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Loev

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[54] **2-AMINOMETHYL DIBENZO (b,d) PYRANS**

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[52] **U.S. Cl.**..... **260/345.3,** 424/283, 260/326.5 CA, 260/293.58

[51] **Int. Cl.**..... **C07d 7/20**

[58] **Field of Search**... 260/345.3, 326.5 CA, 293.58

[56] **References Cited**

UNITED STATES PATENTS

3,654,312 4/1972 Pars et al..... 260/345.3

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[57] **ABSTRACT**

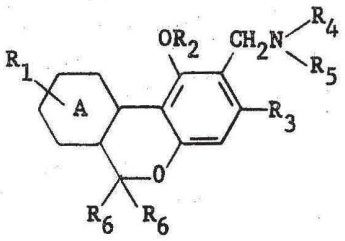
The compounds of this invention are 2-aminomethyl dibenzo[b,d]pyrans having pharmacological activity such as central nervous system activity. A preferred compound of this invention is 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

4 Claims, No Drawings

2-AMINOMETHYL DIBENZO [b,d] PYRANS

This invention relates to new 2-aminomethyl dibenzo[b,d]pyrans which have pharmacological activity.

The compounds of this invention are represented by the following structural formula:



FORMULA I

in which:

ring A is a benzene ring, a cyclohexane ring or a cyclohexene ring with the double bond being at position 6*a*–10*a*, 8 or 9;

R_1 is hydrogen, methyl or ethyl;

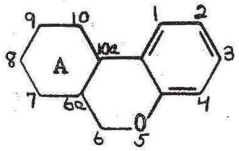
R_2 is hydrogen or lower alkanoyl of from two to five carbon atoms;

R_3 is a saturated hydrocarbon chain optionally branched with from one to three alkyl groups, each group consisting of one or two carbon atoms, with R_3 containing a total of from five to twelve carbon atoms;

R_4 and R_5 are hydrogen or lower alkyl of from one to four carbon atoms or are joined together with the nitrogen atom to which they are attached to form a piperidine or a pyrrolidine ring; and

R_6 is methyl or ethyl.

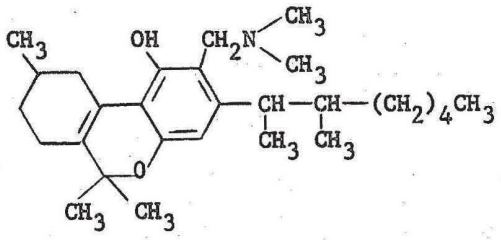
In the nomenclature used herein the dibenzo[b,d]pyran ring is numbered as follows:



Preferred compounds of this invention are represented by Formula I in which ring A is a cyclohexene ring with the double bond at the 6*a*–10*a* position and R_4 and R_5 are lower alkyl of from one to four carbon atoms or are joined together with the nitrogen atom to which they are attached to form a piperidine or a pyrrolidine ring.

Advantageous compounds of this invention are represented by Formula I in which ring A is a cyclohexene ring with the double bond at position 6*a*–10*a*, R_1 is methyl in the 9-position, R_2 is hydrogen or acetyl, R_3 is a saturated hydrocarbon chain optionally branched with from one to three methyl groups, with R_3 containing a total of from five to twelve carbon atoms and R_4, R_5 and R_6 are methyl.

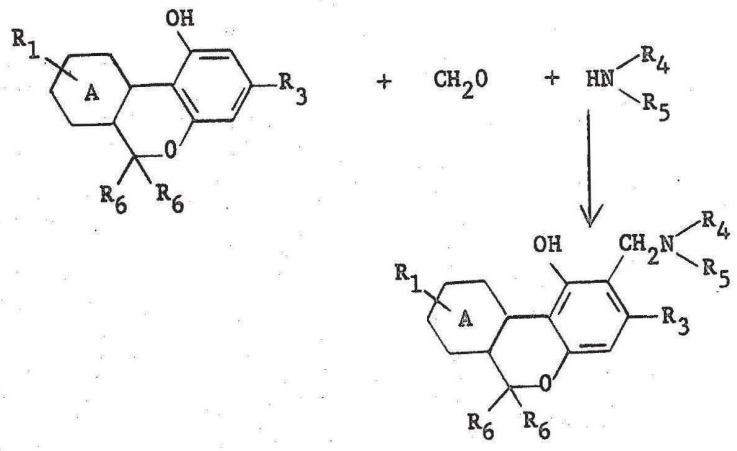
Particularly preferred is the compound 2-N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran. This compound is represented by the following structural formula:



FORMULA II

The compounds of this invention may exist as optical isomers due to the possible asymmetry of carbon atoms in the side chain and in ring A. All of the isomers, including separated isomers and mixtures thereof, are included within the scope of this invention.

The compounds of this invention in which R_2 is hydrogen are obtained by Mannich condensations on 3-alkyl-1-hydroxy-6-H-dibenzo[b,d]pyrans according to standard procedures, for example, by reaction of a 3-alkyl-1-hydroxy-6H-dibenzo[b,d]pyran with formaldehyde and an amine of the formula R_4R_5NH in a solvent such as ethanol at a temperature of from about 25° to 80° as shown in the following scheme:



The terms R_1, R_3, R_4, R_5, R_6 and A are defined as described above.

