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- (71) **Applicant: JUBILANT LIFE SCIENCES LIMITED**
[IN/IN]; Plot 1A, Sector 16A, Noida, UP 201 301 (IN).
- (72) **Inventors: DUBEY, Shailendr, Kumar;** c/o Jubilant Life Sciences Limited, D-12, Sector-59, Noida, Uttar Pradesh 201 301 (IN). **MISHRA, Himanchal;** c/o Jubilant Life Sciences Limited, D-12, Sector-59, Noida, Uttar Pradesh 201 301 (IN). **BANSAL, Deepak;** c/o Jubilant Life Sciences Limited, D-12, Sector-59, Noida, Uttar Pradesh 201 301 (IN). **CHOUDHARY, Alka Srivastava;** c/o Jubilant Life Sciences Limited, D-12, Sector-59, Noida, Uttar Pradesh 201 301 (IN). **VIR, Dharam;** c/o Jubilant Life Sciences Limited, C-26, Sector-59, Noida, Uttar Pradesh 201 301 (IN). **AGARWAL, Ashutosh;** c/o Jubilant Life Sciences Limited, C-26, Sector-59, Noida, Uttar Pradesh 201 301 (IN).
- (74) **Agent: NAIR, Manisha, Singh;** Lex Orbis, Intellectual Property Practice, 709/710, Tolstoy House, 15 - 17, Tolstoy Marg, New Delhi 110 001 (IN).

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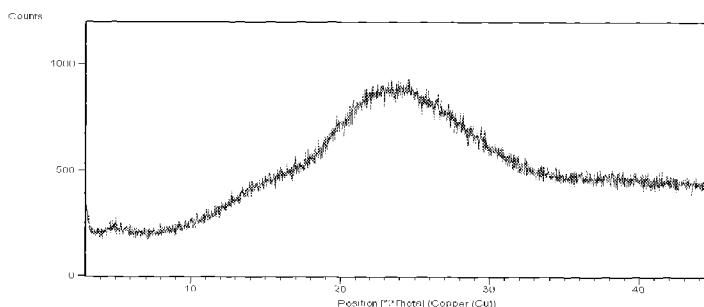
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(54) **Title:** SOLID STATE FORMS OF AZILSARTAN AND AZILSARTAN MEDOXOMIL MONOPOTASSIUM AND PREPARATION THEREOF

FIG. 1



(57) **Abstract:** The present invention relates to novel solid state forms of azilsartan and azilsartan medoxomil monopotassium salt i.e. amorphous and crystalline forms of azilsartan and azilsartan medoxomil monopotassium salt and processes for the preparation thereof. The present invention also relates to co-precipitate of azilsartan. Further, it relates to the pharmaceutical composition of amorphous and crystalline forms of azilsartan and azilsartan medoxomil monopotassium salt and its use.



Solid State Forms of Azilsartan and Azilsartan Medoxomil

Monopotassium And Preparation Thereof

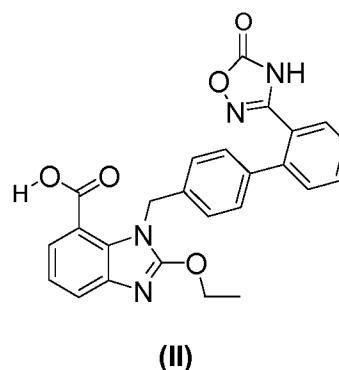
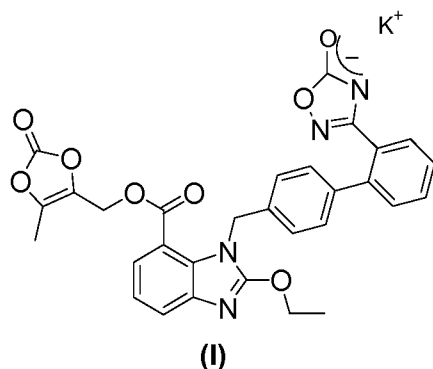
Field of the Invention

The present invention relates to novel solid state forms of azilsartan and
5 azilsartan medoxomil monopotassium salt i.e. amorphous and crystalline forms of
azilsartan and azilsartan medoxomil monopotassium salt and processes for the
preparation thereof. The present invention also relates to co-precipitate of azilsartan.
Further, it relates to the pharmaceutical composition of amorphous and crystalline
forms of azilsartan and azilsartan medoxomil monopotassium salt and its use.

