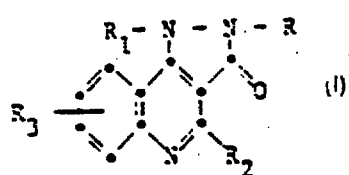


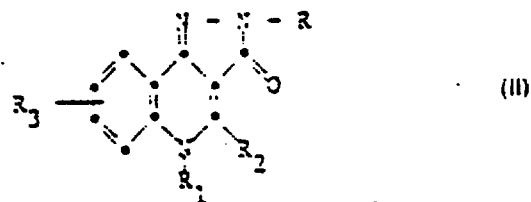
Description

2-Unsubstituted 4-phenyl-pyrazolo[4,3-c]quinoline-3-ones and their 3-hydroxy tautomeric compounds are described in Monatsh, 57, 52 (1931). European Patent 5,745 relates to antiinflammatory 3-phenyl-pyrazolo[3,4-c]isoquinolin-5-ones which have a depressant effect on the central nervous system and an action against anxiety. J. Chem. Soc. 1959, 599 discloses the synthesis of 2-phenyl-pyrazolo[3,4-c]isoquinolin-3-ones (or 3-ols) and U.S. A-3,890,324 discloses 1H-pyrazolo[4,3-c]quinol-4-[5H]one-3-carboxylic acids with an antiinflammatory action. It has now been found, surprisingly, that 2-aryl-pyrazolo-[4,3-c]quinolin-3-ones are useful psychoactive compounds.

The present invention relates to 2-aryl-pyrazolo-[4,3-c]quinolin-3-(1 and 5H)-one compounds of the general formulae I and II



and



wherein R₃ denotes hydrogen or not more than 3 identical or different substituents from the group comprising C₁-C₇-alkyl, C₁-C₇-alkoxy, C₁-C₇-alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino, mono- or di-C₁-C₇-alkylamino, cyano, carbamoyl and carboxyl, R represents phenyl which is unsubstituted or substituted by not more than 3 of the radicals mentioned for R₃, pyridyl, C₁-C₇-alkylpyridyl or halogenopyridyl, R₁ denotes hydrogen, C₁-C₇-alkyl or (hydroxy, di-C₁-C₇-alkylamino or R₃-phenyl)-C₁-C₇-alkyl, wherein the hydroxyl or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R₂ represents hydrogen or C₁-C₇-alkyl; their 3-hydroxy tautomeric compounds; C₁-C₇-alkanoyl, carbamoyl and mono- or di-C₁-C₇-alkylcarbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or the

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salts, in particular the pharmaceutically acceptable salts, thereof, and to processes for their preparation, pharmaceutical preparations containing these psychoactive compounds, and the compounds, for therapeutic use.

The 1,2-phenylene radical is preferably unsubstituted or substituted by one, two or three substituents of the group comprising C₁-C₇-alkyl, for example methyl, ethyl or n- or i-propyl or -butyl; C₁-C₇-alkoxy, for example methoxy, ethoxy or n- or i-propoxy or -butoxy; C₁-C₇-alkylthio, for example methylthio or ethylthio; hydroxyl; halogen, for example fluorine, chlorine or bromine; trifluoromethyl; nitro; amino; mono- or di-C₁-C₇-alkylamino, for example mono- or di-(methyl, ethyl or n- or i-propyl)-amino; cyano, carbamoyl and carboxyl.

The phenyl or pyridyl radical R in the 2-position is preferably an ortho-unsubstituted phenyl radical which, like the 1,2-phenyl radical defined above, contains no substituents or not more than three substituents, but also 3-, 4- or 2-pyridyl- (sic), or a C₁-C₇-alkylated or halogenated pyridyl radical, preferably (4-methyl or 5-chloro)-2-pyridyl. Of the substituents listed above for the 1,2-phenylene and/or R radical, starting with trifluoromethyl, in each case preferably only one such substituent is present.

The symbol R₁, in either the 1-position or, preferably, the 5-position, is preferably hydrogen, but also one of the alkyl groups mentioned or a (hydroxy, di-C₁-C₇-alkylamino or phenyl-C₁-C₇-lower (sic) alkyl group which separates the adjacent hetero atoms by at least 2 carbon atoms. Such radicals are 2-(hydroxy, dimethylamino or diethylamino)-ethyl or 2- or 3-(hydroxy or dimethylamino)-propyl; benzyl or 1- or 2-phenylethyl.

The radical R₂ in the 4-position is also preferably hydrogen or one of the alkyl groups mentioned, in particular methyl.

Because of the 1- or 5-substituents R₁ mentioned, the compounds of the present invention are correctly represented as 3-ones or as 3-oxo derivatives. However, if the

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symbol R_1 denotes hydrogen, the compounds can form a small amount of tautomeric 3-hydroxy compounds, depending on the medium and the substitution. In general, however, they are weak bases or acids, which give salts either with strong acids or bases. Only the (hydroxy or amino)-phenyl compounds mentioned form acyl derivatives. The acyl derivatives mentioned are C_1 - C_7 -alkanoyl, carbamoyl or mono- or di- C_1 - C_7 -alkyl-carbamoyl derivatives of the abovementioned (hydroxy or amino)-phenyl compounds or (hydroxy or amino)-phenylene compounds. Such derivatives are, for example, acetyl, propionyl, pivaloyl and (methyl or ethyl)-carbamoyl derivatives. Salts are preferably alkali metal salts, for example sodium or potassium salts of 1- or 5-unsubstituted compounds ($R_1 = H$) and/or of carboxy-(phenyl or phenylene) compounds, or acid addition salts of all the compounds mentioned with acids, in particular with the acids mentioned below.

The C_1 - C_7 -alkyl radicals mentioned above or below are to be understood as those with not more than 7, preferably 4 and in particular 1 or 2 carbon atoms.

The compounds of the invention show useful pharmacological properties, in particular psychoactive effects, and primarily antidepressant or anxiolytic properties. These can be demonstrated by in vitro or in vivo test methods, preferably on mammals, for example mice, rats or monkeys, as test objects. The compounds mentioned can be administered to them enterally or parenterally, preferably orally, or subcutaneously, intravenously or intraperitoneally, for example by push-fit capsules or in the form of starch-containing suspensions or aqueous solutions or suspensions. The dose used can be within a range of between 0.01 and 100 mg/kg/day, preferably 0.05 to 5 mg/kg/day and in particular between 0.1 and 0.5 mg/kg/day.

The antidepressant properties mentioned can be demonstrated on mice in accordance with the "behavioral despair" test (Arch. Int. Pharmacodyn. Ther. 229 (2), 327-336, October 1977). In this test, the experimental animal is forced to

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swim in a narrow cylinder from which it cannot escape, whereupon a depressive state is induced. After a brief period of vigorous activity, the mouse assumes a characteristic immobile body attitude which is easily recognizable. The occurrence of this immobility is reduced by the compounds of this invention, by other tricyclic antidepressants, monoaminooxidase-inhibiting agents and atypical antidepressants and by electroconvulsive shock.

The anxiolytic effects are routinely detected in accordance with the classical Metrazole antagonism test on rats, or in accordance with the Cook-Davidson conflict method, in which male Wistar rats are used. These rats are kept at 80% of the normal body weight by their diet, but with no restriction on the supply of water. They are trained to press a lever inside a conditioning chamber. The chamber also contains a dropper for liquid, a light source, a loud-speaker and a grid floor. Both the lever and the grid are connected to an electric shock source. The chamber is placed in a soundproofed room in which a white noise source shields the chamber from external hearing influences in the course of the test method. Each test period of 47 minutes consists of two alternating programmes. The first is a variable interval (VI) programme of 30 seconds, which is repeated for 5 minutes. In this programme, a sweetened condensed milk ration is released to the rat 30 seconds after the first operation of the lever. The decrease in this performance of operating the lever induced by the active compound is regarded as an indication of the neurological deficit. Immediately after the VI programme, a sound of 1,000 Hz and a light signal are activated at the same time, indicating the start of the second so-called fixed ratio (FR) programme, which lasts 2 minutes. During this interval of time, an electric shock to the feet is administered at the same time as the milk ration immediately after the lever has been pressed for the tenth time, whereupon a conflict situation arises. The intensity of the shock mentioned is between 2.0 and 3.6 mA. It varies for each experimental animal so that

the animal is stabilized at approximately 25 to 100 pressings of the lever within this programme during the entire session. The increase in this performance caused by the active compound during the FR programme serves as an indication of the anxiolytic action such as is found with the compounds of the present invention.

The anxiolytic effects of the new compounds can also be evaluated in the "diazepam receptor binding" experiment *in vitro*, for example as described in Nature 266, 732 (1977) or in Proc. Nat. Acad. Sci. USA 74, 3805 (1975). Diazepam binds specifically and with a high affinity to crude synaptosomal membrane preparations from the forebrain of the rat. This binding is inhibited by other anxiolytic compounds, for example by pharmacologically active benzodiazepines. If tritium-labelled diazepam is used, the interaction of other active compounds with the receptor mentioned can easily be evaluated as follows: Membranes from the forebrain of the rat are incubated at 0-5° with tritium-labelled diazepam and with various concentrations of the substances tested in a physiological medium at a pH value of 7.5. The membranes, which contain the receptors with various amounts of the tritium-labelled diazepam, are filtered on glass fibre filters. These are then shaken in a liquid scintillation counter. The concentration of the compounds according to the invention which is necessary for 50% inhibition of the specific binding of 2 nM tritium-labelled diazepam, that is to say the IC₅₀ (inhibitory concentration), can be calculated graphically. This concentration goes down to a region of approximately 0.6 nM. This concentration is lower in order than that of diazepam (5 nM) and is lower than the value for chlordiazepoxide (400 nM) by a power of almost four.

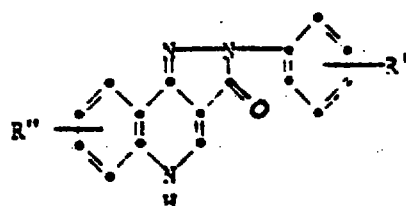
The compounds of the invention are accordingly useful in the treatment of mental depression and preferably for combating anxiety states which are similar to those treated with diazepam. In contrast to diazepam, the compounds of the invention mentioned evidently have no tendency to induce a neurological deficit at doses at which the anxiolytic action

(4)

already comes into being. The new compounds can moreover be used as intermediate products for the preparation of other useful preparations, in particular pharmacologically active preparations.

Preferred compounds are those of the formulae I and II wherein R_3 denotes hydrogen or one or two substituents from the group comprising C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 -alkylamino, cyano, carbamoyl and carboxyl, R represents phenyl which is unsubstituted or substituted by one or two of the radicals mentioned for R_3 , pyridyl, C_1 - C_7 -alkylpyridyl or halogenopyridyl, R_1 denotes hydrogen, C_1 - C_7 -alkyl or (hydroxy, di- C_1 - C_7 -alkylamino or R_3 -phenyl)- C_1 - C_7 -alkyl, wherein the hydroxy or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R_2 represents hydrogen or C_1 - C_7 -alkyl; C_1 - C_7 -alkanoyl, carbamoyl and mono- or di- C_1 - C_7 -alkyl-carbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or the salts, in particular the pharmaceutically usable alkali metal or acid addition salts, thereof.

Compounds of the formula III



(III)

wherein R'' denotes hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine or trifluoromethyl, R' represents hydrogen alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine, trifluoromethyl, nitro, amino, monoalkylamino or alkylcarbamoylamino with in each case not more than 4 carbon atoms or cyano; or the salts, in particular the pharmaceutically usable alkali metal or acid addition salts, thereof are also preferred.

The compounds of the formula III wherein R" denotes hydrogen or 8-(methyl, methoxy, fluoro or chloro) and R' represents hydrogen or denotes 4-fluoro, if R" is 8-chloro; or the salts, in particular the pharmaceutically usable alkali metal or acid addition salts, are to be singled out in respect of their predominantly antidepressant activity.

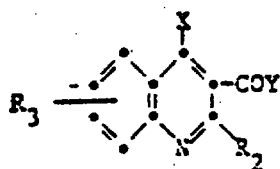
Compounds of the formula III wherein R" denotes hydrogen or 8-(methyl, methoxy, fluoro or chloro) and R' represents 4-(methyl, methoxy, chloro, bromo, amino or cyano) or denotes 4-fluoro if R" is other than 8-chloro; or the salts, in particular pharmaceutically usable alkali metal or acid addition salts thereof, are to be particularly singled out in respect of their predominantly anxiolytic activity.

Compounds of the general formula III wherein R' denotes hydrogen and R" represents hydrogen or 8-(methoxy, fluoro or chloro) or R' denotes 4-fluoro and R" is 8-chloro; or the salts, in particular their sodium salt, hydrochloride or methanesulfonate, are also preferred in respect of their predominantly antidepressant activity.

Compounds of the formula III wherein R' denotes 4-(methyl, chloro or amino) and R" represents hydrogen; or the salts, in particular their sodium salt, hydrochloride or mesylate, are particularly preferred in respect of their predominantly anxiolytic activity.

The compounds of the invention are prepared by methods which are known per se, for example by a process in which

a) compounds of the formula IV



(IV)

wherein X denotes -NH-NH-R and Y represents hydroxyl or C₁-C₇-alkoxy; or X denotes halogen and Y represents H₂N-N-R; or X denotes C₁-C₇-alkoxyamino or azido and Y represents NH-R, are cyclized and, if desired, a resulting compound or

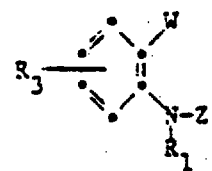
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an alkali metal salt thereof is reacted with a reactive ester of an alcohol R_1-OH .

The cyclization of the acids or amides IV mentioned is carried out by heating to temperatures between 80 and 180° , preferably in the presence of inert solvents, for example aliphatic or aromatic hydrocarbons and/or ethers, such as toluene, xylenes, biphenyls and/or diphenyl ethers, the water or alkanol formed being distilled off. The hydrazides IV mentioned are cyclized in an analogous manner, but preferably under basic conditions, for example in the presence of aqueous alkali metal hydroxides, in order to neutralize the hydrogen halide acids formed. The cyclization of the amides IV mentioned is carried out by heating to temperatures between 120 and 300° , preferably between 200 and 250° , in particular also in the presence of the inert solvents mentioned.