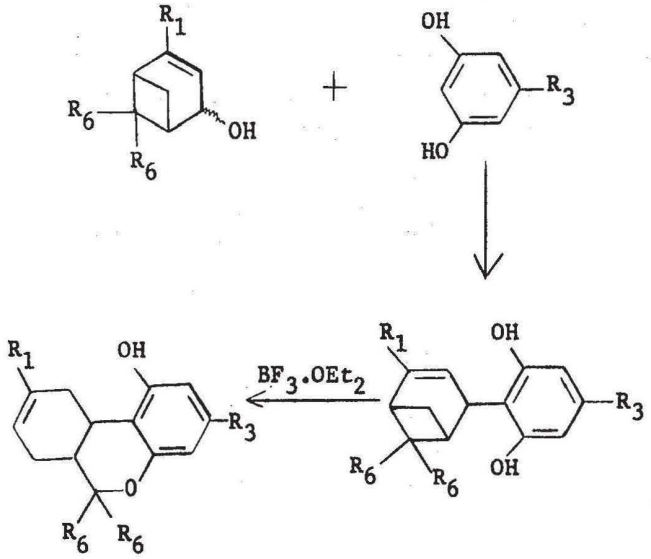
Alternatively, when one of R_4 or R_5 is hydrogen the corresponding compounds of Formula I in which R_2 is hydrogen may be prepared by condensation of a 3-alkyl-1-hydroxy-6H-dibenzo[b,d]pyran with an N-alkyl-N-benzylamine and formaldehyde as described above followed by chemical or catalytic debenzylation, for example by the use of sodium in liquid ammonium or by hydrogenolysis over palladium on carbon in glacial acetic acid, to give the 3-alkyl-2-(N-alkylaminomethyl)-1-hydroxy-6H-dibenzo[b,d]pyran.

When both R_4 and R_5 are hydrogen the corresponding compounds of Formula I in which R_2 is hydrogen may be prepared by condensation of a 3-alkyl-1-hydroxy-6H-dibenzo[b,d]pyran with dibenzylamine and formaldehyde followed by debenzylation as described above.

The 3-alkyl-1-hydroxy-6H-dibenzo[b,d]pyran starting materials in the above procedure are prepared as follows.

The 3-alkyl-1-hydroxy-6H-dibenzo[b,d]pyrans in which ring A is a cyclohexene ring with the double bond at position 6*a*–10*a* and R_2 is hydrogen are prepared by condensation of a 2-carbalkoxycyclohexanone, for example 2-carbethoxycyclohexanone with a 5-alkyl resorcinol followed by treatment of the 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6H-dibenzo[b,d]pyrone with a methyl or ethyl magnesium halide and subsequent cyclization to the 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6H-dibenzo[b,d]pyran by addition of the reaction mixture to aqueous acid, for example dilute hydrochloric acid.

The 3-alkyl-1 -hydroxy-6*a*, 7,10,10*a*-tetrahydro-6H-dibenzo[b,d]pyrans, in which ring A is a cyclohexene ring with the double bond at the 8-position and R_2 is hydrogen, are prepared by condensing verbenol or an analog thereof with a 5-alkyl resorcinol in the presence of acid such as p-toluenesulfonic acid followed by treatment of the resulting adduct with boron trifluoride etherate by the procedure of Mechoulam et al. [Arzneim.-Forsch. 22:1995 (1972)] as shown in the following scheme:



The terms R_1, R_3 and R_6 are defined as described above.

The 3-alkyl-1-hydroxy-6*a*, 7,8,10*a*-tetrahydro-6H-dibenzo[b,d]pyrans, where ring A is a cyclohexene ring with the double bond at the 9-position and R_2 is hydrogen, are prepared by isomerization of the corresponding 3-alkyl-1-hydroxy-6*a*, 7,10,10*a*-tetrahydro-6H-dibenzo[b,d]pyrans with zinc chloride and hydrogen chloride followed by treatment with base [Mechoulam et al., Arzneim.-Forsch. 22:1995 (1972) and Petrzilka et al., Helv. Chim. Acta 52:1102 (1969)].

Other procedures which may be applied to prepare the 3-alkyl-1-hydroxy-6*a*, 7,8,10*a*-tetrahydro-6H-dibenzo[b,d]pyrans are described by Fahrenholtz et al., J. Amer. Chem. Soc. 89:5934 (1967), Mechoulam et al., J. Amer. Chem. Soc. 89:4552 (1967) and Razdan et al., J. Amer. Chem. Soc. 92:6061 (1970) and in U.S. Pat. No. 3,388,136.

The alkyl substituted resorcinols are prepared from reaction of 3,5-dimethoxyacetophenone, 3,5-dimethoxybenzaldehyde or 3,5-dimethoxybenzonitrile with an appropriate alkyl magnesium halide with subsequent dehydration of the intermediate alcohols followed by hydrogenation and removal of the protective groups by standard procedures, for example by acid hydrolysis or with pyridine hydrochloride or boron tribromide.

The 3-alkyl-1-hydroxy-6H-dibenzo[b,d]pyrans in which ring A is benzene ring and R_2 is hydrogen are prepared by dehydrogenation of the corresponding compounds in which ring A is a cyclohexene ring. The dehydrogenation is carried out either using a catalyst such as palladium on carbon or using a chemical dehydrogenating agent such as 2,3-dichloro-5,6-dicyanoquinone.

The 3-alkyl-1-hydroxy-6*a*, 7,8,9,10,10*a*-hexahydro-6H-dibenzo[b,d]pyrans, in which ring A is a cyclohexane ring and R_2 is hydrogen are prepared from the corresponding compounds in which ring A is a cyclohexene ring by chemical or catalytic reduction according to standard procedures such as with palladium on carbon in ethanol.