10

Background of the Invention

Azilsartan kamedoxomil i.e. (5-methyl-2-oxo-1,3-dioxol-4-yl)methyl-2-
ethoxy-1-([2'-(5-oxo-4,5-dihydro-1,2,4-oxadiazol-3-yl)biphenyl-4-yl]methyl)-1H-
benzimidazole-7-carboxylate monopotassium salt (I) has been approved in US under
the trade name EDARBI® and is used for the treatment of circulatory diseases such as
15 hypertension. Azilsartan kamedoxomil is the prodrug of 2-ethoxy-1-([2'-(5-oxo-4,5-
dihydro-1,2,4-oxadiazol-3-yl)biphenyl-4-yl]methyl)-1H-benzimidazole-7-carboxylic
acid (II). Azilsartan free base i.e. 2-ethoxy-1-([2'-(5-oxo-4,5-dihydro-1,2,4-oxadiazol-
3-yl)biphenyl-4-yl]methyl)-1H-benzimidazole-7-carboxylic acid has been approved in
Japan under the trade name AZILVA® for the treatment of circulatory diseases such
20 as hypertension.



It is disclosed in US 7,157,584 that azilsartan medoxomil and salts thereof such as monopotassium salt are benzimidazole derivative useful as an angiotensin II receptor antagonist.

Pharmaceutical Research, (2008), 25, 530, explains that the ability to deliver
5 the drug to the patient in a safe, efficacious and cost effective way depends largely upon the physicochemical properties of the APIs in the solid state and accordingly one of the challenging tasks in the pharmaceutical industry is to design pharmaceutical materials with specific physicochemical properties. It is known that different solid state forms of biologically active compounds may have different
10 absorption profile *in vivo* and consequently different pharmacokinetic profile. It is known in the art that the amorphous forms of APIs generally exhibit the better solubility profile over the corresponding crystalline forms. This is because the lattice energy does not have to be overcome in order to dissolve the solid state structure as in the case for crystalline forms.

15 According to *Journal of Chemical Communications* (2004), 1889, in the past few years, the formation of pharmaceutical co-crystals has gained an increased interest as a means of optimizing the physicochemical properties of solid dosage forms. Apart from potential improvement in solubility, pharmaceutical co-crystals frequently enhance other essential properties of APIs such as hygroscopicity, chemical stability,
20 compressibility and flowability. *Crystal growth design*, (2009), 9, 2950, explains that in co-crystals the physicochemical properties get altered without compromising the structural integrity of the API. The co-crystals are held together by freely reversible non covalent interactions. For example as described in *Crystal Growth and Design*, (2003), 3 (6), 909, carbamazepine has limited bioavailability because of low solubility
25 in water but when combined with any of the water soluble vitamins in the form of co-crystals it gets easily dissolved in water.

Thus, there is a need to develop the novel solid state forms of pharmaceutically active compound, having better physicochemical properties. Especially, for the enhancement of the solubility, amorphous form is preferred. Also,
30 there is a constant need to have the cost effective, industrial friendly process for the preparation of the solid state forms.