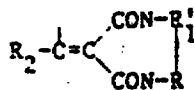
Some of the starting substances of the formula IV are new, but they can easily be prepared from the known precursors wherein X denotes hydroxyl, by condensation with corresponding aryl-hydrazines. Such methods are, for example, illustrated in the examples or described in J. Med. Chem. 12, 1096 (1969) or C.R. Acad. Sc. Paris, t. 280, C, 1385 (1975). The hydrazides mentioned are obtained by condensation of 4-chloroquinoline-3-carboxylic acid chlorides and β -acylated arylhydrazines, for example trifluoroacetates, which hydrolyse under the cyclization conditions. The amides mentioned are preferably prepared by condensation of 4-halogenoquinoline-3-carboxylic acid halides with R-amines and subsequently with O-C₁-C₇-alkyl-hydroxylamines or alkali metal azides.

Another process for the preparation of the compounds according to the invention comprises a procedure in which
b) compounds of the formula V

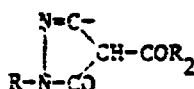


(V)

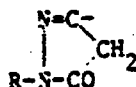
wherein the two symbols W and R₁ denote hydrogen and Z represents the grouping



wherein R₁' denotes C₁-C₇-alkyl; or W is the grouping



and Z represents hydrogen; or W denotes the grouping



and Z represents R₂-CO, or R₁-N-Z taken together represents isocyano, are subjected to a condensation reaction and, if desired, a resulting compound is converted into another compound of the invention, and/or, if desired, a resulting compound is converted into its salt or a resulting salt is converted into the free compound or into another salt, and/or, if desired, a resulting mixture of isomers is resolved into the individual isomers.

The cyclization condensation of starting substances in which W denotes hydrogen is preferably carried out with strong aprotic condensing agents, for example polyphosphoric acid lower alkyl esters. If starting substances in which Z denotes hydrogen are used, the water formed during the cyclization is preferably removed azeotropically. The process is preferably carried out in the abovementioned hydrocarbons and/or ethers, if desired, in the presence of conventional molecular sieves and/or catalytic amounts of an acid, for example hydrochloric acid.

Finally, compounds of the formula V in which W and Z contains carbon (sic) are cyclized under neutral conditions, if appropriate in the presence of dehydrating agents, for

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example thionyl halides, phosphorus oxyhalides or polyphosphoric acid lower alkyl esters.

The starting substance of the formula V is also new, but it can be prepared by methods which are known per se, for example by condensation of 1-arylpyrazolidine-3,5-diones with ethyl orthoformate and an aniline. The second starting substance of the formula V mentioned can be obtained analogously to that in Khim. Geterotsikl. Spedin. Akad. Nauk. Latv. SSR. 1965, 587, but using analogous compounds with an o-nitro group, which is subsequently reduced with catalytically activated hydrogen. The last group of starting substances of the formula V is prepared similarly, starting from the customary 1-R-3-(o-nitrophenyl)-5-pyrazolones mentioned, by reduction, N-acylation and, if desired, their dehydration with phosgene or dimethylformamide/thionyl halide mixtures to give the isonitriles mentioned.

The resulting compounds of the invention can be converted into one another in a manner which is known per se. Thus, for example, compounds in which R₁ denotes hydrogen can be substituted in the 1-position with a reactive ester of R₁-OH. These esters are derived, for example, from hydrogen halide acids or aliphatic or aromatic sulfonic acids and denote, for example, R₁ (halides, sulfates or aliphatic or aromatic sulfonates), such as methyl iodide, dimethyl sulfate, benzyl chloride or methyl methanesulfonate or toluenesulfonate. 1-Substituted compounds of the formula I are thereby obtained. Those of the formula II are prepared similarly from corresponding alkali metal salts, for example in which R₁ denotes sodium or potassium, the substitution taking place in the 5-position. Resulting C₁-C₇-alkoxy compounds can also be hydrolysed with strong hydrogen halide acids, for example hydrobromic acid, to give the corresponding phenols. Resulting nitro compounds can be reduced to the corresponding amines with catalytically activated or nascent hydrogen, for example hydrogen in the presence of noble metal catalysts, for example nickel catalysts, palladium catalysts or platinum catalysts, or with hydrogen, which is generated

by the action of reactive metals on alcohols or acids, for example zinc and hydrogen halide acids. The amines mentioned can be alkylated in the same way as described for the compounds where $R_1 = H$ or by reductive alkylation, or can be acylated, for example with corresponding reactive acid derivatives, for example anhydrides, halides or isocyanates. Resulting nitriles can be converted into the corresponding amides in a manner which is known per se, for example by treatment with aqueous alkali metal hydroxide solutions, for example aqueous sodium hydroxide solution, ethanol and hydrogen superoxide, or converted into the corresponding acids by hydrolysis, for example with aqueous alkali metal hydroxide solutions, such as aqueous sodium hydroxide solution.

Finally, a resulting compound can be converted either into its alkali metal salts, preferably using alkali metal hydrides, hydroxides or C_1 - C_7 -alkoxides, or into their acid addition salts (especially in the case of amino-substituted compounds), preferably using inorganic or organic acids which give therapeutically usable salts. Examples of such acids are strong inorganic acids, such as hydrogen halide acids, for example hydrochloric or hydrobromic acid or sulfuric, phosphoric, nitric or perchloric acid; or aliphatic or aromatic carboxylic and sulfonic acids, for example formic, acetic, propionic, succinic, glycolic, lactic, malic, tartaric, citric, maleic, hydroxymaleic, pyruvic, phenylacetic, benzoic, 4-aminobenzoic, anthranilic, 4-hydroxybenzoic, salicylic, 4-aminosalicylic, pantoic, nicotinic, methanesulfonic, ethanesulfonic, hydroxyethanesulfonic, ethylenesulfonic, halogenobenzenesulfonic, toluenesulfonic, naphthalenesulfonic, sulfanilic or cyclohexylsulfamic acid; or ascorbic acid. These or other salts, for example picrates, can also be used in the purification of amino bases. The bases are converted into their salts, the salts are separated off and the free compounds are liberated from the salts. As a result of the close relationships between the new compounds in the free form and in the form of their salts, free compounds and salts above and below are correspondingly and

accordingly, if appropriate, also to be understood as the corresponding salts or free compounds. Acid addition salts of compounds which contain no basic substituents, for example no amino group, as a rule hydrolyse in approximately neutral aqueous media.

The abovementioned reactions are carried out by methods which are known per se in the presence or absence of diluents, preferably in those which are inert towards the reagents and dissolve them, catalysts, condensing agents or neutralizing agents and/or in an inert atmosphere, with cooling, at room temperature or at elevated temperatures, preferably at the boiling point of the solvent used, under normal or increased pressure.

Resulting isomer mixtures can be resolved into the individual isomers by methods which are known per se, for example by fractional distillation, crystallization and/or chromatography.

The invention likewise relates to modifications of the present process, according to which an intermediate product obtainable at any stage of the process is used as the starting material and the remaining process steps are carried out, or the process is interrupted at any stage, or according to which a starting material is formed under the reaction conditions, for example those of the formula IV where $X = NH-NH-R$, starting from their precursors in which X denotes chlorine, or wherein a starting substance is used in the form of a salt.

Those starting substances which lead to the compounds described above as particularly useful, in particular those of the formula III, are preferably used in the process of the present invention.

The pharmacologically usable compounds of the present invention can be used for the preparation of pharmaceutical preparations which contain an effective amount of the active substance, together or as a mixture with excipients which are suitable for enteral or parenteral administration. Tablets or gelatine capsules which contain the active compound to-

gether with diluents, for example lactose, dextrose, sucrose, mannitol, sorbitol, cellulose and/or glycine, and lubricants, for example silica, talc, stearic acid or salts thereof, such as magnesium stearate or calcium stearate, and/or polyethylene glycol, are preferably used; tablets also contain binders, for example magnesium aluminum silicate, starch paste, gelatine, tragacanth, methylcellulose, sodium carboxymethylcellulose and/or polyvinylpyrrolidone, and, if desired, disintegrating agents, for example starches, agar, alginic acid or a salt thereof, enzymes of (sic) binders and/or effervescent mixtures, or adsorbents, dyestuffs, flavouring substances and sweeteners. Injectable preparations are preferably isotonic aqueous solutions or suspensions, and suppositories are primarily fat emulsions or suspensions. The pharmacological preparations can be sterilized and/or can contain auxiliaries, for example preservatives, stabilizers, wetting agents and/or emulsifying agents, solubilizing agents, salts for regulating the osmotic pressure and/or buffers. The present pharmaceutical preparations, which, if desired, can contain other pharmacologically useful substances, are prepared in a manner which is known per se, for example by means of conventional mixing, granulating or tablet-coating processes, and contain from about 0.1 to about 75%, in particular from about 1 to 50%, of the active substance.

The following examples serve to illustrate the invention. Temperatures are given in degrees Celsius and the parts data relate to parts by weight. Unless defined otherwise, the evaporation of solvents is carried out under reduced pressure, for example between 0.1 and 15 mm Hg (0.133 and 20 mbar).

The compounds mentioned in the following examples which have too high a melting point are characterized by their IR or NMR spectra.

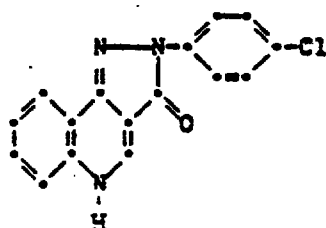
Example 1

A mixture of 1,681 g of ethyl 4-chloroquinoline-3-carboxylate, 1,017 g of p-chlorophenyl hydrazine and 25,000

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ml of xylene is heated at 105° in a nitrogen atmosphere for 24 hours, with stirring. The resulting suspension is cooled to 20° and 14,000 ml of 2 normal aqueous sodium hydroxide solution are added and the mixture is stirred for 15 minutes and diluted with 30,000 ml of water. Stirring is continued for 1 hour, the aqueous phase is separated off, washed five times with 8,000 ml of diethyl ether each time and filtered and the filtrate is treated with a solution of 1,600 g of ammonium chloride in 8,000 ml of water under a nitrogen atmosphere, with stirring. The resulting suspension is stirred overnight at room temperature and filtered and the residue is washed five times with 12,000 ml of hot water. The residue is dried under 5 mm Hg at 90° and 1,665 g thereof are dissolved in 8,400 ml of dimethylformamide at 130° . The solution is filtered and left to cool to room temperature, with stirring. The resulting suspension is filtered and the residue is washed twice with 500 ml of cold dimethylformamide each time and four times with 1,000 ml of diethyl ether and dried under 0.1 mm Hg (0.133 mbar) at 100° . 2-(p-Chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one of the formula



which melts at $324-327^{\circ}$, with decomposition, is obtained.

The starting substance is prepared as follows (according to a general (sic) applicable method): 2,953 g of diethyl ethoxymethylene-malonate are added to 1,272 g of aniline in the course of 20 minutes, with stirring, and stirring is continued at $90-92^{\circ}$ for 135 minutes. The ethanol formed is distilled off under 10 mm Hg 13.33 mbar (sic) at 80° in the course of 4 hours. The oil obtained as the residue is allowed to crystallize on sheets. The crystals are pulverized and dried at 5 mm Hg (6.67 mbar and room temperature). Diethyl phenylaminomethyl-ene-malonate with a melting point of $45-46^{\circ}$ is obtained.

1,085 g of the compound last mentioned are added to 10,850 ml of a eutectic mixture of diphenyl ether/biphenyl (73.5 : 26.5 parts by weight) under nitrogen at 215-220° in the course of 45 minutes, with stirring. When the addition has ended, the temperature is increased to 238° and the mixture of ethanol and diphenyl ether formed is collected in a separator in the course of 4 hours (approximately 390 ml). The reaction mixture is allowed to cool to room temperature, with stirring. The resulting suspension is filtered and the residue is washed twice with 500 ml of diethyl ether each time and dried under 0.1 mm Hg (0.133 mbar) at 85°. Ethyl 4-hydroxyquinoline-3-carboxylate which melts at 276-280° is obtained.

1,630 g of the compound last mentioned are added to 2,463 ml of phosphorus oxychloride in a nitrogen atmosphere in the course of 30 minutes, with stirring. The mixture is stirred at 70° for 15 minutes and at 95° for 2 hours and the liquid is then distilled off under 11 mm Hg (14.7 mbar) at 60°. The residue is dissolved in 8,000 ml of methylene chloride and the solution is cooled to 0° and treated with 5,000 g of crushed ice. The mixture is stirred and treated with 3,000 ml of 50% strength aqueous sodium hydroxide solution at below 15° and, when the pH value reaches 12, the organic layer is separated off. This is washed twice with 2,000 ml of water each time and once with 2,000 ml of saturated aqueous sodium chloride solution, dried and evaporated. The oil obtained as a residue is allowed to crystallize on sheets. These crystals are powdered and dried under 0.1 mm Hg (0.133 mbar (sic) at room temperature. Ethyl 4-chloroquinoline-3-carboxylate which melts at 44-46° is obtained.

A solution of 793 g of sodium nitrite in 3,300 ml of water is added to a solution of 1,445 g of p-chloroaniline in 3,375 ml of 38% strength hydrochloric acid and 5,650 ml of water at -5° to -8° in a nitrogen atmosphere in the course of one hour, with stirring. After 15 minutes, 7,617 g of stannous chloride in 9,000 ml of 38% strength hydrochloric acid are added thereto in the course of 30 minutes at below

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25°. The resulting suspension is stirred in an ice bath for one hour and filtered. The residue is suspended in 30,000 ml of water, and 5,000 g of solid sodium hydroxide are added in a nitrogen atmosphere at 0-25° in the course of one hour, with stirring. The mixture is extracted twice with 8,000 ml of diethyl ether and the combined extracts are washed twice with 4,000 ml of water and once with saturated aqueous sodium chloride solution, dried, filtered and evaporated. The residue is dried under 5 mm Hg (6.67 mbar) at room temperature. p-Chlorophenyl-hydrazine, which melts at 82-87°, is obtained.