The compounds of Formula I in which R_2 is lower alkanoyl are prepared from the corresponding compounds in which R_2 is hydrogen by conventional methods, for example by reacting the hydroxy compound

with a lower alkanoic acid in the presence of a dehydrating agent such as dicyclohexylcarbodiimide, a lower alkanoic acid anhydride or a lower alkanoyl halide.

The compounds of this invention have pharmacological activity such as central nervous system activity; for example the compounds have central nervous system depressant, sedative and tranquilizing activity. In addition, the compounds may have analgesic, hypotensive, anti-inflammatory and diuretic activity.

The central nervous system activity is demonstrated by oral administration to rats at doses of about 50 to 100 mg./kg. to produce effects such as decreased spontaneous motor activity.

One skilled in the art will recognize that in determining the amounts of the compound to produce the desired pharmacological effect, the activity of the compound as well as the size of the host animal must be considered.

The compounds of this invention may be combined with standard pharmaceutical carriers and administered internally in conventional dosage forms such as capsules, tablets or liquid preparations.

The following examples illustrate the invention but are not to be construed as limiting the scope thereof. Temperatures are in degrees Centigrade unless otherwise stated.

EXAMPLE 1

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

To a warm solution of 10.1 g. (0.027 mol.) of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in 75 ml. of ethanol was added 1.8 g. (0.060 mol.) of paraformaldehyde, 7 ml. (0.060 mol.) of 40 percent aqueous dimethylamine and 10 drops of acetic acid. The solution was refluxed for 45 minutes and allowed to stir at 25° for 18 hours. The colorless precipitate was filtered, washed with cold methanol and recrystallized from anhydrous methanol to give the title compound, m.p. 103°–107°.

EXAMPLE 2

Substitution of an equivalent amount of an amine listed below:

diethylamine
methyl ethyl amine
diisopropylamine
di-n-butylamine
pyrrolidine
piperidine

into the procedure of Example 1 for dimethylamine gives the following 2-aminomethyl dibenzo[b,d]pyrans, respectively:

2-(N,N-diethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran
3-(1,2-dimethylheptyl)-2-(N-ethyl-N-methylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran
2-(N,N-diisopropylaminomethyl)-3-(1,2dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran
2-(N,N-di-n-butylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran
3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-2-pyrrolidinomethyl-6H-dibenzo[b,d]pyran
3(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 3

3-(1,2-Dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

When an equivalent amount of 40 percent aqueous methyl amine is substituted in the procedure of Example 1 for dimethylamine, the title compound is formed. After stirring at 25°, 200 ml. of water is added to the reaction mixture and the resulting solution is extracted with ether. The extracts are dried ($MgSO_4$) and saturated with gaseous hydrogen chloride. The precipitated gum is collected and washed with dry ether, then stirred with 100 ml. of 10 percent aqueous sodium carbonate and 100 ml. of ether. The etheral solution is washed with water, dried ($MgSO_4$) and concentrated to give the title compound.

Alternatively, the title compound is prepared by substitution of an equivalent amount of N-methyl-N-benzylamine in the procedure of Example 1 for dimethylamine followed by hydrogenolysis of the resulting 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methyl-N-benzylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran over palladium on carbon in glacial acetic acid.

EXAMPLE 4

2-Aminomethyl-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

When an equivalent amount of aqueous ammonia is substituted in the procedure of Example 3 for methyl amine, the title compound is obtained.

The title compound is also prepared by substitution of an equivalent amount of dibenzylamine in the alternate procedure of Example 3 for N-methyl-N-benzylamine.

EXAMPLE 5

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,10,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

To a stirred solution of 0.23 g. (1.4 mmol.) of dry p-toluenesulfonic acid and 2.4 g. (10 mmol.) of 5-(1,2-dimethylheptyl)resorcinol in 500 ml. of chloroform is added a solution of 1.9 g. (13.5 mmol.) of cis-verbenol [J. Chem. Soc. 2864 (1960)] in 200 ml. of chloroform over a 50 minute interval. The reaction mixture is stirred for 30 minutes, then ether and water are added and the layers are separated. The organic phase is washed with 5 percent aqueous sodium bicarbonate, dried ($MgSO_4$) and concentrated in vacuo. The residue is chromatographed on Florisil and eluted with 5 percent ether-petroleum ether to give 2,6-dihydroxy-4-(1,2-dimethylheptyl)-1-verbenylbenzene which is dissolved in 100 ml. of methylene chloride containing 1 ml. of boron trifluoride etherate. After 30 minutes ether and water are added and the layers are separated. The aqueous phase is extracted twice with ether and the combined extracts are washed with 5 percent aque-

ous sodium bicarbonate, dried ($MgSO_4$) and concentrated in vacuo. Chromatography of the residue on Florisil and elution with 2 percent etherpetroleum *ether gives 3-(1,2-dimethylheptyl)-1-hydroxy-6a*,7,10,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-(1,2-dimethyl-heptyl)-1-hydroxy-6*a*, 7,10,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the title compound is obtained.

