degrees, 9.8 degrees, 17.2 degrees and 19.4 degrees, wherein the X-ray powder diffraction diagram is obtained by using Cu Kα radiation (λ=1.54 Å),

Another aspect is Form-II crystal of compound A which shows diffraction peaks in the powder X-ray diffraction spectrum of compound A (hereinafter referred to as "Form-II crystal of the invention") at the following angles of diffraction 2θ: 9.0 degrees, 12.9 degrees, 20.7 degrees and 22.6 degrees, wherein the X-ray powder diffraction diagram is obtained by using Cu Kα radiation (λ=1.54 Å),

Another aspect of the present invention is Form-III crystal of compound A which shows diffraction peaks in the powder X-ray diffraction spectrum of compound A (hereinafter referred to as "Form-III crystal of the invention") at the following angles of diffraction 2θ: 9.3 degrees, 9.7 degrees, 16.8 degrees, 20.6 degrees and 23.5 degrees, wherein the X-ray powder diffraction diagram is obtained by using Cu Kα radiation (λ=1.54 Å)

Yet another aspect of the present invention is a pharmaceutical composition containing the crystal of one of the above three as the active ingredient (hereinafter referred to as "pharmaceutical composition of the invention").

When specifying an angle of diffraction 2 theta (2θ) for a peak in the invention embodiments and the claims, it should be understood that the value given is to be understood as an interval from said value minus 0.2° to said value plus 0.2°, and preferably from said value minus 0.1° to said value plus 0.1°.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. **1** shows a powder X-ray diffraction spectrum chart of Form-I crystal of the invention. The vertical axis indicates the peak intensity (cps), and the horizontal axis indicates the diffraction angle (2θ[°]).

FIG. **2** shows a powder X-ray diffraction spectrum chart of Form-II crystal of the invention. The vertical axis indicates the peak intensity (cps), and the horizontal axis indicates the diffraction angle (2θ[°]).

FIG. **3** shows a powder X-ray diffraction spectrum chart of Form-III crystal of the invention. The vertical axis indicates the peak intensity (cps), and the horizontal axis indicates the diffraction angle (2θ[°]).

FIG. **4** shows a scanning electron micrograph of Form-I crystal of the invention.

FIG. **5** shows a scanning electron micrograph of Form-II crystal of the invention.

FIG. **6** shows a scanning electron micrograph of Form-III crystal of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Form-I crystal of the invention is characterized in that it shows diffraction peaks at 9.4 degrees, 9.8 degrees, 17.2 degrees and 19.4 degrees in the powder X-ray diffraction spectrum of compound A.

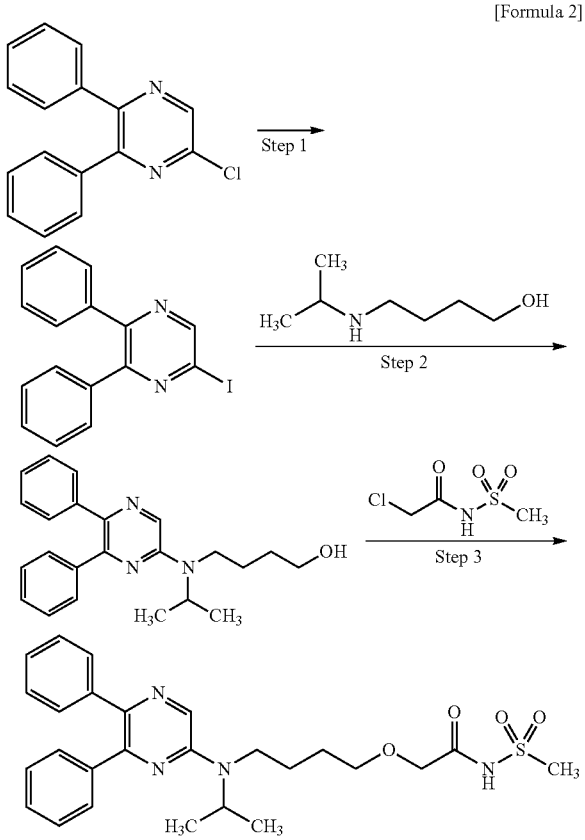
Form-II crystal of the invention is characterized in that it shows diffraction peaks at 9.0 degrees, 12.9 degrees, 20.7 degrees and 22.6 degrees in the powder X-ray diffraction spectrum of compound A.

Form-III crystal of the invention is characterized in that it shows diffraction peaks at 9.3 degrees, 9.7 degrees, 16.8 degrees, 20.6 degrees and 23.5 degrees in the powder X-ray diffraction spectrum of compound A.

A. Production of Compound A

Compound A can be produced, for example, according to the method described in WO '084, and, it can also be produced according to the production method mentioned below.

[Formula 2]



Step 1:

6-Iodo-2,3-diphenylpyrazine can be produced from 6-chloro-2,3-diphenylpyrazine by reacting it with sodium iodide. The reaction is carried out in the presence of an acid in an organic solvent (e.g., ethyl acetate, acetonitrile, acetone, methyl ethyl ketone, or their mixed solvent). The acid to be used is, for example, acetic acid, sulfuric acid, or their mixed acid. The amount of sodium iodide to be used is generally within a range of from 1 to 10 molar ratio relative to 6-chloro-2,3-diphenylpyrazine, preferably within a range of from 2 to 3 molar ratio. The reaction temperature varies depending on the kinds of the solvent and the acid to be used, but may be generally within a range of from 60° C. to 90° C. The reaction time varies depending on the kinds of the solvent and the acid to be used and on the reaction temperature, but may be generally within a range of from 9 hours to 15 hours.

Step 2:

5,6-Diphenyl-2-[4-hydroxybutyl(isopropyl)amino]pyrazine can be produced from 6-iodo-2,3-diphenylpyrazine by reacting it with 4-hydroxybutyl(isopropyl)amine. The reaction is carried out in the presence of a base in an organic solvent (e.g., sulfolane, N-methylpyrrolidone, N,N-dimethylimidazolidinone, dimethyl sulfoxide or their mixed solvent). The base to be used is, for example, sodium hydrogencarbonate, potassium hydrogencarbonate, potassium carbonate, sodium carbonate or their mixed base. The amount