Example 2

A mixture of 1 g of 2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one and 3.38 ml of 1 normal aqueous sodium hydroxide solution is stirred at room temperature overnight in a nitrogen atmosphere. The resulting solution is filtered and evaporated and the residue is dried under reduced pressure. The corresponding sodium salt, which melts at 280-284°, is obtained.

Example 3

A mixture of 1 g of 2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-2(5H)-one, 20 ml of trifluoroacetic acid and 0.325 g of methanesulfonic acid is stirred at room temperature for one hour and evaporated. The residue is triturated with diethyl ether and filtered off. The corresponding methanesulfonate, which melts at 250-255°, is obtained.

Example 4

A mixture of 3 g of 2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one and 100 ml of dimethyl sulfate is stirred at 110-130° for 2 hours and evaporated. The residue is dissolved in 1 normal aqueous sodium hydroxide solution, the solution is extracted with methylene chloride and the extract is evaporated. The residue is recrystallized from diethyl ether. 1-Methyl-2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3-one, which melts at 158-161°, is obtained.

Example 5

A mixture of 5 g of 2-(p-chlorophenyl)-pyrazolo[4,3-

clquinolin-3(5H)-one, 0.81 g of 50% strength sodium hydride in mineral oil and 100 ml of anhydrous tetrahydrofuran is boiled under reflux for 2 hours. The mixture is cooled to room temperature, 3 g of methyl iodide are added, with stirring, and after one hour the mixture is stirred with a further 1 g of methyl iodide. The mixture is stirred overnight at room temperature and filtered and the residue is recrystallized from tetrahydrofuran/heptane. 5-Methyl-2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3-one, which melts at 322-323°, is obtained.

Example 6

A mixture of 10 g of 2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, 1.8 g of 50% strength sodium hydride in mineral oil and 250 ml of 1,2-dimethoxyethane is stirred at 100° until the constituents have dissolved. The mixture is cooled to room temperature and 15 g of 3-dimethylamino-propyl chloride in 10 ml of 1,2-dimethoxyethane are added. The mixture is stirred overnight at 150° and cooled, the solution forming the top layer is decanted and the residue is treated with the solution mentioned. 5-(3-Dimethylaminopropyl)-2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3-one, which melts at 180-191°, is obtained.

5-(2-Dimethylaminoethyl)-2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3-one, which melts at 184-186°, is obtained in an analogous manner.

Example 7

A mixture of 2 g of 2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, 0.33 g of 50% strength sodium hydride in mineral oil and 50 ml of 1,2-dimethoxyethane is stirred at 100° until the constituents have dissolved. The mixture is cooled to room temperature, 3.9 g of o-fluorobenzyl chloride in 2 ml of 1,2-dimethoxyethane are added and the mixture is boiled under reflux for 4 hours. The mixture is cooled to room temperature and filtered, the residue is washed with diethyl ether and suspended in 10 ml of 1 normal aqueous sodium hydroxide solution, the suspension is filtered again and the residue is washed with water and dried.

5-(o-Fluorobenzyl)-2-(p-chlorophenyl)-pyrazolo[3,4-c]quinolin-3-one, which melts at 338-339°, is obtained.

Example 8

A mixture of 3.5 g of ethyl 4-(2,4-dichlorophenylhydrazino)-quinoline-3-carboxylate and 40 ml of eutectic diphenyl ether/biphenyl is heated at 175° for 4 hours, cooled to room temperature and diluted with diethyl ether. The resulting suspension is filtered and the residue is washed with diethyl ether and dissolved in 1 normal aqueous sodium hydroxide solution. The solution is washed with diethyl ether, its pH value is brought to 8.5 with ammonium chloride and the resulting precipitate is separated off. The precipitate is washed successively with water, methanol and diethyl ether. 2-(2,4-Dichlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows bands at 890, 867, 845, 832, 816, 796, 775, 767, 756, 730 and 701 cm⁻¹ in the IR spectrum, is obtained.

The starting substance is prepared as follows: a mixture of 2.8 g of ethyl 4-chloroquinoline-3-carboxylate, 2.1 g of 2,4-dichlorophenylhydrazine and 40 ml of eutectic diphenyl ether/biphenyl is heated at 80-90° overnight, with stirring. The mixture is cooled to room temperature and diluted with diethyl ether and the precipitate is separated off. This is taken up in 1 normal aqueous sodium hydroxide solution, the solution is extracted with diethyl ether, the extract is washed with water, dried, filtered and concentrated and the precipitate is separated off. Ethyl 4-(2,4-dichlorophenylhydrazino)-quinoline-3-carboxylate, which melts at 151-153°, is obtained.

Example 9

A mixture of 3.6 g of ethyl 4-chloro-2-methyl-quinoline-3-carboxylate, 1.8 g of phenylhydrazine and 40 ml of xylene is boiled under reflux for 4 hours, cooled to room temperature, diluted with diethyl ether and filtered. The residue is dissolved in 50 ml of 2 normal aqueous sodium hydroxide solution, the solution is washed with diethyl ether and its pH value is brought to 8.5 with ammonium chloride.

The resulting precipitate is separated off and washed successively with hot water, methanol and diethyl ether. 4-Methyl-2-phenyl-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows bands at 874, 867, 858, 850, 822, 780, 765, 756, 750, 740 and 722 cm^{-1} in the IR spectrum, is obtained.

4-Methyl-2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one is also prepared in an analogous manner. Melting point $349-350^{\circ}$.

Example 10

A mixture of 2.7 g of ethyl 4-chloro-6-methoxy-quinoline-3-carboxylate, 1.4 g of p-fluorophenylhydrazine and 20 ml of eutectic diphenyl ether/biphenyl is heated at $160-165^{\circ}$ for 4 hours and then cooled to room temperature and diluted with diethyl ether. The crystalline product obtained as a precipitate is separated off, washed thoroughly with diethyl ether and dried. 2-(p-Fluorophenyl)-8-methoxy-pyrazolo[4,3-c]quinolin-3(5H)-one hydrochloride, which melts at $322-324^{\circ}$, is obtained.

Example 11

A mixture of 4 g of ethyl 4-chloroquinoline-3-carboxylate, 2.04 g of 2-hydrazino-pyridine and 50 g of eutectic diphenyl ether/biphenyl is stirred at $110-130^{\circ}$ in a nitrogen atmosphere for 3 hours. The mixture is cooled to room temperature, diluted with diethyl ether and filtered and the solid material is washed with diethyl ether and dissolved in 100 ml of aqueous sodium hydroxide solution. The solution is washed with diethyl ether and its pH value is brought to 8.5 with ammonium chloride. The resulting precipitate is separated off and washed successively with water, methanol and diethyl ether. 2-(2-Pyridyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows bands at 887, 865, 853, 788, 780, 765, 756, 737 and 726 cm^{-1} in the IR spectrum, is obtained.

8-Fluoro-2-(2-pyridyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows bands at 895, 868, 826, 792, 776, 758 and 725 cm^{-1} in the IR spectrum, is also prepared in an analogous manner.

The starting substance for the compound mentioned

last is prepared as follows: a mixture of 28.9 g of ethyl 6-fluoro-4-hydroxy-quinoline-3-carboxylate [J.A.C.S. 69, 371 (1947)] and 240 ml of phosphorus oxychloride is boiled under reflux in a nitrogen atmosphere for 3 hours. It is cooled to room temperature, the solution is evaporated and the residue is treated with ice-water and chloroform. The organic layer is dried and evaporated. The residue is taken up in aqueous sodium bicarbonate solution and diethyl ether and the ethereal layer is dried and evaporated. Ethyl 4-chloro-6-fluoro-quinoline-3-carboxylate, which melts at 55-57°, is obtained.

Example 12

A mixture of 3 g of 2-(p-methoxyphenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one and 260 ml of 48% strength hydrobromic acid is boiled under reflux for one hour and concentrated to approximately 50 ml. The concentrate is cooled to room temperature and the precipitate is separated off, washed with methanol and diethyl ether and dissolved in dilute aqueous sodium hydroxide solution. The solution is washed with diethyl ether and its pH value is then brought to 8.5 with ammonium chloride. The resulting precipitate is separated off, washed with methanol and then with diethyl ether and dried. 2-(p-Hydroxyphenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which melts at 294-296°, is obtained.

Example 13

A solution of 1.9 g of 2-(p-nitrophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one in a mixture of 18.6 ml of 2 normal aqueous sodium hydroxide solution and 75 ml of ethanol is hydrogenated over 0.2 g of platinum oxide under 2.7 atmospheres for 6 hours. The mixture is filtered, the filtrate is evaporated, the residue is taken up in water and the solution is washed with diethyl ether. Its pH value is brought to 8.5 with ammonium chloride and the precipitate is separated off, washed successively with methanol and diethyl ether and dried. 2-(p-Aminophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows IR bands at 896, 885, 865, 840, 820, 815, 782, 776, 761, 740, 736 and 720 cm^{-1} , is obtained.

Example 14

0.6 g of glacial acetic acid is added to a mixture of 1.4 g of 2-(p-aminophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, 4.1 ml of 37% strength aqueous formaldehyde, 1 g of sodium cyanoborohydride and 20 ml of acetonitrile, with stirring. The mixture is further stirred overnight at room temperature and then diluted with water. The resulting precipitate is dissolved in dilute sodium hydroxide solution, the aqueous solution is washed with diethyl ether and its pH value is brought to 8.5 with aqueous ammonium chloride solution. The resulting precipitate is separated off, washed first with methanol and then with diethyl ether and dried. 2-(p-Methylaminophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which melts at 302-304°, is obtained.

Example 15

A mixture of 0.7 g of 2-(p-aminophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, 1.4 g of methyl isocyanate and 25 ml of methanol is boiled under reflux for 7 hours and left to stand at room temperature overnight. The mixture is evaporated, the residue is treated with dilute aqueous sodium hydroxide solution and diethyl ether, the aqueous solution is separated off and washed with diethyl ether and its pH value is brought to 8.5 with ammonium chloride. The resulting precipitate is separated off, washed first with methanol and then with diethyl ether and dried. 2-(p-Methylcarbamoylaminophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows IR bands at 895, 869, 850, 825, 816, 812, 785, 780, 767 and 738 cm^{-1} , is obtained.

Example 16

A mixture of 38.5 ml of a 0.17 molar solution of ethyl 4-chloro-quinoline-3-carboxylate in xylene and 0.96 g of p-cyano-phenylhydrazine in 30 ml of xylene is heated at 115-120° for 3 hours, with stirring. The mixture is cooled to room temperature and stirred with 20 ml of 1 normal aqueous sodium hydroxide solution and an amount of water sufficient to dissolve the solid material. The aqueous layer is separated off, washed twice with diethyl ether and

then treated with an aqueous solution of 1.07 g of ammonium chloride. The resulting precipitate is separated off, washed with water and dried. 2-(p-Cyanophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows bands at 885, 830, 780, 755 and 730 cm^{-1} in the IR spectrum, is obtained.

Example 17

One gram of 2-(p-cyanophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, 3.50 ml of 1 normal aqueous sodium hydroxide solution and 10 ml of ethanol are mixed and the mixture is stirred at room temperature until the solid material has dissolved. The solution is then treated with 1.4 ml of 30% strength hydrogen superoxide, whereupon a precipitate separates out immediately. The mixture is stirred at room temperature for 2 hours and filtered and the solid material is recrystallized from dimethylformamide. 2-(p-Carbamoylphenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which shows bands at 885, 853, 830, 785, 775, 752 and 732 cm^{-1} in the IR spectrum, is obtained.

Example 18

One gram of 2-(p-cyanophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one and 50 ml of 2 normal aqueous sodium hydroxide solution are mixed and the mixture is cooled (sic) under reflux for 3 hours. The solution is acidified with 50 ml of hydrochloric acid and filtered and the precipitate which has been separated off is dried. This is taken up in 25 ml of 1 normal aqueous sodium hydroxide solution and the solution is brought to a pH value of 6-7 with 1 normal hydrochloric acid. The resulting solid material is filtered off, triturated with water and dried. 2-(p-Carboxyphenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one 3/2-hydrate, which shows bands at 886, 858, 820, 780, 770, 760 and 730 cm^{-1} in the IR spectrum, is obtained.

Example 19

The pH value of a solution of 1 g of 4-chloro-quinoline-3-(N-phenyl-N-trifluoroacetamido)-carboxamide in a minimum amount of 50% strength aqueous tetrahydrofuran is brought to 10 by addition of lithium hydroxide. The mixture

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is stirred at room temperature for 48 hours, concentrated for the purpose of removing most of the tetrahydrofuran, washed with methylene chloride and brought to a pH value of 3 by acidification with dilute hydrochloric acid. The resulting precipitate is filtered off with suction and purified by preparative thin layer chromatography on silica gel. The elution is carried out with toluene : ethanol : concentrated ammonium hydroxide (70 : 30 : 3). 2-Phenyl-pyrazolo[4,3-c]-quinolin-3(5H)-one, which melts at 326-328°, is obtained.

The starting substance is prepared as follows: a solution of 10.8 g of phenylhydrazine in 120 ml of diethyl ether is cooled with ice, and 10.5 g of trifluoroacetic anhydride in 25 ml of diethyl ether are added dropwise in the course of 15 minutes. The mixture is stirred at 0-5° for 15 minutes and then at room temperature for 2 hours and thereafter is filtered. The filtrate is washed with water, dried and evaporated and the residue is crystallized from diethyl ether/n-heptane. 8-Trifluoroacetyl-phenylhydrazine, which melts at 119-121°, is obtained.