EXAMPLE 6

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,8,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

Dry gaseous hydrogen chloride is bubbled into a solution of 4.6 g. (13 mmol.) of 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,10,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in 250 ml. of dry toluene containing 0.5 g. (3.7 mmol.) of anhydrous zinc chloride at −5° to −15° for six hours. The reaction mixture is filtered and the filtrate is washed with water until neutral, dried ($MgSO_4$) and concentrated in vacuo at 25°. The residue is dried for 12 hours at 25° under vacuum to give 9-chloro-3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,8,10, 10*a*-pentahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

To a 1M solution of potassium t-amylate in 10 ml. of benzene under an argon atmosphere at 5° is added dropwise with stirring a solution of 3.1 mmol. of the 9-chloro-6H-dibenzo[b,d]pyran in 15 ml. of dry benzene. The reaction mixture is heated to 65° for 15 minutes, then it is cooled in an ice bath and bubbled with carbon dioxide for 30 minutes. Ether and ice water are added and the mixture is neutralized with 5 percent aqueous sodium bicarbonate. The layers are separated and the organic phase is dried ($MgSO_4$) and concentrated in vacuo to give 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,8,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,8,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the title compound is obtained.

EXAMPLE 7

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

A solution of 200 g. of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran in 70 ml. of dry p-cymene is added dropwise at reflux to a well stirred suspension of 660 mg. of 10 percent palladium on carbon in 70 ml. of dry p-cymene, which is bubbled continuously with nitrogen. The addition is made over 45 minutes Refluxing is continued for an additional hour, and the mixture is then cooled, chloroform is added and the catalyst is filtered off. The chloroform solution is evaporated in vacuo. The residue is chromatographed on a silica gel dry-column and the product is distilled to give 3-(1,2-dimethylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, b.p. 180°–183°C. at 0.007 mm.

In like manner, the aromatized dibenzo[b,d]pyran may be obtained from 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,8,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran or from 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,10,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran into the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the title compound.

EXAMPLE 8

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-6*a*, 7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

A mixture of 2.9 g. (8.1 mmol.) of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in 100 ml. of absolute ethanol and 10 percent palladium on carbon is hydrogenated at 48 p.s.i. and 25° until 8 mmol. of hydrogen is absorbed. After addition of a small amount of chloroform the mixture is filtered, the solvent is evaporated and the residue is distilled to give 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

In like manner, the hexahydro dibenzo[b,d]pyran may be obtained from 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*,7,8,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran or from 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*,7,10,10*a*-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the title compound.

EXAMPLE 9

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran

To the Grignard reagent prepared from 13.3 g. (0.56 mol.) of magnesium turnings and 123.9 g. (0.56 mol.) of 2-bromodecane in anhydrous ether, under nitrogen, is added with stirring a solution of 50.5 g. (0.28 mol.) of 3,5-dimethoxyacetophenone [J. Prakt. Chem. 107:104 (1924)] in 200 ml. of anhydrous tetrahydrofuran. After refluxing for 12 hours the mixture is quenched with 300 ml. of saturated aqueous ammonium chloride and extracted with ether. The extracts are washed with water, dried ($MgSO_4$) and the solvent is removed to give 5-(1,2-dimethyl-1-hydroxydecyl)resorcinol dimethyl ether.

Dehydration by distillation from a few drops of 20 percent aqueous sulfuric acid gives a mixture of 5-(1,2-dimethyldec-1-enyl)resorcinol dimethyl ether and 5-(1-methylenyl-2-methyldecyl)resorcinol dimethyl ether which is hydrogenated over 10 percent palladium on carbon in absolute ethanol at 50 p.s.i. and 25° to give 5-(1,2-dimethyldecyl)-resorcinol dimethyl ether.

A solution of 30.6 g. (0.1 mol.) of 5-(1,2-dimethyldecyl)resorcinol dimethyl ether in 350 ml. of glacial

acetic acid and 150 ml. of 48 percent hydrogen bromide is refluxed eight hours, then stirred at 25° for 12 hours. The reaction mixture is diluted with water and extracted three times with ether. The combined extracts are washed with saturated aqueous sodium bisulfite and saturated aqueous sodium bicarbonate, dried ($MgSO_4$), concentrated and distilled to give 5(1,2-dimethyldecyl)resorcinol.

To a stirred solution of 3.9 g. (0.014 mol.) of 5-(1,2-dimethyldecyl)resorcinol and 2.57 g. (0.014 mol.) of 5-methyl-2-carbethoxycyclohexanone in 50 ml. of benzene is added a solution of 2.17 g. (0.014 mol.) of phosphorus oxychloride in 5 ml. of benzene. After one hour the reaction mixture is refluxed for five minutes then allowed to stir at 25° for 24 hours. Water is then added and the mixture is refluxed for 15 minutes and ethyl acetate is added. The layers are separated and the organic phase is washed with 5 percent aqueous sodium bicarbonate, dried ($MgSO_4$) and concentrated. The residue is triturated with a minimum amount of 40 percent aqueous sodium hydroxide. The precipitate which forms is filtered, washed with benzene and 10 percent aqueous sodium hydroxide, acidified with dilute hydrochloric acid and extracted into benzene. The benzene solution is dried ($MgSO_4$) and concentrated to give 3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyrone.

A solution of 3.0 g. (7.6 mmol.) of the dibenzo[b,d]-pyrone in benzene is added to a stirred solution of 50 ml. (0.1 mol.) of a solution of methyl magnesium bromide in benzene-tetrahydrofuran under nitrogen. After refluxing for 18 hours the solution is slowly poured with stirring onto 300 ml. of ice-water containing 40 ml. of concentrated hydrochloric acid. The cold mixture is extracted with ether and the organic phase is dried ($MgSO_4$) and concentrated. Distillation of the residue gives 3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

Substitution of an equivalent amount of 3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the title compound.