Description of the drawings

- FIG. 1 depicts a powder X-ray diffractogram of amorphous form of azilsartan medoxomil monopotassium salt.
- FIG. 2 represents IR spectrum of amorphous form of azilsartan medoxomil monopotassium salt.
- FIG. 3 Thermogravimetric analysis (TGA) of amorphous form of azilsartan medoxomil monopotassium salt.
- FIG. 4 depicts a powder X-ray diffractogram of crystalline form **Ji** of azilsartan medoxomil monopotassium salt.
- 10 FIG. 5 represents IR spectrum of crystalline form **Ji** of azilsartan medoxomil monopotassium salt.
- FIG. 6 Thermogravimetric analyses (TGA) of crystalline form **Ji** of azilsartan medoxomil monopotassium salt.
- FIG. 7 Differential scanning calorimetry (DSC) heating trace of crystalline form **Ji** of azilsartan medoxomil monopotassium salt.
- 15 FIG. 8 depicts a powder X-ray diffractogram of amorphous form of azilsartan.
- FIG. 9 depicts IR spectrum of amorphous form of azilsartan.
- FIG. 10 depicts Differential scanning calorimetry (DSC) heating trace of amorphous form of azilsartan.
- 20 FIG. 11 depicts a powder X-ray diffractogram of crystalline form **Ji** of azilsartan.
- FIG. 12 depicts Differential scanning calorimetry (DSC) heating trace of crystalline form **Ji** of azilsartan.
- FIG. 13 depicts a powder X-ray diffractogram of crystalline form of co-precipitate of azilsartan with caffeine.
- 25 FIG. 14 depicts IR spectrum of crystalline form of co-precipitate of azilsartan with caffeine.
- FIG. 15 depicts Differential scanning calorimetry (DSC) heating trace of crystalline form of co-precipitate of azilsartan with caffeine.
- FIG. 16 depicts a powder X-ray diffractogram of crystalline form **J₂** of azilsartan.
- 30 FIG. 17 depicts IR spectrum of crystalline form **J₂** of azilsartan.
- FIG. 18 depicts Differential scanning calorimetry (DSC) heating trace of crystalline form **J₂** of azilsartan.

FIG. 19 depicts Thermogravimetric analyses (TGA) of crystalline form J₂ of azilsartan.

FIG. 20 depicts a powder X-ray diffractogram of crystalline form J₂ of azilsartan as per synthetic example 13.

5

Description of the Invention

The principal embodiment of the present invention provides the details of azilsartan or azilsartan medoxomil monopotassium salt in the solid state *viz.* the novel solid state form i.e. amorphous and crystalline forms of azilsartan or monopotassium salt of azilsartan medoxomil.

10 In another embodiment of the present invention, amorphous form of monopotassium salt of azilsartan medoxomil is disclosed.

In another embodiment of the present invention the process for the preparation of the amorphous form of monopotassium salt of azilsartan medoxomil is disclosed. The process comprises of dissolving azilsartan medoxomil monopotassium salt in one
15 or more solvents; and recovering the azilsartan medoxomil monopotassium salt in the amorphous form by the removal of solvent through convenient methods. Azilsartan medoxomil monopotassium salt can be prepared from any prior art processes such as known in US 7,157,584 or the improvements thereof.

20 In another embodiment of the present invention, amorphous form of azilsartan is disclosed.

In another embodiment of the present invention the process for the preparation of the amorphous form of azilsartan is disclosed. The process comprises of dissolving azilsartan in one or more solvents; and recovering the azilsartan in the amorphous form by the removal of solvent through convenient methods. Azilsartan can be
25 prepared from any prior art processes such as known in US 5,243,054 or the improvements thereof.

In another embodiment of the present invention, crystalline form J_i of monopotassium salt of azilsartan medoxomil is disclosed.

30 In another embodiment of the present invention, the process for the preparation of the crystalline form J_i of monopotassium salt of azilsartan medoxomil is disclosed. The process comprises of dissolving azilsartan medoxomil

monopotassium salt in one or more solvents; and recovering the azilsartan medoxomil monopotassium salt in the crystalline form by the removal of solvent through convenient methods.

5 In another embodiment of the present invention, crystalline form **J_i** of azilsartan is disclosed.

In another embodiment of the present invention, the process for the preparation of the crystalline form **J_i** of azilsartan is disclosed. The process comprises the steps of i) providing a solution of azilsartan in water; ii) removal of water through convenient methods and iii) recovering the crystalline form **J_i** of azilsartan.