A mixture of 1.5 g of the compound last mentioned, 100 ml of tetrahydrofuran and 0.06 g of lithium hydride is stirred at room temperature for 5 hours, with exclusion of moisture, in order to obtain a solution. 1.9 g of 4-chloro-3-chlorocarbonyl-quinoline hydrochloride in 100 ml of tetrahydrofuran are stirred separately with 0.06 g of lithium hydride at 10° for one minute, with exclusion of moisture, and this solution is added in portions of 10 ml to the previously mentioned solution. The reaction mixture is stirred at room temperature for 18 hours and then boiled under reflux for 8 hours and concentrated under reduced pressure. 4-Chloro-quinoline-3-(N-phenyl-N-trifluoroacetamido)-carboxamide, which is used without further purification, is obtained.

Example 20

A mixture of 0.211 g of 4-(O-methylhydroxylamino)-quinoline-3-(N-p-chlorophenyl)-carboxamide and 15 ml of eutectic diphenyl ether/biphenyl is heated at 240° in a

nitrogen atmosphere for 2 hours. The mixture is cooled to room temperature and diluted with 150 ml of petroleum ether and the resulting precipitate is separated off. This is washed with petroleum ether and stirred with 15 ml of diethyl ether and 3 ml of 2 normal aqueous sodium hydroxide solution for one hour, the solid material is filtered off and the phases of the filtrate are separated. The aqueous phase is treated with 0.32 g of ammonium chloride. A yellow precipitate is obtained and is separated off and recrystallized from ethanol. 2-(p-Chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which melts at 327°, is obtained. The product is identical to that of Example 1.

The starting substance is prepared as follows: a mixture of 11.62 g of 4-hydroxy-quinoline-3-carboxylic acid [M. Hamana et al., Chem. Pharm. Bull. 26, 3856 (1978)], 7.84 g of p-chloroaniline, 17.59 g of 1-ethoxycarbonyl-2-ethoxy-1,2-dihydroquinoline and 150 ml of dimethylformamide is heated at 60-70° for 2 hours in order to obtain a clear solution. This is cooled, filtered and evaporated in a rotary evaporator. The residue is triturated in diethyl ether and filtered off and the precipitate is washed with diethyl ether. A mixture which contains the remainder of the acid used as the starting substance is obtained. The mixture is stirred with 100 ml of 2 normal aqueous sodium hydroxide solution for 1.5 hours and filtered and the residue is washed with water and dried. 4-Hydroxyquinoline-3-(N-p-chlorophenyl)-carboxamide, which shows bands at 3,450, 3,260 and 3,210 cm⁻¹ in the IR spectrum, is obtained.

A mixture of 1 g of the compound last mentioned and 25 ml of phosphorus oxychloride is heated at 80° for 3 hours in order to obtain a clear solution. This is evaporated, the residue is treated with 400 ml of a 1 : 1 mixture of ice and 2 normal aqueous sodium hydroxide solution, the mixture is stirred with 200 ml of methylene chloride and filtered and the layers are separated. The organic phase is dried and evaporated. 4-Chloroquinoline-3-(N-p-chlorophenyl)-carboxamide, which melts at 229-234°, is obtained. (This compound

can also be prepared by a procedure in which the acid mentioned is first treated with phosphorus oxychloride and the resulting dichloride is then treated with the aniline mentioned).

A mixture of 0.5 g of the compound last mentioned, 1 g of O-methylhydroxylamine hydrochloride and 1.65 g of diisopropylethylamine is heated at 100° in a small pressure vessel for 18 hours. The cooled mixture is triturated with water and dissolved in tetrahydrofuran, the solution is dried and evaporated and the residue is recrystallized from methanol. 4-(O-Methylhydroxylamino)-quinoline-3-(N-p-chlorophenyl)-carboxamide, which melts at 210-212°, is obtained.

Example 21

A solution of 308 mg of 1-(p-chlorophenyl)-4-hydroxymethylene-3-(o-nitrophenyl)-4,5-dihydropyrazol-5-one in 80 ml of tetrahydrofuran is hydrogenated over 50 mg of 5% strength platinum-on-charcoal catalyst at room temperature under 3 atmospheres for half an hour. The mixture is filtered, the filtrate is evaporated and the residue is taken up in 150 ml of toluene. 0.1 ml of concentrated hydrochloric acid is added to the solution and the mixture is boiled under reflux for 18 hours, using a water separator. The mixture is cooled and the resulting precipitate is filtered off and purified by preparative thin layer chromatography on silica gel. The solvent used is ethyl acetate : ethanol : concentrated ammonium hydroxide (17 : 3 : 3). 2-(p-Chlorophenyl)-pyrazolo-[4,3-c]quinolin-3(5H)-one, which melts at 327°, is obtained. The product is identical to that of Example 1.

The starting substance is prepared as follows: a solution of 39.6 g of monoethyl malonate, 50 mg of 2,2-bipyridyl (indicator) and 650 ml of tetrahydrofuran is cooled to -70°, and 305 ml of 1.97 molar n-butyl-lithium in hexane are then slowly added in a nitrogen atmosphere, with stirring. Towards the end of the addition, when the pink-red colour of the indicator persists, the temperature is allowed to increase to approximately -5°. The mixture is cooled again to -65° and a solution of 31.7 g of o-nitrobenzoyl

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chloride in 50 ml of tetrahydrofuran is added dropwise in the course of 10 minutes. The resulting mixture is stirred at room temperature for 1 hour and then poured onto a mixture of 650 ml of 1 normal hydrochloric acid and 1,100 ml of diethyl ether. The organic layer is separated off, washed successively with 350 ml of saturated aqueous sodium bicarbonate solution, 400 ml of water and 200 ml of saturated aqueous sodium chloride solution, dried and evaporated. Ethyl 2-(o-nitrobenzoyl)-acetate is obtained as a colourless oil.

A solution of 3.55 g of the compound last mentioned and 1.7 g of p-chlorophenylhydrazine in 65 ml of toluene is boiled under reflux for 3 hours using a water separator. The mixture is evaporated, the residue is chromatographed on silica gel and the product is heated with 15% strength ethyl acetate in toluene. 1-(p-Chlorophenyl)-3-(o-nitrophenyl)-4,5-dihydropyrazol-5-one (sic), which melts at 138-141°, is obtained.

0.7 g of the compound last mentioned in 10 ml of dimethylformamide/dimethylacetal are stirred at room temperature for 18 hours. The dark reaction mixture is poured onto ice-water, the precipitate is filtered off with suction and taken up in ethyl acetate and the solution is washed with water, dried and evaporated. 1-(p-Chlorophenyl)-4-dimethylaminomethylene-3-o-nitrophenyl-4,5-dihydropyrazol-5-one, which melts at 208-210° with decomposition, is obtained.

2.5 g of the compound last mentioned in a mixture of 20 ml of tetrahydrofuran and 20 ml of 20% strength aqueous hydrochloric acid are stirred first at 60° for 3 hours and then at room temperature for 18 hours. The mixture is diluted with saturated aqueous sodium chloride solution and the precipitate is separated off and washed with ethyl acetate. 1-(p-Chlorophenyl)-4-hydroxymethylene-3-(o-nitrophenyl)-4,5-dihydropyrazol-1-5-one, which melts at 155-157°, is obtained.

Example 22

A mixture of 650 mg of 1-(p-chlorophenyl)-2-methyl-4-anilinomethylidene-pyrazolidine-3,5-dione, 2 g of ethyl polyphosphate and 10 ml of 1,1,2,2-tetrachloroethane is boiled

under reflux for 24 hours. The solution is poured onto 10 ml of 2 normal aqueous sodium hydroxide solution and the organic layer is chromatographed on silica gel plates and eluted with toluene : ethanol : concentrated ammonium hydroxide (80 : 20 : 1). 1-Methyl-2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3-one with an Rf value of 0.48 is obtained. If methylene chloride : methanol (19 : 1) is used as the eluting agent, the compound mentioned has an Rf value of 0.33. The product is identical to that of Example 4.

The starting substance is prepared as follows: 20 mg of diethyl malonate are added to 5.8 g of sodium metal dissolved in 100 ml of absolute ethanol. The mixture is stirred for 15 minutes, 17.8 g of p-chlorophenylhydrazine are added and the excess ethanol is then filtered off with suction. The residue is heated at 110 to 120° for 4.5 hours and then chilled with 500 ml of ice-water. The resulting mixture is washed twice with diethyl ether and the aqueous layer is brought to a pH value of 2 with concentrated hydrochloric acid. The resulting solid material is recrystallized from toluene. 1-(p-Chlorophenyl)-pyrazolidine-3,5-dione, which melts at 189-193°, is obtained.

A mixture of 2 g of the compound last mentioned, 2.81 g of triethyl orthoformate, 0.97 g of aniline and 30 ml of ethanol is boiled under reflux for 16 hours. The reaction mixture is cooled and filtered and the precipitate is washed with water. 1-(p-Chlorophenyl)-4-anilinomethylidene-pyrazolidine-3,5-one (sic), which melts at 288-290°, is obtained.

A mixture of 500 mg of the compound last mentioned, 15 mg of lithium hydride and 2 ml of dimethylformamide is heated at 70° for 3 hours. The solution is then cooled to 5°, and 700 mg of methyl iodide are added. The mixture is stirred at room temperature for 16 hours and evaporated. The residue is taken up in water and methylene chloride and the organic phase is separated off, dried and evaporated. 1-(p-Chlorophenyl)-2-methyl-4-anilinomethylidene-pyrazolidine-3,5-dione, which shows NMR bands at 3.14, 7.47, 8.42, 10.92

and 10.98 ppm, is obtained.

Example 23

A solution of 50 mg of 1-(p-chlorophenyl)-3-(o-formylaminophenyl)-4,5-dihydropyrazol-5-one in 10 ml of methylene chloride is evaporated, a thin film remaining on the inside wall of the flask. This film is heated at 190-200° for 30 minutes in a gentle stream of nitrogen. The reaction product is chromatographed on silica gel plates and eluted with ethyl acetate : ethanol : concentrated ammonium hydroxide (17 : 3 : 3). 2-(p-Chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one, which has an Rf value of 0.16, is obtained. If 5% strength methanol in methylene chloride is used, the compound has an Rf value of 0.07. With toluene : ethanol : concentrated ammonium hydroxide (70 : 30 : 3 (sic)), the Rf value is 0.32.

The starting substance is prepared as follows: 2 g of 1-(p-chlorophenyl)-3-(o-nitrophenyl)-4,5-dihydropyrazol-5-one are hydrogenated in 100 ml of ethanol over 200 mg of 5% strength platinum-on-charcoal catalyst at room temperature under 3 atmospheres. Since the product crystallizes out of the mixture immediately after being formed, the reaction mixture is diluted with methylene chloride in order to dissolve the crystalline product. The mixture is filtered, the filtrate is evaporated and the dried residue is recrystallized from ethanol. 3-(o-Aminophenyl)-1-(p-chlorophenyl)-4,5-dihydropyrazol-5-one, which melts at 199-201°, is obtained.

0.3 g of the compound last mentioned is added to 10 ml of 97% strength formic acid in a nitrogen atmosphere, while cooling with ice and stirring, whereupon a colourless solution forms. 1 ml of acetic anhydride is added to this and the mixture is stirred overnight at room temperature and then poured into 300 ml of saturated aqueous sodium chloride solution. The colourless precipitate is separated off, dissolved in 200 ml of diethyl ether, dried and evaporated. 1-(p-Chlorophenyl)-3-(o-formylaminophenyl)-4,5-dihydropyrazol-5-one, which melts at 170-172°, is obtained.

Example 24

The following compounds of the formula II in which $R_1 = R_2 = H$ are also prepared in accordance with the methods illustrated in the preceding examples, in particular in Examples 1 and 8 to 11:

No.	R^3	R	Melting point $^{\circ}C$ or IR bands cm^{-1}
1	8-CH ₃ O	2-Pyridyl	319-323
2	7-CF ₃	2-Pyridyl	348-350
3	H	4-CH ₃ -2-pyridyl	342-344
4	H	5-Cl-2-pyridyl	886, 835, 828, 797, 778, 756
5	H	2,5-Cl ₂ -phenyl	337-338
6	H	3,4-Cl ₂ -phenyl	890, 878, 867, 823, 818, 795
7	H	3,5-Cl ₂ -phenyl	890, 871, 847, 830, 806, 788

The following compounds of the formula III are also prepared analogously to the methods illustrated in the preceding examples

No.	R^1	R^2	Melting point $^{\circ}C$ or IR bands cm^{-1}
8	H	o-CH ₃	349-350 (HCl salt)
9	H	p-CH ₃	338-340
10	H	p-OCH ₃	268-270
11		p-SCH ₃	307-309
12	H	p-F	342-346
13	H	m-F	335-338
14	H	o-F	338-340
15	H	o-Cl	336-339
16	H	m-Cl	336-337
17	H	p-Br	328-330
18	H	p-CF ₃	315-320
19	H	p-NO ₂	886, 853, 818, 780, 758, 749
20	7-Cl	H	872, 851, 830, 818, 798, 770
21	7-Cl	p-Cl	865, 852, 823, 795, 768, 752
22	7-Cl	p-F	890, 858, 835, 804, 770, 731
23	7-Cl	m-Cl	333-335
24	8-CH ₃	H	860, 810, 785, 770, 750, 730
25	8-CH ₃	p-CH ₃	340-342
26	8-CH ₃	p-Cl	335-337
27	8-OCH ₃	H	321-325
28	8-OCH ₃	p-OCH ₃	313-315
29	8-OCH ₃	o-F	344-347
30	8-OCH ₃	m-Cl	324-327
31	8-OCH ₃	p-Cl	347-349
32	8-F	H	327-328
33	8-F	p-OCH ₃	289-292
34	8-F	p-F	884, 868, 827, 767, 715, 708

Table (Continuation)

No.	R'	R	Melting point °C or IR bands cm ⁻¹
35	8-F	m-F	900, 881, 865, 839, 827, 774
36	8-F	o-F	868, 850, 815, 782, 750, 724
37	8-F	p-Cl	342-345
38	8-F	m-Cl	870, 810, 800, 775, 760, 714
39	8-Cl	H	894, 871, 845, 812, 787, 770
40	8-Cl	o-F	895, 875, 858, 820, 814, 782
41	8-Cl	m-F	892, 884, 867, 860, 815, 771
42	8-Cl	p-F	898, 890, 870, 855, 832, 820
43	8-Cl	o-Cl	896, 885, 880, 848, 823, 789
44	8-Cl	p-Cl	890, 842, 820, 806, 782, 768
45	8-Cl	m-Cl	890, 885, 815, 790, 777, 740
46	8-Cl	p-NO ₂	895, 882, 849, 834, 808, 784
47	8-F	p-NO ₂	896, 884, 869, 860, 828, 821
48	8-OCH ₃	p-NO ₂	338-340
49	6-Cl	p-Cl	825, 806, 762, 736, 720
50	7-CF ₃	H	324-327
51	7-CF ₃	p-F	331-334
52	7-CF ₃	m-Cl	317-320
53	7-CF ₃	p-Cl	890, 854, 826, 800, 770, 756

Example 25

Tablets containing 5 mg of the active compound.