EXAMPLE 10

2-(N,N-Dimethylaminomethyl)-3-dodecyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

To the Grignard reagent prepared from 18.3 g. (0.75 mol.) of magnesium turnings and 176.5 g. (0.75 mol.) of 1-bromoundecane in anhydrous ether under nitrogen is added with stirring 40.8 g. (0.25 mol.) of 3,5-dimethoxybenzonitrile. The reaction mixture is refluxed for eight hours, cooled, poured onto a stirred 2N sulfuric acid-ice mixture and the solvent is evaporated. The remaining aqueous solution is stirred at 95° for one hour, cooled and extracted with ether. The extract is washed with water, dried ($MgSO_4$) and concentrated to give a residue which is distilled to give 3,5-dimethoxyphenyl undecyl ketone.

To a solution of 41.5 g. (0.74 mol.) of potassium hydroxide in 400 ml. of ethylene glycol is added 32.1 g. (0.1 mol.) of 3,5-dimethoxyphenyl undecyl ketone and 43 ml. of 85 percent hydrazine hydrate. The reaction mixture is refluxed for one hour, distilled up to 185°, then refluxed an additional ten hours. The mixture is cooled, diluted with water, acidified with concentrated hydrochloric acid and extracted four times with ether. The combined extracts are washed with water, dried ($MgSO_4$) and concentrated to yield 5-dodecylresorcinol dimethyl ether which is demethylated according to the procedure of Example 9 to give 5-dodecylresorcinol.

Condensation of equivalent amounts of 5-dodecylresorcinol and 5-methyl-2-carbethoxycyclohexanone followed by treatment with methyl magnesium bromide and subsequent cyclization as described in Example 9 gives 3-dodecyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-dodecyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the title compound is obtained.

EXAMPLE 11

3-Decyl-2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

Substitution of an equivalent amount of 1-bromononane in the procedure of Example 10 followed by reduction and demethylation as described gives 5-decylresorcinol.

Condensation of equivalent amounts of 5-decylresorcinol and 5-methyl-2-carbethoxycyclohexanone followed by treatment with methyl magnesium bromide and subsequent cyclization as described in Example 9 gives 3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the title compound is obtained.

EXAMPLE 12

2-(N,N-Dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

To 0.2 mol. of methyl magnesium bromide (2N in tetrahydrofuran-benzene), under nitrogen, is added 55.6 g. (0.2 mol.) of 2-(3,5-dimethoxyphenyl)-2-methyloct-3-one [J. Amer. Chem. Soc. 70:664 (1948); Helv. Chim. Acta 52:116 (1969)] in tetrahydrofuran. After refluxing for 12 hours the mixture is quenched with saturated aqueous ammonium chloride and extracted with ether. The extracts are washed with water, dried ($MgSO_4$) and the solvent is removed to give 5-(2-hydroxy-1,1,2-trimethylheptyl)resorcinol dimethyl ether as an oil. A solution of 5.9 g. (0.020 mol.) of the carbinol in ether is allowed to react over a six hour period with a suspension of 0.8 g. (0.020 mol.) of metallic potassium in 60 ml. of ether. Carbon disulfide (1.5 g.; 0.020 mol.) is added and the mixture is stirred for 30 minutes, then 2.8 g. (0.020 mol.) of methyl iodide is added and the reaction mixture is refluxed for six hours and left at 25° for 12 hours. The mixture is filtered and the filtrate is concentrated and distilled in vacuo. The distillate is dissolved in ethanol, refluxed with Raney nickel and redistilled to give a mixture of 5-(1,1,2-

trimethylhept-2-enyl)resorcinol dimethyl ether and 5-(1,1-dimethyl-2-methylenylheptyl)-resorcinol dimethyl ether. Removal of the protective groups and hydrogenation is accomplished as described in Example 9 to give 5-(1,1,2-trimethylheptyl)resorcinol.

Condensation of equivalent amounts of 5-(1,1,2-trimethylheptyl)resorcinol and 5-methyl-2-carbethoxycyclohexanone followed by treatment with methyl magnesium bromide and subsequent cyclization as described in Example 9 gives 1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the title compound is obtained.

EXAMPLE 13

2-(N,N-Dimethylaminomethyl)-3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran

Substitution of equivalent amounts of 3,5-dimethoxyphenyl ethyl ketone and 2-bromoheptane in the procedure of Example 9 for 3,5-dimethoxyacetophenone and 2-bromodecane followed by dehydration, hydrogenation, and removal of the protective groups as described gives 5-(1-ethyl-2-methylheptyl)resorcinol.

Condensation of equivalent amounts of 5-(1-ethyl-2-methylheptyl)resorcinol and 5-methyl-2-carbethoxycyclohexanone followed by treatment with methyl magnesium bromide and subsequent cyclization as described in Example 9 gives 3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran, the title compound is obtained.

EXAMPLE 14

3-(1,2-Diethylheptyl)-2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran

Substitution of equivalent amounts of 3,5-dimethoxyphenyl ethyl ketone and 3-bromooctane in the procedure of Example 9 for 3,5-dimethoxyacetophenone and 2-bromodecane followed by dehydration, hydrogenation and removal of the protective groups as described gives 5-(1,2-diethylheptyl)-resorcinol.