10 In another embodiment of the present invention, crystalline form **J₂** of azilsartan is disclosed.

In another embodiment of the present invention, the process for the preparation of the crystalline form **J₂** of azilsartan is disclosed. The process comprises the steps of i) providing a solution of azilsartan in an organic solvent or mixture thereof, or mixture of organic solvent and water; ii) removal of solvent(s) through convenient methods and iii) recovering the crystalline form **J₂** of azilsartan.

The solvents are selected from the group comprising of ketones, esters, alcohols, nitriles, amides, dialkylsulfoxides, mixture of alcohols and chlorinated solvents, ethers or the mixtures thereof. Ketones are selected from the group comprising of acetone, methyl ethyl ketone, methyl isobutyl ketone etc. Esters are selected from the group comprising of ethyl acetate, propyl acetate and the like. Alcohols are selected from the group comprising of methanol, ethanol, n-propanol, isopropanol, n-butanol and the like. Nitriles are selected from the group comprising of acetonitrile, propionitrile, butyronitrile, valeronitrile and the like. Amides can be selected from the group comprising of dimethylformamide, dimethylacetamide, N-methylformamide and the like. Dialkyl sulfoxides can be selected from the group comprising of dimethylsulfoxide, diethylsulfoxide, dibutylsulfoxide and the like. Chlorinated solvents are selected from the group comprising of dichloromethane, chloroform, dichloroethane, chlorobenzene and the like.

30 The method for removal the solvent, to obtain the amorphous form of azilsartan or azilsartan medoxomil monopotassium salt, can be selected from the processes comprising of evaporation, distillation, distillation under vacuum, spray

drying, roller drying, freeze drying i.e. lyophilization, thin film drying and the like. The method for removal the solvent to obtain the crystalline form of azilsartan or azilsartan medoxomil monopotassium salt can be selected from the processes comprising of evaporation, distillation, distillation under vacuum and the like.

5 In another embodiment the azilsartan or azilsartan medoxomil monopotassium salt is milled by grinding action between two surfaces till the time we get amorphous azilsartan or azilsartan medoxomil monopotassium salt essentially free of any crystallinity. Such milling can be carried out by using a traditional technique of compounding using a pestle and mortar or by milling machines that essentially work
10 on the same principle. Examples of such milling machines can be selected from the group comprising of ball mills, roller mills, jet mills, gyratory mills, and the like.

 In further embodiment the amorphous form of azilsartan or azilsartan medoxomil monopotassium salt is obtained through solvent precipitation by using polar-nonpolar solvents. The polar solvent is selected from the group consisting of
15 ketones, esters, alcohols, nitriles, amides, dialkylsulfoxides, mixture of alcohols and chlorinated solvents, or the mixtures thereof. Ketones are selected from the group comprising of acetone, methyl ethyl ketone, methyl isobutyl ketone, diethyl ketone etc. Esters are selected from the group comprising of ethyl acetate, propyl acetate and the like. Alcohols are selected from the group comprising of methanol, ethanol, n-
20 propanol, isopropanol, n-butanol and the like. Nitriles are selected from the group comprising of acetonitrile, propionitrile, butyronitrile, valeronitrile and the like. Amides can be selected from the group comprising of dimethylformamide, dimethylacetamide, N-methylformamide and the like. Dialkyl sulfoxides can be selected from the group comprising of dimethylsulfoxide, diethylsulfoxide,
25 dibutylsulfoxide and the like. Chlorinated solvents are selected from the group comprising of dichloromethane, chloroform, dichloroethane, chlorobenzene and the like. The non polar solvent can be selected from the group comprising of alkanes or cycloalkanes such as pentane, hexane, heptane, cyclohexane, cyclopentane, toluene, xylene and the like.