Composition (for 10,000 tablets):

2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3-

(5H)-one

50 g

Lactose

Maize starch

75 g

Polyethylene glycol 6000

75 g

Talc powder

75 g

Magnesium stearate

18 g

Purified water

q.s.

All the powdered constituents are sieved through a sieve of 0.6 mm mesh width. The active compound is then mixed with lactose, talc and magnesium stearate and half the starch in a suitable mixer. The other half of the starch is suspended in 40 ml of water and the suspension is added to the boiling solution of polyethylene glycol in 150 ml of water. The resulting paste is added to the powders and the mixture is granulated, if appropriate with the addition of a further amount of water. The granules are dried over-

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night at 35°C, passed through a sieve of 1.2 mm mesh width and pressed to form tablets of 6.4 mm diameter with a breaking groove.

Example 26

Capsules containing 10 mg of the active compound.

Composition (for 10,000 capsules)

2-Phenyl-pyrazolo[4,3-c]quinolin-3(5H)-one	100 g
Lactose	1,800 g
Talc powder	100 g

All the powders are sieved through a sieve of 0.6 mm mesh width. The active compound is homogenized first with the talc and then with the lactose in a suitable mixer. No. 3 capsules are filled with in each case 200 mg of the mixture with a filling machine.

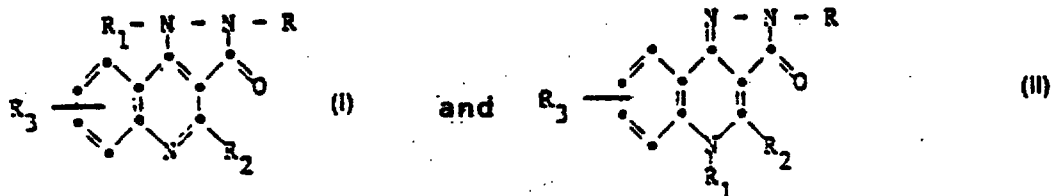
Tablets and capsules containing the other compounds of the invention, for example those of the present examples, are also prepared in an analogous manner.



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Claims (for the contracting states: BE, CH, DE, FR, GB, IT, LI, LU, NL, SE)

1. Compounds of the general formulae I and II



wherein R_3 denotes hydrogen or not more than 3 identical or different substituents from the group comprising C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 -alkylamino, cyano, carbamoyl and carboxyl, R represents phenyl which is unsubstituted or substituted by not more than 3 of the radicals mentioned for R_3 , pyridyl, C_1 - C_7 -alkylpyridyl or halogenopyridyl, R_1 denotes hydrogen, C_1 - C_7 -alkyl or (hydroxy, di- C_1 - C_7 -alkylamino or R_3 -phenyl)- C_1 - C_7 -alkyl, wherein the hydroxyl or amino group is separated from the ring nitrogen atom by at least two carbon atoms, and R_2 represents hydrogen or C_1 - C_7 -alkyl; their 3-hydroxy tautomeric compounds; C_1 - C_7 -alkanoyl, carbamoyl and mono- or di- C_1 - C_7 -alkylcarbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or their salts.

2. Compounds according to claim 1, of the formulae I and II wherein R_3 denotes hydrogen or not more than 3 identical or different substituents from the group comprising C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 -alkylamino, and the other symbols have the meanings given in claim 1.

3. Compounds according to claim 1, of the formulae I and II wherein R_3 denotes hydrogen or one or two substituents from the group comprising C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino, mono-

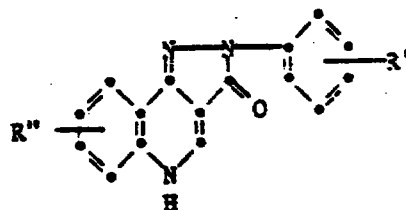


- 33 -

or di-C₁-C₇-alkylamino, cyano, carbamoyl and carboxyl. (sic) R represents phenyl which is unsubstituted or substituted by one or two of the radicals mentioned for R₃, pyridyl, C₁-C₇-alkylpyridyl or halogenopyridyl, R₁ denotes hydrogen, C₁-C₇-alkyl or (hydroxy, di-C₁-C₇-alkylamino or R₃-phenyl)-C₁-C₇-alkyl, wherein the hydroxy or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R₂ represents hydrogen or C₁-C₇-alkyl.

4. Compounds according to claim 1, of the formulae I and II wherein R₃ is substituted (sic) hydrogen or one or two substituents from the group comprising lower alkyl, lower alkoxy, lower alkylthio, hydroxyl, halogen, trifluoromethyl, nitro and amino- (sic), mono- or di-lower alkylamino and the other symbols have the meanings given in claim 3.

5. Compounds according to claim 1, which correspond to the formula III



(III)

wherein R'' denotes hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine or trifluoromethyl, R' represents hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine, trifluoromethyl, nitro, amino, monoalkylamino or alkylcarbamoylamino with in each case not more than 4 carbon atoms or cyano, or their salts.

6. Compounds according to claim 1, which correspond to the formula III shown in claim 5 wherein R'' denotes hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine or trifluoromethyl and R' represents hydrogen or o- or m-fluoro; or their salts.

7. 2-(p-Chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one or its salts.

8. 2-Phenyl-pyrazolo[4,3-c]quinolin-3(5H)-one or its salts.

9. Compounds according to claim 1, for use as psycho-



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active compounds.

10. Compounds according to claim 2, for use as psychoactive compounds.

11. Pharmaceutical preparations containing compounds according to one of claims 1, 3, 5, 8 and 9 or therapeutically usable salts of such compounds.

12. Pharmaceutical preparations containing compounds according to one of claims 2, 4, 6, 7 and 10 or therapeutically usable salts of such compounds.

13. The compounds of claims 1, 3, 5, 8 and 9 for use as psychoactive agents in the treatment of the human or animal body.

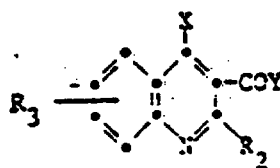
14. The compounds of claims 2, 4, 6, 7 and 10 for use as psychoactive agents in the treatment of the human or animal body.

15. Use of compounds of claims 1, 3, 5, 8 and 9 for the preparation of pharmaceutical preparations.

16. Use of compounds of claims 2, 4, 6, 7 and 10 for the preparation of pharmaceutical preparations.

17. Process for the preparation of 2-arylpyrazolo[4,3-c]-quinolin-3(1 and 5H)-one compounds defined in claim 1, characterized in that

a) compounds of the formula IV



(IV)

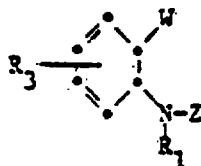
wherein X denotes -NH-NH-R and Y represents hydroxyl or C₁-C₇-alkoxy; or X denotes halogen and Y represents H₂N-N-R; or X denotes C₁-C₇-alkoxyamino or azido and Y represents NH-R, are cyclized and, if desired, a resulting compound or an alkali metal salt thereof is reacted with a reactive ester of an alcohol R₁-OH, or

b) compounds of the formula V



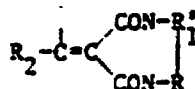
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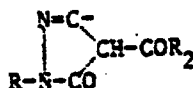


(V)

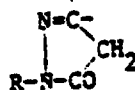
wherein the two symbols W and R₁ denote hydrogen and Z represents the grouping



wherein R₁' denotes C₁-C₇-alkyl; or W is the grouping



and Z represents hydrogen; or W denotes the grouping



and Z represents R₂-CO, or R₁-N-Z taken together represents isocyano, are subjected to a condensation reaction and, if desired, a resulting compound is converted into another compound of the invention, and/or, if desired, a resulting compound is converted into its salt or a resulting salt is converted into the free compound or into another salt, and/or, if desired, a resulting mixture of isomers is resolved into the individual isomers.

18. The compounds obtainable by the process of claim 17.

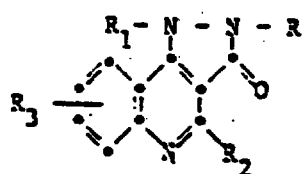
Claims (for the contracting state AT)

1. Process for the preparation of new 2-aryl-pyrazolo-[4,3-c]quinolin-3(1 and 5H)-one compounds of the general formulae I and II

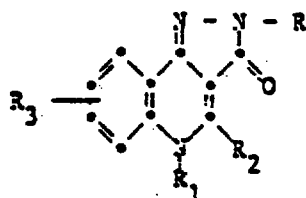


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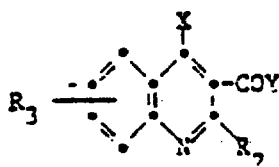
(I) and



(II)

herein R_3 denotes hydrogen or not more than 3 identical or different substituents from the group comprising C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 -alkylamino, cyano, carbamoyl and carboxyl, R represents phenyl which is unsubstituted or substituted by not more than 3 of the radicals mentioned for R_3 , pyridyl, C_1 - C_7 -alkylpyridyl or halogenopyridyl, R_1 denotes hydrogen, C_1 - C_7 -alkyl or (hydroxy, di- C_1 - C_7 -alkylamino or R_3 -phenyl)- C_1 - C_7 -alkyl, wherein the hydroxyl or amino group is separated from the ring nitrogen atom by at least two carbon atoms, and R_2 represents hydrogen or C_1 - C_7 -alkyl; their 3-hydroxy tautomeric compounds; C_1 - C_7 -alkanoyl, carbamoyl and mono- or di- C_1 - C_7 -alkylcarbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or their salts, characterized in that

a) compounds of the formula IV



(IV)

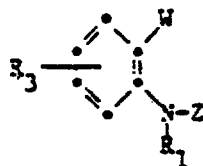
wherein X denotes $-NH-NH-R$ and Y represents hydroxyl or C_1 - C_7 -alkoxy; or X denotes halogen and Y represents H_2N-N-R ; or X denotes C_1 - C_7 -alkoxyamino or azido and Y represents $NH-R$, are cyclized and, if desired, a resulting compound or an alkali metal salt thereof is reacted with a reactive ester of an alcohol R_1-OH , or

b) compounds of the formula V



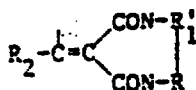
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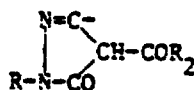


(V)

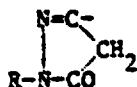
wherein the two symbols W and R₁ denote hydrogen and Z represents the grouping



wherein R₁' denotes C₁-C₇-alkyl; or W is the grouping



and Z represents hydrogen; or W denotes the grouping



and Z represents R₂-CO, or R₁-N-Z taken together represents isocyano, are subjected to a condensation reaction and, if desired, a resulting compound is converted into another compound of the invention, and/or, if desired, a resulting compound is converted into its salt or a resulting salt is converted into the free compound or into another salt, and/or, if desired, a resulting mixture of isomers is resolved into the individual isomers.

2. Process according to claim 1, characterized in that a resulting compound is converted into another compound of the invention by a process in which a compound in which R₁ denotes hydrogen is substituted in the 1-position by reaction with a reactive ester of the alcohol R₁-OH, and/or a resulting compound of the formula II wherein R₁ denotes an alkali metal atom is substituted in the 5-position by reaction with a reactive ester of the alcohol R₁-OH, and/or a resulting

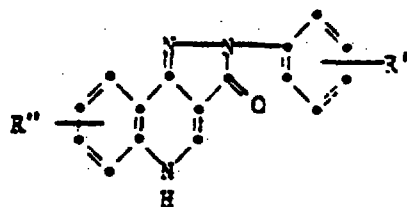


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C₁-C₇-alkoxy compound is hydrolysed to the corresponding phenol, and/or a resulting nitro compound is reduced to the corresponding amine, and/or a resulting amino compound is alkylated or acylated, the acyl groups being given in claim 1, and/or a resulting nitrile is converted into the corresponding amide or hydrolysed to the carboxyl group.

3. Process according to one of claims 1 or 2, characterized in that compounds of the formulae I and II shown in claim 1, wherein R₃ is substituted (sic) hydrogen or one or two substituents of the group comprising C₁-C₇-alkyl, C₁-C₇-alkoxy, C₁-C₇-alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino, mono- or di-C₁-C₇-alkylamino, cyano, carbamoyl and carboxyl, R represents phenyl which is unsubstituted or substituted by one or two of the radicals mentioned for R₃, pyridyl, C₁-C₇-alkylpyridyl or halogenopyridyl, R₁ denotes hydrogen, C₁-C₇-alkyl or (hydroxy, di-C₁-C₇-alkylamino or R₃-phenyl)-C₁-C₇-alkyl, wherein the hydroxyl or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R₂ represents hydrogen or C₁-C₇-alkyl; C₁-C₇-alkanoyl, carbamoyl and mono- or di-C₁-C₇-alkylcarbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or their salts, are prepared.

4. Process according to one of claims 1 and 2, characterized in that compounds of the formula III



(III)

wherein R'' denotes hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine or trifluoromethyl, R' represents hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine, trifluoromethyl, nitro, amino, monoalkylamino or alkylcarbamoylamino with in each case not more than 4



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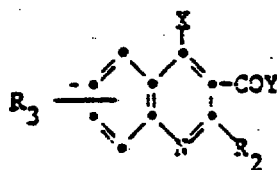
carbon atoms or cyano, or their salts, are prepared.