Condensation of equivalent amounts of 5-(1,2-diethylheptyl)resorcinol and 5-methyl-2-carbethoxycyclohexanone followed by treatment with methyl magnesium bromide and subsequent cyclization as described in Example 9 gives 3-(1,2-diethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-(1,2-diethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the title compound is obtained.

EXAMPLE 15

Substitution of an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed below:

1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-heptyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6-H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,9-trimethyl-6- H-dibenzo[b,d]pyran in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the following 2-(N,N-dimethylaminomethyl) dibenzo[b,d]pyrans:

2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-heptyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1methylheptyl)-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran.

EXAMPLE 16

When a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed below:

1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is treated with piperidine according to the procedure of Example 1, the following 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyrans are obtained:

1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-3-pentyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran

3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran

3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran

3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-2-piperidinomethyl-6H-dibenzo[b,d]pyran.

Likewise, reaction of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed above with an amine listed in Example 2 gives the corresponding 3-alkyl-2-aminomethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyrans.

EXAMPLE 17

When an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed in Example 16 is substituted in the procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the following 2-(N-methylaminomethyl)dibenzo[b,d]pyrans are obtained:

1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 18

Substitution of an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed in Example 16 in the procedure of Example 4 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the following 2-aminomethyl dibenzo[b,d]pyrans:

2-aminomethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

2-aminomethyl-3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-aminomethyl-1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]-pyran

2-aminomethyl-3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-aminomethyl-1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-aminomethyl-3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 19

When equivalent amounts of 5-(1,2-dimethylheptyl)-resorcinol and 4-methyl-2-carbethoxycyclohexanone are condensed according to the procedure described in Example 9 and the intermediate dibenzo[b,d]pyrone is treated with methyl magnesium bromide and the product cyclized, 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran is obtained.

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo-[b,d]pyran.

Similarly, condensation of 5-(1,2-dimethylheptyl)resorcinol and 3-methyl-2-carbethoxycyclohexanone as described in Example 9, treatment of the dibenzo[b,d]-pyrone with methyl magnesium bromide, subsequent cyclization and reaction of the dibenzo[b,d]pyran with dimethylamine and paraformaldehyde as described in Example 1 gives 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro16,6,7-trimethyl-6H-dibenzo[b,d]pyran.

In like manner, when 5-(1,2-dimethylheptyl)-resorcinol is condensed with 6-methyl-2-carbethoxycyclohexanone and the dibenzo[b,d]pyrone is treated with methyl magnesium bromide and the product cyclized as previously described followed by reaction of the dibenzo-[b,d]pyran with dimethylamine and paraformaldehyde as described in Example 1, 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,10-trimethyl-6H-dibenzo[b,d]pyran is obtained.

EXAMPLE 20

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]-pyran

3-(1,2-Dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran is prepared by reaction of equivalent amounts of 5-(1,2-dimethyl-heptyl)resorcinol and 2-carbethoxycyclohexanone as described in Example 9.

Treatment of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,-dimethyl-6H-dibenzo[b,d]pyran with dimethylamine and paraformaldehyde according to the procedure of Example 1 gives the title compound.

EXAMPLE 21

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran

Condensation of equivalent amounts of 5-(1,2-dimethylheptyl)resorcinol and 5-ethyl-2-carbethoxycyclohexanone followed by treatment of the dibenzo[b,d]pyrone with methyl magnesium bromide and subsequent cyclization as described in Example 9 gives 3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran.

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the title compound.

EXAMPLE 22

2-(N,N-Dimethylaminomethyl)-3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran

When 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyrone is treated with ethyl magnesium bromide and subsequently cyclized as described in Example 9, 3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran is obtained.

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the title compound.

EXAMPLE 23

Substitution of an equivalent amount of a resorcinol listed below:

5-n-pentylresorcinol
5-n-decylresorcinol
5-(1,1,2-trimethylheptyl)resorcinol
5-(1-ethyl-2methylheptyl)resorcinol
5-(1-methylheptyl)resorcinol
5-(1,2-dimethyldecyl)-resorcinol

in the procedure of Example 19 for 5-(1,2-dimethylheptyl)resorcinol gives the following dibenzo[b,d]pyrans:

1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran
3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran listed above is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the following dibenzo[b,d]pyrans are obtained:

2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran
3-decyl-2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1,1,2-trimethylheptyl)-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,8-trimethyl-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)-3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo-[b,d]pyran.

EXAMPLE 24

When an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,8-trimethyl-6H-dibenzo[b,d]pyran is obtained.

In like manner, substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 4 for 3-(1,3-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran gives 2-aminomethyl-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,8-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 25

When an equivalent amount of a resorcinol listed in Example 23 is substituted in the procedure of Example 20 for 5-(1,2-dimethylheptyl)resorcinol, the following 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyrans are obtained:

1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-pentyl-6H-dibenzo[b,d]pyran
3-decyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran
1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-(1,1,2-trimethylheptyl)-6H-dibenzo[b,d]pyran
3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran
1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6-dimethyl-6H-dibenzo[b,d]pyran
3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran.

Substitution of an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran listed above in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the following dibenzo[b,d]pyrans:

2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-pentyl-6H-dibenzo[b,d]pyran
3-decyl-2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-(1,1,2-trimethylheptyl)-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)-3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran
2-N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6-dimethyl-6H-dibenzo[b,d]pyran
2-(N,N-dimethylaminomethyl)-3-(1,2-dimethyldecyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 26

When an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, 3-(1,2-dimethylheptyl-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6-dimethyl-6H-dibenzo[b,d]pyran is obtained.