30 In another embodiment the invention provides co-crystal form of azilsartan. Two different components are required for the preparation of co-crystal form. First component is azilsartan whereas the second component is selected from caffeine,

water soluble vitamins, cyclodextrins, amino acids, citric acid, salicylic acid, oxalic acid, saccharin and the like.

In an another embodiment the azilsartan particles have d_{90} less than 200 μm , d_{50} less than 100 μm and d_{10} less than 50 μm preferably, d_{90} less than 150 μm , d_{50} less than 70 μm and d_{10} less than 25 μm .

In an another embodiment the azilsartan medoxomil monopotassium salt particles have $d_{0.9}$ less than 200 μm , $d_{0.5}$ less than 100 μm and $d_{0.1}$ less than 50 μm preferably, $d_{0.9}$ less than 150 μm , $d_{0.5}$ less than 70 μm and $d_{0.1}$ less than 25 μm .

In another aspect there is provided a pharmaceutical composition that includes a therapeutically effective amount of novel amorphous form of azilsartan or azilsartan medoxomil monopotassium salt; and one or more pharmaceutically acceptable carriers, excipients or diluents.

In yet another aspect there is provided a use of a pharmaceutical composition that includes a therapeutically effective amount of novel amorphous form of azilsartan or azilsartan medoxomil monopotassium salt; and one or more pharmaceutically acceptable carriers, excipients or diluents.

In another aspect there is provided a pharmaceutical composition that includes a therapeutically effective amount of crystalline form of azilsartan or azilsartan medoxomil monopotassium salt; and one or more pharmaceutically acceptable carriers, excipients or diluents.

In yet another aspect there is provided a use of a pharmaceutical composition that includes a therapeutically effective amount of crystalline form of azilsartan or azilsartan medoxomil monopotassium salt; and one or more pharmaceutically acceptable carriers, excipients or diluents

Although the examples are directed to amorphous and crystalline forms of azilsartan or azilsartan medoxomil monopotassium salt, the principles described in the example can be applied to other salts / hydrates / solvates of azilsartan or azilsartan medoxomil monopotassium salt. The details of one or more embodiments of the inventions are set forth in the description below. Other features, objects and advantages of the inventions will be apparent from the description.

Examples

Example 1

Preparation of amorphous form of azilsartan medoxomil monopotassium salt.

5 Azilsartan medoxomil potassium salt (1 gm) was dissolved in methanol (20 ml) at about 20-25°C and the solvent was evaporated under vacuum to obtain amorphous form of azilsartan medoxomil monopotassium salt. (Yield: 0.9 gm); XRD as provided in Fig. 1.

Example 2

Preparation of amorphous form of azilsartan medoxomil monopotassium salt.

10 Azilsartan medoxomil potassium salt (1 gm) was dissolved in methanol (20 ml) and dichloromethane (10 ml) at 20-25°C and the solvent was evaporated under vacuum to obtain amorphous form of azilsartan medoxomil monopotassium salt. (Yield: 0.9 gm).

Example 3

Preparation of amorphous form of azilsartan medoxomil monopotassium salt.

15 Azilsartan medoxomil potassium salt (1 gm) was dissolved in acetonitrile (250 ml) at 20-25°C and the resulting clear solution was taken in crystalline dish. Full evaporation of acetonitrile solvent was achieved at 20-25°C by leaving it open. (Yield: 0.3 gm)

Example 4

Preparation of amorphous form of azilsartan medoxomil monopotassium salt.

20 Azilsartan medoxomil potassium salt (5 gm) was dissolved in methanol (150 ml) at 20-25°C to obtain the clear solution. The resulting solution was spray dried to obtain amorphous of azilsartan medoxomil monopotassium salt (Yield: 0.5 gm).

Example 5

Preparation of amorphous form of azilsartan medoxomil monopotassium salt.

25 Azilsartan medoxomil potassium salt (5 gm) was dissolved in dimethylformamide (150 ml). The resulting solution was spray dried to obtain amorphous of azilsartan medoxomil monopotassium salt (Yield: 0.5 gm).