5. Process according to claim 1, characterized in that 2-(p-chlorophenyl)-pyrazolo[4,3-c]quinolin-3(5H)-one or its salts are prepared.

6. Process according to claim 1, characterized in that 2-phenyl-pyrazolo[4,3-c]quinolin-3(5H)-one or its salts are prepared.

7. Process according to claim 1, for the preparation of 2-arylpyrazolo[4,3-c]quinolin-3(1 and 5H)-one compounds of the formulae I and II shown in claim 1, wherein R₃ denotes hydrogen or not more than 3 identical or different substituents from the group comprising C₁-C₇-alkyl, C₁-C₇-alkoxy, C₁-C₇-alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino and mono- or di-C₁-C₇-alkylamino, R represents phenyl which is unsubstituted or substituted by not more than 3 of the radicals mentioned for R₃, pyridyl, C₁-C₇-alkylpyridyl or halogenopyridyl, R₁ denotes hydrogen, C₁-C₇-alkyl or (hydroxy, di-C₁-C₇-alkylamino or R₃-phenyl)-C₁-C₇-alkyl, wherein the hydroxyl or amino group is separated from the ring nitrogen atom by at least two carbon atoms, and R₂ represents hydrogen or C₁-C₇-alkyl; and their 3-hydroxy tautomeric compounds; and C₁-C₇-alkanoyl, carbamoyl and mono- or di-C₁-C₇-alkylcarbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or their salts, characterized in that

a) compounds of the formula IV



(IV)

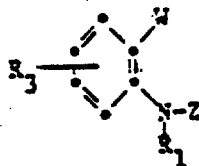
wherein X denotes -NH-NH-R and Y represents hydroxyl or lower alkoxy; or X denotes halogen and Y represents H₂-N-N-R, are cyclized and, if desired, a resulting compound or an alkali metal salt thereof is reacted with a reactive ester of an alcohol R₁-OH, or

b) compounds of the formula V



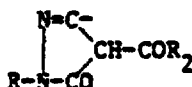
(81)

- 40 -



(V)

wherein w is the grouping



and Z represents hydrogen, are subjected to a condensation reaction and, if desired, a resulting compound is converted into another compound of the invention, and/or, if desired, a resulting compound is converted into its salt or a resulting salt is converted into the free compound or into another salt, and/or, if desired, a resulting mixture of isomers (sic) into the individual isomers.

8. Process according to claim 7, characterized in that a resulting compound is converted into another compound of the invention by a process in which a compound in which R₁ denotes hydrogen is substituted in the 1-position by reaction with a reactive ester of the alcohol R₁-OH, and/or a resulting compound of the formula II wherein R₁ denotes an alkali metal atom is substituted in the 5-position by reaction with a reactive ester of the alcohol R₁-OH, and/or a resulting C₁-C₇-alkoxy compound is hydrolysed to the corresponding phenol, and/or a resulting nitro compound is reduced to the corresponding amine, and/or a resulting amino compound is alkylated or acylated, the acyl groups being given in claim 7.

9. Process according to one of claims 7 and 8, characterized in that compounds of the formulae I and II given in claim 1, wherein R₃ denotes hydrogen or one or two substituents from the group comprising C₁-C₇-alkyl, C₁-C₇-alkoxy, C₁-C₇-alkylthio, hydroxyl, halogen, trifluoromethyl, nitro, amino and mono- or di-C₁-C₇-alkylamino, R represents phenyl which is unsubstituted or substituted by one or two of the radicals mentioned for R₃, pyridyl, C₁-C₇-alkyl-



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pyridyl or halogenopyridyl, R₁ denotes hydrogen, C₁-C₇-alkyl or (hydroxy, di-C₁-C₇-alkylamino or R₃-phenyl)-C₁-C₇-alkyl, wherein the hydroxyl or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R₂ represents hydrogen or C₁-C₇-alkyl; C₁-C₇-alkanoyl, carbamoyl and mono- or di-C₁-C₇-alkyl-carbamoyl derivatives of the (hydroxy or amino)-(phenyl or phenylene) compounds mentioned; or their salts, are prepared.

10. Process according to one of claims 7 and 8, characterized in that compounds of the formula III shown in claim 4, wherein R'' denotes hydrogen, alkyl or alkoxy with in each case 4 carbon atoms, hydroxyl, fluorine, chlorine, bromine or trifluoromethyl and R' represents hydrogen or o- or m-fluoro; or their salts, are prepared.

11. Process according to claim 7, characterized in that 2-(p-chlorophenyl)-pyrazolo[4,3-c]-quinolin-3(5H)-one or its salts are prepared.

12. Process for the preparation of a pharmaceutical preparation, characterized in that an active compound according to the invention from one of claims 1 to 6 is processed with a pharmaceutical excipient.

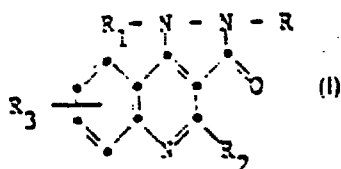
13. Process for the preparation of a pharmaceutical preparation, characterized in that an active compound according to the invention from one of claims 7 to 10 is processed with a pharmaceutical excipient.



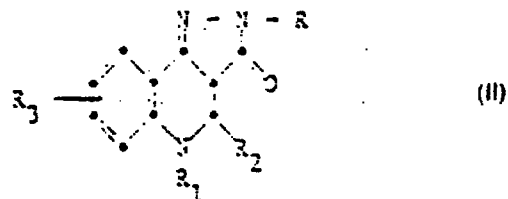
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Claims (for the Contracting States : BE. CH. DE. FR. GB. IT. LI. LU. NL. SE) (as printed)

1. A Compound of the general formulae I and II



and



wherein R_3 is hydrogen or not more than 3 identical or different members selected from C_1 - C_7 alkyl, C_1 - C_7 alkoxy, C_1 - C_7 alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 alkylamino, cyano, carbamoyl and carboxy; R is phenyl or phenyl substituted by not more than 3 of the radicals as defined for R_3 , pyridyl, C_1 - C_7 alkylpyridyl, or halopyridyl; R_1 is hydrogen, C_1 - C_7 alkyl or (hydroxy, di- C_1 - C_7 alkyl-amino or R_3 -phenyl)- C_1 - C_7 alkyl, wherein the hydroxy or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R_2 is hydrogen or C_1 - C_7 alkyl; their 3-hydroxy-tautomers: C_1 - C_7 alkanoyl, carbamoyl, mono- or di- C_1 - C_7 alkylcarbamoyl derivatives of said (hydroxy or amino)-(phenyl or phenylene) compounds; or salts thereof.

2. A compound according to claim 1 of the formulae I and II, wherein R_3 is hydrogen or not more than 3 identical or different members selected from C_1 - C_7 alkyl, C_1 - C_7 alkoxy, C_1 - C_7 alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino or mono- or di- C_1 - C_7 alkylamino; and the other symbols have the meanings given in claim 1.

3. A compound according to claim 1 of the general formulae I and II, wherein R_3 is hydrogen or one or two members selected from C_1 - C_7 alkyl, C_1 - C_7 alkoxy, C_1 - C_7 alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 alkylamino, cyano, carbamoyl and carboxy; R is phenyl or phenyl substituted by one or two of the substituents as defined for R_3 , pyridyl, C_1 - C_7 alkylpyridyl or

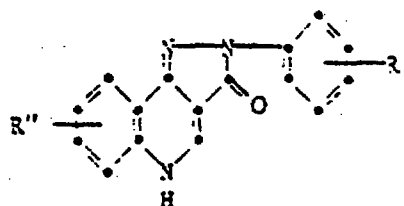


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nalopyridyl; R_1 is hydrogen, C_1 - C_7 -alkyl or (hydroxy, di- C_1 - C_7 -alkylamino or R_3 -phenyl)- C_1 - C_7 -alkyl, wherein the hydroxy or amino group is separated from the ring-nitrogen atom by at least 2 carbon atoms; and R_2 is hydrogen or C_1 - C_7 -alkyl.

4. A compound according to claim 1 of the formulae I and II, wherein R_1 is hydrogen or one or two members selected from lower alkyl, lower alkoxy, lower alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di-lower alkylamino; and the other symbols have the meanings given in claim 3.

5. A compound according to claim 1 of the formula III



(III)

wherein R'' is hydrogen, alkyl or alkoxy, each containing 4 carbon atoms, hydroxy, fluorine, chlorine, bromine or trifluoromethyl; and R' is hydrogen, alkyl or alkoxy each containing 4 carbon atoms, hydroxy, fluorine, chlorine, bromine, trifluoromethyl, nitro, amino, monoalkylamino or alkylcarbamoylamino, each containing 4 carbon atoms, or cyano; or a salt thereof.

6. A compound according to claim 1 of the formula III as indicated in claim 5, wherein R'' is hydrogen, alkyl or alkoxy, each containing 4 carbon atoms, hydroxy, fluorine, chlorine, bromine or trifluoromethyl, R' is hydrogen, *o*- or *m*-fluorine, or a salt thereof.

7. 2-(*p*-Chlorophenyl)-pyrazolo [4,3-*c*] quinolin-3(5H)-one or a salt thereof.

8. 2-Phenyl-pyrazolo [3,4-*c*] quinolin-3(5H)-one or a salt thereof.

9. A compound according to claim 1 for use as psychoactive drug.

10. A compound according to claim 2 for use as psychoactive drug.

11. A pharmaceutical preparation containing a compound according to any one of claims 1, 3, 5, 8 and 9, or a therapeutically acceptable salt thereof.

12. A pharmaceutical preparation containing a compound according to any of claims 2, 4, 6, 7 and 10, or a therapeutically acceptable salt thereof.

13. A compound of any one of claims 1, 3, 5, 8 and 9 for use as a psychoactive drug for treating the human or animal body.

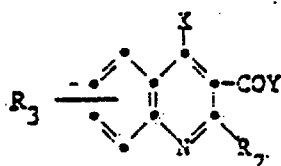
14. A compound of any one of claims 2, 4, 6, 7 and 10 for use as a psychoactive drug for treating the human or animal body.

15. Use of a compound according to any one of claims 1, 3, 5, 8 or 9 for the manufacture of pharmaceutical preparations.

16. Use of a compound according to any one of claims 2, 4, 6, 7 or 10 for the manufacture of pharmaceutical preparations.

17. A process for the manufacture of a 2-aryl-pyrazolo [4,3-*c*] quinolin-3-(1 or 5H)-one as defined in claim 1, which comprises

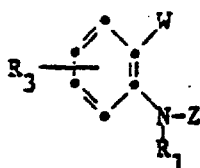
a) cyclising a compound of the formula IV



(IV)

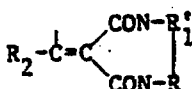
wherein X is $-NH-NH-R$ and Y is hydroxy or C_1 - C_7 -alkoxy; or X is halogen and Y is H_2N-R ; or X is C_1 - C_7 -alkoxyamino or azido, and Y is $NH-R$, and, if desired, reacting a resulting compound, or an alkali metal salt thereof, with a reactive ester of the alcohol R_1-OH , or

b) condensing a compound of the formula V



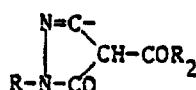
(V)

wherein W and R_1 are both hydrogen, Z is

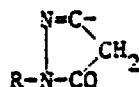




and R_1 is C-C-alkyl; or W is



and Z is hydrogen; or W is

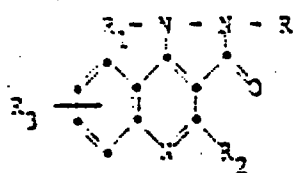


and Z is $R_2-\text{CO}$, or $\text{R}-\text{N}-\text{Z}$ together is isocyano; and, if desired, converting a resulting compound into another compound of the invention, and/or, if desired, converting a resulting compound into a salt thereof or a resulting salt into the corresponding free compound or into another salt, and/or, if desired, separating a mixture of isomers obtained into the individual isomers.

18. A compound obtainable according to the process of claim 17.

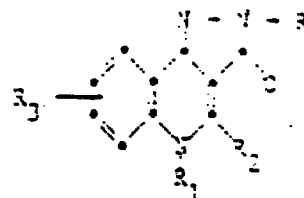
Claims (for the Contracting State AT) (as printed)

1. A process for the preparation of a 2-aryl-pyrazo o [4,3-c] quinolin-3-(1 or 5H)-one of the general formulae I and II



(I)

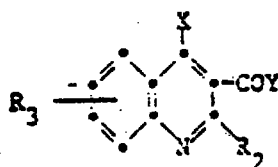
and



(II)

wherein R_3 is hydrogen or not more than 3 identical or different members selected from C-C-alkyl, C-C-alkoxy, C-C-alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di-C-C-alkylamino, cyano, carbamoyl and carboxy; R is phenyl or phenyl substituted by not more than 3 of the radicals as defined for R_3 , pyridyl, C-C-alkylpyridyl, or halopyridyl; R_1 is hydrogen, C-C-alkyl or (hydroxy, di-C-C-alkylamino or R_3 -phenyl)-C-C-alkyl, wherein the hydroxy or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R_2 is hydrogen or C-C-alkyl; their 3-hydroxy-tautomers; C-C-alkanoyl, carbamoyl, mono- or di-C-C-alkylcarbamoyl derivatives of said (hydroxy or amino)-(phenyl or phenylene) compounds; or a salt thereof, which comprises

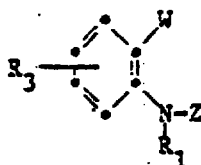
a) cyclising a compound of the formula IV



(IV)

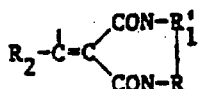
wherein X is $-\text{NH}-\text{NH}-\text{R}$ and Y is hydroxy or C-C-alkoxy; or X is halogen and Y is $\text{H}_2\text{N}-\text{R}$; or X is C-C-alkoxyamino or azido, and Y is $\text{NH}-\text{R}$, and, if desired, reacting a resulting compound, or an alkali metal salt thereof, with a reactive ester of the alcohol R_1-OH , or

b) condensing a compound of the formula V



(V)

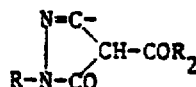
wherein W and R_1 are both hydrogen, Z is



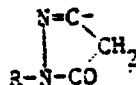


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and R_1 is C_1 - C_7 -alkyl; or W is



and Z is hydrogen; or W is

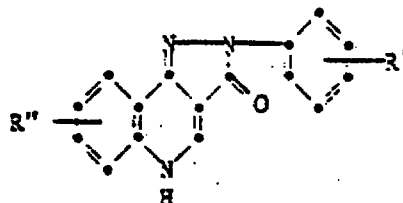


and Z is R_2 -CO, or R_2 -N-Z together is isocyano; and, if desired, converting a resulting compound into another compound of the invention, and/or, if desired, converting a resulting compound into a salt thereof, or a resulting salt into the corresponding free compound or into another salt, and/or, if desired, separating a mixture of isomers obtained into the individual isomers.