Similarly, substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran in the procedure

of Example 4 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 2-aminomethyl-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 27

When an equivalent amount of a resorcinol listed in Example 23 is substituted in the procedure of Example 21 for 5-(1,2-dimethylheptyl)resorcinol, the following 3-alkyl-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyrans are obtained:

9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran

9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-(1,1,2-trimethylheptyl)-6H-dibenzo[b,d]pyran

9-ethyl-3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran

9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6-dimethyl-6H-dibenzo[b,d]pyran

3-(1,2-dimethyldecyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran.

Substitution of a 3-alkyl-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran listed above in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the following 2-(N,N-dimethylaminomethyl) dibenzo[b,d]pyrans:

2-(N,N-dimethylaminomethyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-2-(N,N-dimethylaminomethyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]-pyran

2-(N,N-dimethylaminomethyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-3-(1,1,2-trimethylheptyl)-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-9-ethyl-3-(1-ethyl-2-methylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6-dimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-2-(1,2-dimethyldecyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 28

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran in procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6-dimethyl-6H-dibenzo[b,d]pyran.

When an equivalent amount of 3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 4 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, 2-aminomethyl-3-(1,2-dimethylheptyl)-9-ethyl-1-hydroxy-7,8,9,10-tetrahydro-6,6-dimethyl-6H-dibenzo[b,d]pyran is obtained.

EXAMPLE 29

Substitution of an equivalent amount of a resorcinol listed in Example 23 in the procedure of Example 9 for 5-(1,2-dimethylheptyl)resorcinol followed by treatment with ethyl magnesium bromide and subsequent cyclization gives the following 3-alkyl-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyrans:

6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran

6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-3-(1,1,2-trimethylheptyl)-6H-dibenzo[b,d]pyran

3-(1-ethyl-2-methylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran

6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-3-(1-methylheptyl)-6H-dibenzo[b,d]pyran

3-(1,2-dimethyldecyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran.

Reaction of a 3-alkyl-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran listed above with dimethylamine and paraformaldehyde as described in Example 1 gives the following 2-(N,N-dimethylaminomethyl) dibenzo[b,d]pyrans:

6,6-diethyl-2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-2-(N,N-dimethylaminomethyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-6,6-diethyl-hydroxy-7,8,9,10-tetrahydro-9-methyl-3-(1,1,2-trimethylheptyl)-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-(1-ethyl-2-methylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-3-(1-methylheptyl)-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-(1,2-dimethyldecyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran.

EXAMPLE 30

When an equivalent amount of 3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo-[b,d]pyran, 3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9.10-tetrahydro-9-methyl-2-(N-methylaminomethyl)-6H-dibenzo[b,d]pyran is obtained.

In like manner, substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran in the procedure of Example 4 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]-pyran gives 2-aminomethyl-3-(1,2-dimethylheptyl)-6,6-diethyl-1-hydroxy-7,8,9,10-tetrahydro-9-methyl-6H-dibenzo[b,d]pyran.

EXAMPLE 31

Substitution of an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed in Example 16 in the procedure of Example 7 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives the following aromatic dibenzo[b,d]pyrans:

1-hydroxy-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

1-hydroxy-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

3-(1-ethyl-2-methylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

1-hydroxy-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

3-(1,2-dimethyldecyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

When a 3-alkyl-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed above is substituted in the procedure of Example 1 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the following 2-(N,N-dimethylaminomethyl)dibenzo[b,d]pyrans are obtained:

2-(N,N-dimethylaminomethyl)1-hydroxy-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran

3-decyl-2-(N,N-dimethylaminomethyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-1-hydroxy-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-(1-ethyl-2-methylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-1-hydroxy-3-(1-methylheptyl)-6,6,9-trimethyl-6-H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-(1,2-dimethyldecyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 32

3-(1,2-Dimethylheptyl)-1-hydroxy-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is prepared by substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

Similarly, substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 4 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 2-aminomethyl-3-(1,2-dimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 33

When an equivalent amount of a 3-alkyl-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran listed in Example 16 is substituted in the procedure of Example 8 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, the following 6*a*,7,8,9,10,10*a*-hexahydro dibenzo[b,d]pyrans are obtained:

2-(N,N-dimethylaminomethyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]-pyran

3-decyl-2-(N,N-dimethylaminomethyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-3-(1,1,2-trimethylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-(1-ethyl-2-methylheptyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

2-(N,N-dimethylaminomethyl)-3-(1,2-dimethyldecyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 34

3-(1,2-Dimethylheptyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is prepared by substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 3 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

Similarly, substitution of an equivalent amount of 3-(1,2-dimethylheptyl-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 4 for 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 2-aminomethyl-3-(1,2-dimethylheptyl)-1-hydroxy-6*a*,7,8,9,10,10*a*-hexahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

EXAMPLE 35

1-Acetoxy-2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-6,6,9-trimethyl-7,8,9,10-tetrahydro-6H-dibenzo[b,d]pyran

A solution of 1.2 g. of 1-hydroxy-2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-6,6,9-trimethyl-7,8,9,10-tetrahydro-6H-dibenzo[b,d]pyran in 20 ml. of acetic anhydride containing 0.5 g. of sodium acetate is refluxed for five hours. The excess anhydride is evaporated in vacuo and the residue is dissolved in water and extracted with ether. The extract is washed with water until neutral, then dried and evaporated to give a residue, which is chromatographed on a silica gel dry-column to give the title compound.