30

Example 6**Preparation of crystalline form J₁ of azilsartan medoxomil monopotassium salt.**

Azilsartan medoxomil potassium salt (1.1 gm) was dissolved in acetone (20 ml) at 50°C. The resulting solution was cooled to 0-5°C and solution of potassium 2-ethyl hexanoate (0.34gm) in acetone (4 ml) was added drop wise. The crystals were filtered and dried to obtain the title compound. (Yield: 0.6 g)

Example 7**Preparation of amorphous form of azilsartan.**

Azilsartan (5 gm) was dissolved in acetone (600 ml) at 25-30°C to obtain the clear solution. The resulting solution was spray dried to obtain amorphous azilsartan (Yield: 1.0 gm) d₁₀ 4.9 μm; d₅₀ 15.1 μm and d₉₀ 42.6 μm

Example 8**Preparation of amorphous form of azilsartan.**

Azilsartan (5 gm) was dissolved in methanol (50 ml) and DCM (200ml) at 25-30°C to obtain the clear solution. The resulting solution was spray dried to obtain amorphous azilsartan (Yield: 0.6 gm) d₁₀ 5.1 μm; d₅₀ 15.1 μm and d₉₀ 43.1 μm

Example 9**Preparation of amorphous form of azilsartan.**

Azilsartan (1 gm) and citric acid (0.23gm) was dissolved in methanol (5 ml) and DCM (10ml) at 25-30°C to obtain the clear solution. The resulting solution was evaporated under vacuum at 30-35°C to obtain amorphous azilsartan. (Yield: 0.6 gm)

Example 10**Preparation of crystalline form Ji of azilsartan.**

To a solution of methyl 2-ethoxy-1-((2'-(5-oxo-4, 5-dihydro-1, 2,4-oxadiazol-3-yl)-[1,1'-biphenyl]-4-yl)methyl)-1H-benzo[d]imidazole-7-carboxylate (80 g) in 0.4N NaOH(1280ml) at 20-25°C. Reaction mass was stirred for 3-4 hrs at 40-45°C followed by cooling to 15-20°C. pH of the resulting solution was adjusted to 2.0-3.0 by 2N HCl followed by stirring and filtration. Product was dried. (Yield: 72.80 gm) d₁₀ 6.1 μm d₅₀ 34.3 μm and d₉₀ 116.4 μm.

Example 11**Preparation of crystalline form of co-precipitate of azilsartan with caffeine.**

Azilsartan (1 gm) and caffeine (0.214gm) was dissolved in methanol (5 ml) and DCM (10ml) at 25-30°C to obtain the clear solution. The resulting solution was
5 evaporated under vacuum at 30-35°C to obtained crystalline azilsartan. (Yield: 0.6 gm)

Example 12**Preparation of crystalline form J₂ of azilsartan.**

Methyl 2-ethoxy-1-((2'-(5-oxo-4, 5-dihydro-1, 2,4-oxadiazol-3-yl)-[1,1'-
10 biphenyl]-4-yl)methyl)-1H-benzo[d]imidazole-7-carboxylate (600 mg) was dissolved in methanol (43.6 ml) to which was added a 2N aqueous solution of LiOH (3.6 ml) followed by heating for 3 hrs under reflux. The reaction was adjusted to pH 3 with 2N HCl, and then solvent was evaporated to dryness. The residue was partitioned between water (72.7ml) and chloroform (182 ml), and then the organic layer was
15 washed with water and dried. The solvent was evaporated to dryness, and the crystalline product was crystallized from ethyl acetate. (Yield: 500 mg) d_{10} 6.0 $\mu\eta$; d_{50} 24.6 $\mu\eta$ and d_{90} 86.8 $\mu\eta$

Example 13**Preparation of crystalline form J₂ of azilsartan.**

Methyl 2-ethoxy-1-((2'-(5-oxo-4, 5-dihydro-1, 2,4-oxadiazol-3-yl)-[1,1'-
20 biphenyl]-4-yl)methyl)-1H-benzo[d]imidazole-7-carboxylate (600 mg) was dissolved in methanol (43.6 ml) to which was added a 2N aqueous solution of LiOH (3.6 ml) followed by heating for 3 hrs under reflux. The reaction was adjusted to pH 3 with 2N HCl, and then solvent was evaporated to dryness. The residue was partitioned
25 between water (72 ml) and chloroform (182 ml), and then the organic layer was washed with water and dried. The solvent was evaporated to dryness.