2. A process according to claim 1, which comprises converting a resultant compound into another compound of the invention by substituting a compound, in which R_1 is hydrogen, in the 1-position by reaction with a reactive ester of the alcohol R_1 -OH, and/or substituting a resultant compound of the formula II, in which R_1 is an alkali metal atom, in the 5-position by reaction with a reactive ester of the alcohol R_1 -OH, and/or hydrolysing a resultant C_1 - C_7 -alkoxy compound to the corresponding phenol, and/or reducing a resultant nitro compound to the corresponding amine, and/or alkylating or acylating a resultant amino compound, in which the acyl groups are as indicated in claim 1, and/or converting a resultant nitrile into the corresponding amide or hydrolysing it to the carboxyl group.

3. A process according to either of claims 1 and 2 for the preparation of a compound of the formulae I and II as indicated in claim 1, wherein R_3 is hydrogen or one or two members selected from C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 -alkylamino, cyano, carbamoyl and carboxy; R is phenyl or phenyl substituted by one or two of the substituents as defined for R_3 , pyridyl, C_1 - C_7 -alkylpyridyl or halopyridyl; R_1 is hydrogen, C_1 - C_7 -alkyl or (hydroxy, di- C_1 - C_7 -alkylamino or R_2 -phenyl)- C_1 - C_7 -alkyl, wherein the hydroxy or amino group is separated from the ring-nitrogen atom by at least 2 carbon atoms; and R_2 is hydrogen or C_1 - C_7 -alkyl; C_1 - C_7 -alkanoyl, carbamoyl, mono- or di- C_1 - C_7 -alkylcarbamoyl derivatives of said (hydroxy or amino)-(phenyl or phenylene) compounds; or salts thereof.

4. A process according to either of claims 1 or 2 for the preparation of a compound of the formula III



(III)

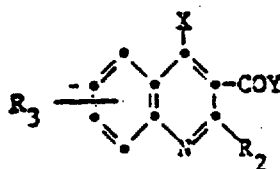
wherein R'' is hydrogen, alkyl or alkoxy, each containing 4 carbon atoms, hydroxy, fluorine, chlorine, bromine or trifluoromethyl; and R' is hydrogen, alkyl or alkoxy each containing 4 carbon atoms, hydroxy, fluorine, chlorine, bromine, trifluoromethyl, nitro, amino/monoalkylamino or alkylcarbamoylamino, each containing 4 carbon atoms, or cyano; or a salt thereof.

5. A process according to claim 1 for the preparation of 2-(p-chlorophenyl)-pyrazolo [4.3-c] quinolin-3(5H)-one or a salt thereof.

6. A process according to claim 1 for the preparation of 2-phenyl-pyrazolo [4.3-c] quinolin-3(5H)-one or a salt thereof.

7. A process according to claim 1 for the preparation of a 2-aryl-pyrazolo [4.3-c] quinolin-3(1 or 5H)-one of the formula I and II as indicated in claim 1, wherein R_3 is hydrogen or not more than 3 identical or different members selected from C_1 - C_7 -alkyl, C_1 - C_7 -alkoxy, C_1 - C_7 -alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di- C_1 - C_7 -alkylamino, cyano, carbamoyl and carboxy; R is phenyl or phenyl substituted by not more than 3 of the radicals as defined for R_3 , pyridyl, C_1 - C_7 -alkylpyridyl, or halopyridyl; R_1 is hydrogen, C_1 - C_7 -alkyl or (hydroxy, di- C_1 - C_7 -alkylamino or R_2 -phenyl)- C_1 - C_7 -alkyl, wherein the hydroxy or amino group is separated from the ring nitrogen atom by at least 2 carbon atoms, and R_2 is hydrogen or C_1 - C_7 -alkyl; their 3-hydroxy-tautomers; C_1 - C_7 -alkanoyl, carbamoyl, mono- or di- C_1 - C_7 -alkylcarbamoyl derivatives of said (hydroxy or amino)-(phenyl or phenylene) compounds; or salts thereof, which comprises

a) cyclising a compound of the formula IV



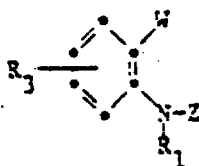
(IV)



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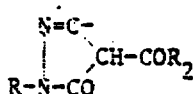
wherein X is $-\text{NH}-\text{NH}-\text{R}$ and Y is hydroxy or lower alkoxy; or X is halogen and Y is $\text{H}_2\text{N}-\text{R}$, and, if desired, reacting a resulting compound, or an alkali metal salt thereof, with a reactive ester of the alcohol R_1-OH , or

b) condensing a compound of the formula V



(V)

wherein W is



and Z is hydrogen, and, if desired, converting a resulting compound into another compound of the invention, and or, if desired, converting a resulting compound into a salt thereof, or a resulting salt into the corresponding free compound or into another salt, and/or, if desired, separating a mixture of isomers obtained into the individual isomers.

3. A process according to claim 7, which comprises converting a resultant compound into another compound of the invention by substituting a compound, in which R_1 is hydrogen, in the 1-position by reaction with a reactive ester of the alcohol R_1-OH , and or substituting a resultant compound of the formula II, in which R_1 is an alkali metal atom in the 5-position by reaction with a reactive ester of the alcohol R_1-OH and/or hydrolysing a resultant C-C-alkoxy compound to the corresponding phenol, and or reducing a resultant nitro compound to the corresponding amine, and or alkylating or acylating a resultant amino compound in which the acyl groups are as indicated in claim 7.

9. A process according to either of claims 7 or 8 for the preparation of a compound of the formula I and II as indicated in claim 1, wherein R_3 is hydrogen or one or two members selected from C-C-alkyl, C-C-alkoxy, C-C-alkylthio, hydroxy, halogen, trifluoromethyl, nitro, amino, mono- or di-C-C-alkylamino, cyano, carbamoyl and carboxy; R_1 is phenyl or phenyl substituted by one or two of the substituents as defined for R_3 , pyridyl, C-C-alkylpyridyl or halocopyridyl; R_2 is hydrogen, C-C-alkyl or (hydroxy, di-C-C-alkylamino, or R_3 -phenyl)-C-C-alkyl, wherein the hydroxy or amino group is separated from the ring-nitrogen atom by at least 2 carbon atoms; and R_1 is hydrogen or C-C-alkyl, or C-C-alkanoyl, carbamoyl, a mono- or di-C-C-alkylcarbamoyl derivative of the cited (hydroxy or amino)-(phenyl or phenylene) compounds, or a salt thereof.

10. A process according to either of claims 7 or 8 for the preparation of a compound of the formula III as indicated in claim 4, wherein R' is hydrogen, alkyl or alkoxy, each containing 4 carbon atoms, hydroxy, fluorine, chlorine, bromine or trifluoromethyl, R' is hydrogen, o- or m-fluorine, or a salt thereof.

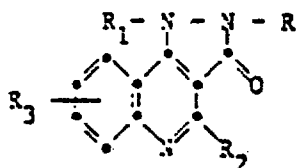
11. A process according to claim 7 for the preparation of 2-(p-chlorophenyl)-pyrazolo [4,3-c] quinoline-3(5H)-one or a salt thereof.

12. A process for the manufacture of a pharmaceutical preparation, which comprises mixing a compound according to any one of claims 1 to 6 with a pharmaceutical carrier.

13. A process for the manufacture of a pharmaceutical preparation, which comprises mixing a compound according to any one of claims 7 to 10 with a pharmaceutical carrier.

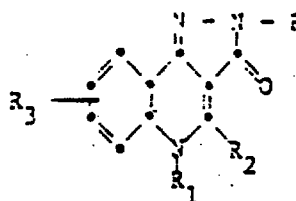
Revendications (pour les Etats contractants : BE, CH, DE, FR, GB, IT, LI, LU, NL, SE) (as printed)

1. Composés de formules générales I et II



(I)

et



(II)

où R_3 représente un hydrogène ou au plus 3 substituants semblables ou différents du groupe alcoyle en C, à C₇, alcoxy en C, à C₇, alcoylthio en C, à C₇, hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou dialcoyle en C, à C₇-amino, cyano, carbamoyl ou carboxy, R_1 représente un phényle non substitué ou substitué par au plus 3 des radicaux mentionnés pour R_3 , un pyridyle, un alcoylpyridyle en C, à C₇ ou un halogéno-pyridyle, R_2 représente un hydrogène, un alcoyle en C, à C₇ ou un (hydroxy, di-alcoyle en C, à C₇-amino ou R_3 -phényl)-alcoyle en C, à C₇, ou le groupe hydroxy ou amino est séparé de



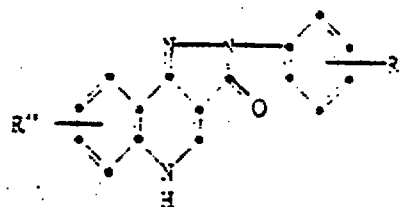
l'atome d'azote du noyau par au moins deux atomes de carbone, et R_2 représente un hydrogène ou un alcoyle en C_1 à C_7 ; leurs composés tautomères 3-hydroxy; les dérivés alcanoyloxy en C_1 à C_7 , carbamoyloxy, mono- ou di-alcoyle en C_1 à C_7 -carbamoyloxy des composés (hydroxy ou amino)-(phényle ou phénylène) mentionnés; ou leurs sels.

2. Composés selon la revendication 1, de formules I et II, où R_3 représente un hydrogène ou au plus 3 substituants semblables ou différents du groupe alcoyle en C_1 à C_7 , alcoxy en C_1 à C_7 , alcoylthio en C_1 à C_7 , hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou di-alcoyle en C_1 à C_7 -amino, et les autres symboles ont les significations données dans la revendication 1.

3. Composés selon la revendication 1 de formules I et II, où R_3 représente un hydrogène ou un ou deux substituants du groupe alcoyle en C_1 à C_7 , alcoxy en C_1 à C_7 , alcoylthio en C_1 à C_7 , hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou di-alcoyle en C_1 à C_7 -amino, cyano, carbamoyloxy ou carboxy, R représente un phényle non substitué ou substitué par 1 ou 2 des radicaux données pour R_3 , un pyridyle, un alcoyle en C_1 à C_7 -pyridyle ou un halogéno-pyridyle, R_1 représente un hydrogène, un alcoyle en C_1 à C_7 ou un (hydroxy, di-alcoyle en C_1 à C_7 -amino ou R_3 -phényl)-alcoyle en C_1 à C_7 , où le groupe hydroxy ou amino est séparé de l'atome d'azote du noyau par au moins deux atomes de carbone, et R_2 représente un hydrogène ou un alcoyle en C_1 à C_7 .

4. Composés selon la revendication 1 de formules I et II, où R_3 représente un hydrogène ou un ou deux substituants du groupe alcoyle inférieur, alcoxy inférieur, alcoyle inférieur-thio, hydroxy, halogène, trifluorométhyle, nitro, amino, un mono- ou un di-alcoyle inférieur-amino et les autres symboles ont les significations données dans la revendication 3.

5. Composés selon la revendication 1, qui correspondent à la formule III



(III)

où R'' représente un hydrogène, un alcoyle ou un alcoxy avec à chaque fois 4 atomes de carbone, un hydroxy, un fluor, un chlore, un brome ou un trifluorométhyle, R' représente un hydrogène, un alcoyle ou un alcoxy avec à chaque fois 4 atomes de carbone, un hydroxy, un fluor, un chlore, un brome, un trifluorométhyle, un nitro, un amino, un monoalcoylamino ou un alcoylcarbamoylamino avec chacun au plus 4 atomes de carbone, ou un cyano, ou leurs sels.

6. Composés selon la revendication 1 qui correspondent à la formule III présentée dans la revendication 5, où R'' représente un hydrogène, un alcoyle ou un alcoxy avec à chaque fois 4 atomes de carbone, un hydroxy, un fluor, un chlore, un brome ou un trifluorométhyle, R' représente un hydrogène, un o- ou un m-fluor; ou leurs sels.

7. La 2-(p-chlorophényl)-pyrazolo [4,3-c] quinolin-3(5H)-one ou ses sels.

8. La 2-phényl-pyrazolo [4,3-c] quinolin-3(5H)-one ou ses sels.

9. Composés selon la revendication 1, aux fins d'application comme substances actives psychotropes.

10. Composés selon la revendication 2, aux fins d'application comme substances actives psychotropes.

11. Préparations pharmaceutiques contenant des composés selon l'une des revendications 1, 3, 5, 8 et 9 ou des sels thérapeutiquement acceptables de tels composés.

12. Préparations pharmaceutiques contenant des composés selon l'une des revendications 2, 4, 6, 7 et 10 ou des sels thérapeutiquement acceptables de tels composés.

13. Les composés des revendications 1, 3, 5, 8 et 9 aux fins d'application comme agents psychotropes dans le traitement du corps humain ou animal.

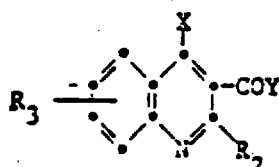
14. Les composés des revendications 2, 4, 6, 7 et 10 aux fins d'application comme agents psychotropes dans le traitement du corps humain ou animal.

