyl, C₂-C₆-alkenyl-oxy, C₂-C₆-alkenylcarbonyloxy, C₂-C₆-alkynyl and C₂-C₆-alkynyloxy, it being possible for these groups to be partially or completely halogenated;

C₃-C₆-cycloalkyl, aryl, aryl-C₁-C₆-alkyl, aryl-C₁-C₆-alkoxy, arylthio, arylcarbonyl, arylcarbonyloxy, heteroaryl, heteroaryl-C₁-C₆-alkyl, heteroaryl-C₁-C₆-alkoxy, heteroaryloxy, heteroarylthio, heteroarylcarbonyl and heteroarylcarbonyloxy, it being possible for these groups to be partially or completely halogenated and/or to carry one to three of the following radicals: cyano, nitro, hydroxyl, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio.

2. A process as claimed in claim 1, wherein for inhibiting respiration at the cytochrome complex III an active compound of the formula IA or IB



IA



IB

is used where is a double or single bond and the index and the substituents have the following meanings:

15 R' is -C[CO₂CH₃]=CHOCH₃, -C[CO₂CH₃]=NOCH₃, -C[CONHCH₃]=NOCH₃,
-C[CO₂CH₃]=CHCH₃, -C[CO₂CH₃]=CHCH₂CH₃, -C[COCH₃]=NOCH₃,
-C[COCH₂CH₃]=NOCH₃, -N(OCH₃)-CO₂CH₃, -N(CH₃)-CO₂CH₃,
-N(CH₂CH₃)-CO₂CH₃,

20 R'' is a C-organic radical which is bonded directly or via an oxy, mercapto, amino or alkylamino group, or

25 together with a group X and the ring Q or T to which they are bonded, are an unsubst. or subst. bicyclic, partially or completely unsaturated system which, in addition to carbon ring members, can contain heteroatoms from the group consisting of oxygen, sulfur and nitrogen,

30 R^x is -OC[CO₂CH₃]=CHOCH₃, -OC[CO₂CH₃]=CHCH₃,
-OC[CO₂CH₃]=CHCH₂CH₃, -SC[CO₂CH₃]=CHOCH₃,
-SC[CO₂CH₃]=CHCH₃, -SC[CO₂CH₃]=CHCH₂CH₃,
-N(CH₃)C[CO₂CH₃]=CHOCH₃, -N(CH₃)C[CO₂CH₃]=NOCH₃,
-CH₂C[CO₂CH₃]=CHOCH₃, -CH₂C[CO₂CH₃]=NOCH₃,
-CH₂C[CONHCH₃]=NOCH₃,

35

R^y is oxygen, sulfur, =CH- or =N-,

n is 0, 1, 2 or 3, it being possible for the radicals X to be different if n > 1;

40

X is cyano, nitro, halogen, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy, C₁-C₄-alkylthio or, in the case where n > 1, a C₃-C₅-alkylene, C₃-C₅-alkenylene, oxy-C₂-C₄-alkylene, oxy-C₁-C₃-alkylenoxy, oxy-C₂-C₄-alkenylene, oxy-C₂-C₄-alkenylenoxy or butadienediyl group bonded to two adjacent C atoms of the phenyl ring, it being possible for these chains in turn

45

4

to carry one to three of the following radicals: halogen,
C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy,
C₁-C₄-haloalkoxy or C₁-C₄-alkylthio,

5 Y is =C- or -N-,

Q is phenyl, pyrrolyl, thienyl, furyl, pyrazolyl,
imidazolyl, oxazolyl, isoxazolyl, thiazolyl,
thiadiazolyl, triazolyl, pyridinyl, 2-pyridonyl,
10 pyrimidinyl and triazinyl,

T is phenyl, oxazolyl, thiazolyl, thiadiazolyl,
oxadiazolyl, pyridinyl, pyrimidinyl and triazinyl.

15 3. A synergistic mixture suitable for controlling fungal pests,
comprising a solid or liquid carrier, an active compound of
the formula IA as set forth in claim 2 and a synergistic
amount of an active compound of the formula II as set forth
in claim 1.

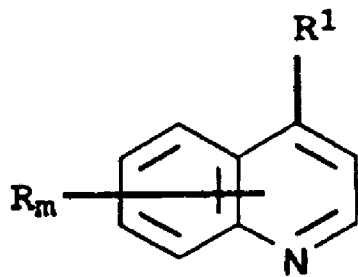
20 4. A synergistic mixture suitable for controlling fungal pests,
comprising a solid or liquid carrier, an active compound of
the formula IB as set forth in claim 2 and a synergistic
amount of an active compound of the formula II as set forth
25 in claim 1.

5. The use of the compounds IA or IB as set forth in claim 2 for
the preparation of a composition suitable for controlling
harmful fungi as claimed in claim 3 or 4.

30 6. The use of the compounds II as set forth in claim 1 for the
production of a composition suitable for controlling fungal
pests as claimed in claim 3 or 4.

35 7. A method as claimed in claim 1, wherein for inhibiting
respiration at the cytochrome complex III an active compound
of the formula IA as set forth in claim 2 is used.

40 8. A method as claimed in claim 1, wherein for inhibiting
respiration at the cytochrome complex III an active compound
of the formula IB as set forth in claim 2 is used.



(II)