We Claim:-

- I. An amorphous azilsartan medoxomil monopotassium salt.
- 5 2. An amorphous azilsartan medoxomil monopotassium salt according to claim 1, having an X-ray powder diffraction pattern in accordance with FIG. 1.
3. An amorphous azilsartan medoxomil monopotassium salt according to claim 1, having an IR spectrum in accordance with FIG. 2.
4. An amorphous azilsartan medoxomil monopotassium salt according to claim 10 1, having thermo-gravimetric analysis (TGA) in accordance with FIG. 3.
5. A process for preparing amorphous azilsartan medoxomil monopotassium salt comprising the steps of:
 - (i) providing a solution of azilsartan medoxomil monopotassium salt in a solvent
 - 15 (ii) removing solvent; and
 - (iii) isolating amorphous azilsartan medoxomil monopotassium salt.
6. Crystalline form **Ji** of azilsartan medoxomil monopotassium salt.
7. Crystalline form **Ji** of azilsartan medoxomil monopotassium salt according to claim 6, having an X-ray powder diffraction pattern in accordance with FIG. 20 4.
8. Crystalline form **Ji** of azilsartan medoxomil monopotassium salt according to claim 6, having an IR spectrum in accordance with FIG.5.
9. Crystalline form **Ji** of azilsartan medoxomil monopotassium salt according to claim 6, having thermo-gravimetric analysis (TGA) in accordance with FIG. 6.
- 25 10. Crystalline form **Ji** of azilsartan medoxomil monopotassium salt according to claim 6, having differential scanning calorimetry (DSC) in accordance with FIG. 7.
- II. A process for preparing crystalline form **Ji** of azilsartan medoxomil monopotassium salt comprising the steps of:
 - 30 (i) providing a solution of azilsartan medoxomil monopotassium salt in a solvent
 - (ii) removing solvent; and

- (iii) isolating crystalline azilsartan medoxomil monopotassium salt
12. An amorphous azilsartan.
13. Amorphous azilsartan according to claim 12, having an X-ray powder diffraction pattern in accordance with FIG. 8.
- 5 14. Amorphous azilsartan according to claim 12, having infrared spectrum (IR) in accordance with FIG. 9.
15. Amorphous azilsartan according to claim 12, having differential scanning calorimetry (DSC) in accordance with FIG. 10.
16. A process for preparing amorphous azilsartan comprising the steps of:
- 10 (i) providing a solution of azilsartan in a solvent
- (ii) removing solvent; and
- (iii) isolating amorphous azilsartan.
17. Crystalline form **J_i** of azilsartan.
18. Crystalline form **J_i** of azilsartan according to claim 17, having an X-ray powder diffraction pattern in accordance with FIG. 11.
- 15 19. Crystalline form **J_i** of azilsartan according to claim 17, having differential scanning calorimetry (DSC) in accordance with FIG. 12.
20. A process for preparing crystalline form **J_i** of azilsartan comprising the steps of:
- 20 (i) providing a solution of azilsartan in water
- (ii) removing water; and
- (iii) recovering crystalline form **J_i** of azilsartan.
21. Co-precipitate of azilsartan.
22. Co-precipitate of azilsartan according to claim 21, which is in crystalline form.
- 25 23. Co-precipitate of azilsartan according to claim 21, wherein one of the component for co-precipitate formation is selected from the group comprising of water soluble vitamins, cyclodextrins, caffeine, amino acids, citric acid, salicylic acid, oxalic acid, saccharin and the like.
24. The component for formation of co-precipitate of azilsartan according to claim
- 30 23, is caffeine.