15. Application de composés des revendications 1, 3, 5, 8 et 9 aux fins de préparation de préparations pharmaceutiques.

16. Application de composés des revendications 2, 4, 6, 7 et 10 à la préparation de préparations pharmaceutiques.

17. Procédé de préparation de composés de 2-aryl-pyrazolo-[4,3-c] quinolin-3(1 et 5H)-one définis dans la revendication 1, caractérisé en ce que

a) on cyclise des composés de formule IV

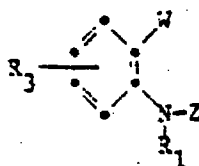


(IV)



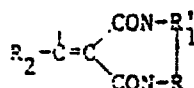
(89)

où X représente —NH—NH—R et Y représente un hydroxy ou un alcoxy en C_1 à C_7 ; ou X représente un halogène et Y représente $\text{H}_2\text{N—N—R}$; ou bien où X représente un alcoxy en C_1 à C_7 -amino ou un azido et Y représente NH—R . et si on le désire, on fait réagir un composé obtenu ou un de ses sels de métaux alcalins avec un ester réactif d'un alcool $\text{R}_1\text{—OH}$, ou
b) on condense des composés de formule V

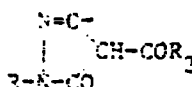


(V)

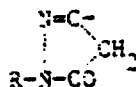
où les deux symboles W et R_1 représentent un hydrogène et Z représente le groupement



où R_1 représente un alcoyle en C_1 à C_7 , ou W est le groupement



et Z représente un hydrogène ; ou W représente le groupement

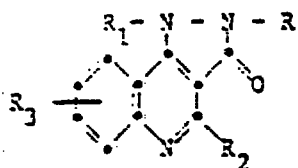


et Z représente $\text{R}_2\text{—CO}$ ou $\text{R}_2\text{—N—Z}$ pris ensemble représentent un isocyano et, si on le désire, on transforme un composé obtenu en un autre composé de l'invention, et/ou, si on le désire, on transforme un composé obtenu en un sel ou un sel obtenu en le composé libre ou en un autre sel, et/ou, si on le désire, on sépare un mélange d'isomères obtenu en les isomères isolés.

18. Les composés que l'on peut obtenir selon le procédé de l'exemple 17.

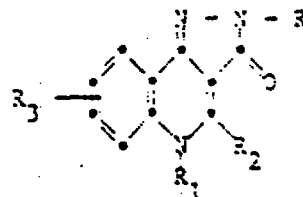
Revendications (pour l'Etat Contractant AT) (as printed)

1. Procédé de préparation de nouveaux composés de 2-aryl-pyrazolo [4.3-c] quinolin-3 (1 et 5H)-one de formules générales I et II



(I)

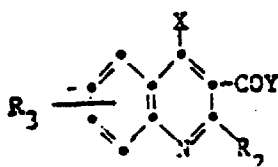
et



(II)

où R_3 représente un hydrogène ou au plus 3 substituants semblables ou différents du groupe alcoyle en C_1 à C_7 , alcoxy en C_1 à C_7 , alcoylthio en C_1 à C_7 , hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou di-alcoyle en C_1 à C_7 -amino, cyano, carbamoyle ou carboxy, R représente un phényle non substitué ou substitué par au plus 3 des radicaux mentionnés pour R_3 , un pyridyle, un alcoylpyridyle en C_1 à C_7 ou un halogéno-pyridyle, R_1 représente un hydrogène, un alcoyle en C_1 à C_7 ou un (hydroxy, di-alcoyle en C_1 à C_7 -amino ou R_3 -phényl)-alcoyle en C_1 à C_7 , où le groupe hydroxy ou amino est séparé de l'atome d'azote du noyau par au moins deux atomes de carbone, et R_2 représente un hydrogène ou un alcoyle en C_1 à C_7 ; leurs composés tautomères 3-hydroxy ; les dérivés alcanoyle en C_1 à C_7 , carbamoyle, mono- ou di-alcoyle en C_1 à C_7 -carbamoyle des composés (hydroxy ou amino)-(phényle ou phénylène) mentionnés ; ou leurs sels, caractérisé en ce que

a) on cyclise des composés de formule IV

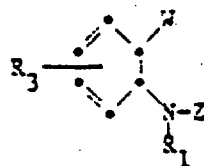


(IV)



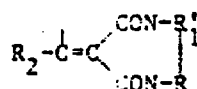
où X représente —NH—NH—R et Y représente un hydroxy ou un alcoxy en C, à C- ; ou X représente un halogène et Y représente $\text{H}_2\text{N—N—R}$; ou bien où X représente un alcoxy en C, à C-amino ou un azido et Y représente NH—R , et, si on le désire, on fait réagir un composé obtenu ou un de ses sels de métaux alcalins avec un ester réactif d'un alcool $\text{R}_1\text{—OH}$, ou

b) on condense des composés de formule V

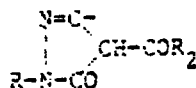


(V)

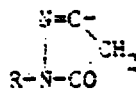
où les deux symboles W et R, représentent un hydrogène et Z représente le groupement



où R, représente un alcoyle en C, à C- ; ou W est le groupement



et Z représente un hydrogène, ou W représente le groupement

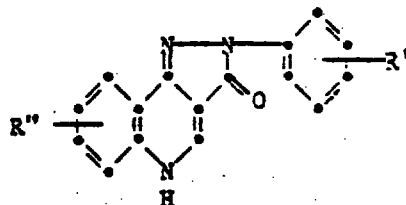


et Z représente $\text{R}_2\text{—CO}$ ou R—N—Z pris ensemble représentent un isocyano et, si on le désire, on transforme un composé obtenu en un autre composé de l'invention, et/ou, si on le désire, on transforme un composé obtenu en un sel ou un sel obtenu en le composé libre ou en un autre sel, et/ou, si on le désire, on sépare un mélange d'isomères obtenu en les isomères isolés.

2. Procédé selon la revendication 1, caractérisé en ce qu'on transforme un composé obtenu en un autre composé de l'invention, en substituant un composé où R, représente un hydrogène, en position 1 par réaction avec un ester réactif de l'alcool R—OH , et/ou en substituant un composé de formule II obtenu, où R, représente un atome de métal alcalin, en position 5 par réaction avec un ester réactif de l'alcool R—OH , et/ou en hydrolysant un composé alcoxy en C, à C- obtenu pour donner le phénol correspondant, et/ou en réduisant un composé nitro obtenu pour donner l'amine correspondante, et/ou en alcoylant ou en acylant un composé amino obtenu, ou les groupes acyle sont donnés dans la revendication 1, et/ou en transformant un nitrile obtenu en l'amide correspondant ou en l'hydrolysant pour donner le groupe carboxy.

3. Procédé selon l'une des revendications 1 et 2, caractérisé en ce qu'on prépare des composés de formules I et II données dans la revendication 1, où R_3 représente un hydrogène ou un ou deux substituants du groupe alcoyle en C, à C-, alcoxy en C, à C-, alcoylthio en C, à C-, hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou di-alcoyle en C, à C-amino, cyano, carbamoyle ou carboxy, R représente un phényle non substitué ou substitué par 1 ou 2 des radicaux donnés pour R_3 , un pyridyle, un alcoyle en C, à C-pyridyle ou un halogénopyridyle, R_1 représente un hydrogène, un alcoyle en C, à C, ou un (hydroxy, di-alcoyle en C, à C-amino ou R_3 -phényl)-alcoyle en C, à C-, où le groupe hydroxy ou amino est séparé de l'atome d'azote du noyau par au moins deux atomes de carbone, et R_2 représente un hydrogène ou un alcoyle en C, à C- ; les dérivés alcanoyle en C, à C-, carbamoyle, mono- ou di-alcoyle en C, à C-carbamoyle des composés (hydroxy ou amino)-(phényle ou phénylène) mentionnés ; ou leurs sels.

4. Procédé selon l'une des revendications 1 et 2, caractérisé en ce qu'on prépare des composés de formule III



(III)



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où R'' représente un hydrogène, un alcoyle ou un alcoxy avec à chaque fois 4 atomes de carbone, un hydroxy, un fluor, un chlore, un brome ou un trifluorométhyle, R' représente un hydrogène, un alcoyle ou un alcoxy avec à chaque fois 4 atomes de carbone, un hydroxy, un fluor, un chlore, un brome, un trifluorométhyle, un nitro, un amino, un monoalcoylamino ou un alcoylcarbamoylamino avec chacun au plus 4 atomes de carbone, ou un cyano, ou leurs sels.

5. Procédé selon la revendication 1, caractérisé en ce qu'on prépare la 2-(p-chlorophenyl)-pyrazolo [4.3-c] quinolin-3(5H)-one ou ses sels.

6. Procédé selon la revendication 1, caractérisé en ce qu'on prépare la 2-phenyl-pyrazolo [4.3-c] quinolin-3(5H)-one ou ses sels.

7. Procédé selon la revendication 1 de préparation de composés de 2-aryl-pyrazolo [4.3-c] quinolin-3(1 et 5H)-one de formules I et II présentées dans la revendication 1, où R₃ représente un hydrogène ou au plus 3 substituants semblables ou différents du groupe alcoyle en C₁ à C₇, alcoxy en C₁ à C₇, alcoylthio en C₁ à C₇, hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou di-alcoyle en C₁ à C₇, amino, R représente un phényle non substitué ou substitué par au plus 3 des radicaux indiqués pour R₃, un pyridyle, un alcoyle en C₁ à C₇, pyridyle ou un halogéno-pyridyle, R₁ représente un hydrogène, un alcoyle en C₁ à C₇ ou un (hydroxy, di-alcoyle en C₁ à C₇, amino ou R₃-phényl-alcoyle en C₁ à C₇, ou le groupe hydroxy ou amino est séparé de l'atome d'azote du noyau par au moins deux atomes de carbone, et R₂ représente un hydrogène ou un alcoyle en C₁ à C₇, ainsi que de leurs composés tautomères 3-hydroxy et des dérivés alcanoyls en C₁ à C₇, carbamoyls, mono- ou di-alcoyle en C₁ à C₇, carbamoyls des composés (hydroxy ou amino)-phényles ou phénylènes mentionnés, ou de leurs sels, caractérisé en ce que

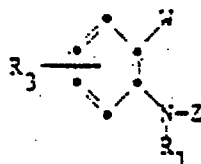
a) on cyclise des composés de formule IV



IV

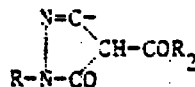
où X représente —NH—NH—R et Y représente un hydroxy ou un alcoyle, ou X représente un halogène et Y représente H₂N—N—R, et, si on le désire, on fait réagir un composé obtenu ou un de ses sels de métaux alcalins, avec un ester réactif d'un alcool R₁—OH, ou

b) on condense des composés de formule V



V

où W est le groupement



et, si on le désire, on transforme un composé obtenu en un autre composé de l'invention, et/ou, si on le désire, on transforme un composé obtenu en son sel ou un sel obtenu en le composé libre ou en un autre sel, et/ou, si on le désire, on dédouble un mélange d'isomères obtenu pour donner les isomères isolés.

8. Procédé selon la revendication 7, caractérisé en ce qu'on transforme un composé obtenu en un autre composé de l'invention, en substituant un composé où R₁ représente un hydrogène, en position 1 par réaction avec un ester réactif de l'alcool R₁—OH, et/ou en ce qu'on substitue un composé de formule II obtenu, où R₁ représente un atome de métal alcalin, en position 5 par réaction avec un ester réactif de l'alcool R₁—OH, et/ou en ce qu'on hydrolyse un composé alcoyle en C₁ à C₇ obtenu pour donner le phénol correspondant, et/ou en ce qu'on réduit un composé nitro obtenu pour donner l'amine correspondante, et/ou en ce qu'on alcoyle ou acyle un composé amino obtenu, où les groupes acyle sont donnés dans la revendication 7.

9. Procédé selon l'une des revendications 7 et 8, caractérisé en ce qu'on prépare des composés de formules I et II données dans la revendication 1, où R₃ représente un hydrogène ou un ou deux substituants du groupe alcoyle en C₁ à C₇, alcoxy en C₁ à C₇, alcoylthio en C₁ à C₇, hydroxy, halogène, trifluorométhyle, nitro, amino, mono- ou di-alcoyle en C₁ à C₇, amino, R représente un phényle non substitué ou substitué par un ou deux des radicaux donnés pour R₃, un pyridyle, un alcoyle en C₁ à C₇, pyridyle ou un halogéno-pyridyle, R₁ représente un hydrogène, un alcoyle en C₁ à C₇ ou un (hydroxy, di-



(P2)

alcoyle en C₁ à C₇-amino ou R₂-phenyl)-alcoyle en C₁ à C₇, ou le groupe hydroxy ou amino est séparé de l'atome d'azote du noyau par au moins deux atomes de carbone, et R₂ représente un hydrogène ou un alcoyle en C₁ à C₇; les dérivés alcanoyles en C₁ à C₇, carbamoyles, mono- ou di-alcoyle en C₁ à C₇, carbamoyles des composés (hydroxy ou amino)-(phényle ou phénylène) mentionnés; ou leurs sels.

10. Procédé selon l'une des revendications 7 et 8, caractérisé en ce qu'on prépare des composés de formule III présentée dans la revendication 4, où R'' représente un hydrogène, un alcoyle ou un alcoxy avec à chaque fois 4 atomes de carbone, un hydroxy, un fluor, un chlore, un brome ou un trifluorométhyle, R' représente un hydrogène, un o- ou un m-fluor; ou leurs sels.

11. Procédé selon la revendication 7, caractérisé en ce qu'on prépare la 2-(p-chlorophenyl)-pyrazolo [4,3-c]-quinolin-3(5H)-one ou ses sels.

12. Procédé de préparation d'une préparation pharmaceutique, caractérisé par le traitement d'une substance active selon l'invention selon l'une des revendications 1 à 6, avec un support pharmaceutique.

13. Procédé de préparation d'une préparation pharmaceutique, caractérisé par le traitement d'une substance active selon l'invention selon l'une des revendications 7 à 10, avec un support pharmaceutique.