EXAMPLE 36

By the procedure of Example 35, using propionic anhydride in place of acetic anhydride, the product is 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-6,6,9-trimethyl-1-propionyloxy-6H-dibenzo[b,d]pyran.

Similarly, using n-butyric anhydride, the product is 1-n-butyryloxy-2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

By the same procedure, using n-valeric anhydride, the product is 2-(N,N-dimethylaminomethyl)-3-(1,2-

dimethylheptyl)-7,8,9,10-tetrahydro-6,6,9-trimethyl-1-n-valeryloxy-6H-dibenzo[b,d]pyran.

EXAMPLE 37

When an equivalent amount of 2-(N,N-dimethylaminomethyl)-1-hydroxy-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is substituted in the procedure of Example 35 for 2-(N,N-dimethylaminomethyl)-3(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran, 1-acetoxy2-(N,N-dimethylaminomethyl)-7,8,9,10-tetrahydro-3-(1-methylheptyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran is obtained.

Similarly, the 1-propionyl, 1-n-butyryl and 1-n-valeryl derivatives may be prepared.

EXAMPLE 38

Substitution of an equivalent amount of 3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-2-(N-methyl-N-benzylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 35 for 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 1-acetoxy-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-2-(N-methyl-N-benzylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran which is hydrogenolyzed over palladium on carbon in glacial acetic acid to give 1-acetoxy-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

In a similar manner, 1-propionyloxy, 1-n-butyryloxy and 1-n-valeryloxy-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-2-(N-methylaminomethyl)-6,6,9-trimethyl 6H-dibenzo[b,d]pyran are prepared.

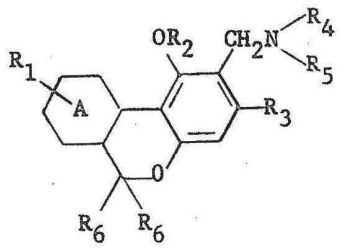
EXAMPLE 39

Substitution of an equivalent amount of 2-(N,N-dibenzylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran in the procedure of Example 35 for 2-(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran gives 1-acetoxy-2-(N,N-dibenzylaminomethyl)-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran which is hydrogenolyzed over palladium on carbon in glacial acetic acid to give 1-acetoxy-2-aminomethyl-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

In like manner, 1-propionyloxy, 1-n-butyryloxy and 1-n-valeryloxy-2-aminomethyl-3-(1,2-dimethylheptyl)-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran are prepared.

What is claimed is:

1. A compound of the formula:



in which:

ring A is a benzene ring, a cyclohexane ring or a cyclohexene ring with the double bond being at position 6*a*–10*a*, 8 or 9;

R_1 is hydrogen, methyl or ethyl;

R_2 is hydrogen or lower alkanoyl of from two to five carbon atoms;

R_3 is a saturated hydrocarbon chain optionally branched with from one to three alkyl groups, each group consisting of one or two carbon atoms, with R_3 containing a total of from five to twelve carbon atoms;

R_4 and R_5 are hydrogen or lower alkyl of from one to four carbon atoms or are joined together with the nitrogen atom to which they are attached to form a piperidine or a pyrrolidine ring; and

R_6 is methyl or ethyl.

2. A compound as claimed in claim 1 where ring A is a cyclohexene ring with the double bond at the 6*a*–10*a* position and R_4 and R_5 are lower alkyl of from one to four carbon atoms or are joined together with the nitrogen atom to which they are attached to form a piperidine or a pyrrolidine ring.

3. A compound as claimed in claim 2 where R_1 is methyl in the 9-position, R_2 is hydrogen or acetyl, R_3 is a saturated hydrocarbon chain optionally branched with from one to three methyl groups, with R_3 containing a total of from five to twelve carbon atoms and R_4, R_5 and R_6 are methyl.

4. A compound as claimed in claim 3 being the compound 2(N,N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10-tetrahydro-6,6,9-trimethyl-6H-dibenzo[b,d]pyran.

* * * * *

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,856,820 Dated December 24, 1974

Inventor(s) Bernard Loev

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 11, "6a, 7,8,10a-tetrahydro" should read -- 6a,7,10,10a-tetrahydro and 6a,7,8,10a-tetrahydro --.

Column 7, line 54, "200 g." should read -- 2.0 g. --.

Column 14, line 11, "tetrahydro16,6,7" should read -- tetrahydro-6,6,7 --.

Column 18, line 37, "6,6-diethyl-" should read -- 6,6-diethyl-1- --.

Column 19, line 68, "follow" should read -- following --.

Signed and sealed this 1st day of April 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
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Abstract

The compounds of this invention are 2-aminomethyl dibenzo(b, d)pyrans having pharmacological activity such as central nervous system activity. A preferred compound of this invention is 2-(N, N-dimethylaminomethyl)-3-(1,2-dimethylheptyl)-1-hydroxy-7,8,9,10tetrahydro -6,6,9-trimethyl-6H-dibenzo(b,d)pyran.

Classifications

C07C49/84 Ketones containing a keto group bound to a six-membered aromatic ring containing ether groups, groups, groups, or groups

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United States

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Inventor: B Loev

Current Assignee : SmithKline Beecham Corp

Worldwide applications

1973 · US

Application events

1973-07-18 • Application filed by SmithKline Corp

1973-07-18 • Priority to US38032673

1974-12-24 • Application granted

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