25. Crystalline form of co-precipitate of azilsartan with caffeine according to claim 24, having an X-ray powder diffraction pattern in accordance with FIG. 13.
26. Crystalline form of co-precipitate of azilsartan with caffeine according to claim 24, having infrared spectrum (IR) in accordance with FIG. 14.
27. Crystalline form of co-precipitate of azilsartan with caffeine according to claim 24, having differential scanning calorimetry (DSC) in accordance with FIG. 15.
28. A process for preparing crystalline form of co-precipitate of azilsartan comprising the steps of:
- (i) providing a solution of azilsartan in a solvent
 - (ii) adding caffeine;
 - (iii) removing solvent; and
 - (iv) recovering crystalline form of co-precipitate of azilsartan.
29. Crystalline form J₂ of azilsartan.
30. Crystalline form J₂ of azilsartan according to claim 29, having an X-ray powder diffraction pattern in accordance with FIG. 16.
31. Crystalline form J₂ of azilsartan according to claim 29, having infrared spectrum (IR) in accordance with FIG. 17.
32. Crystalline form J₂ of azilsartan according to claim 29, having differential scanning calorimetry (DSC) in accordance with FIG. 18.
33. Crystalline form J₂ of azilsartan according to claim 29, having thermogravimetric analysis (TGA) in accordance with FIG. 19.
34. A process for preparing crystalline form J₂ of azilsartan comprising the steps of:
- (i) providing a solution of azilsartan in an organic solvent or mixture thereof, or mixture of organic solvent and water;
 - (ii) removal of solvent; and
 - (iii) recovering crystalline form J₂ of azilsartan
35. The process according to any of the preceding claims, wherein the solvent is selected from the group comprising of ketones, esters, alcohols,

nitriles, amides, dialkylsulfoxides, chlorinated solvents, ethers, or the mixtures thereof.

36. The process according to claim 35, wherein ketone solvent is selected from the group comprising acetone, methyl ethyl ketone, methyl isobutyl ketone and the like; ester solvent is selected from the group comprising of ethyl acetate, propyl acetate and the like; alcohol solvent is selected from the group comprising of methanol, ethanol, n-propanol, isopropanol, n-butanol and the like; nitrile solvent is selected from the group comprising of acetonitrile, propionitrile, butyronitrile, valeronitrile and the like; amide solvent is selected from the group comprising of dimethylformamide, dimethylacetamide, N-methylformamide and the like; dialkylsulfoxide solvent is selected from the group comprising of dimethylsulfoxide, diethylsulfoxide, dibutylsulfoxide and the like, chlorinated solvent solvent is selected from the group comprising of dichloromethane, chloroform, dichloroethane, chlorobenzene and the like; ether solvent is selected from the group comprising of tetrahydrofuran, dioxan, 1,2-dimethoxyethane, diethyl ether and the like; or the mixtures thereof.
37. The process according to any of the preceeding claims, wherein the removal of solvent is selected from the method comprising of spray drying, distillation under vacuum, freeze drying and roller drying.
38. Azilsartan having particle size distribution wherein, d_{90} less than 200 μm , d_{50} less than 100 μm and d_{10} less than 50 μm .
39. Azilsartan having a median particle size of less than 100 μm .
40. Azilsartan medoxomil monopotassium salt having particle size distribution wherein, $d_{0.9}$ less than 200 μm , $d_{0.5}$ less than 100 μm and $d_{0.1}$ less than 50 μm .
41. Azilsartan medoxomil monopotassium salt having a median particle size of less than 100 μm .
42. A pharmaceutical composition comprising amorphous form of azilsartan or azilsartan medoxomil monopotassium salt, or a pharmaceutically acceptable salt thereof prepared by process of present invention and a pharmaceutically acceptable carrier.

43. A pharmaceutical composition comprising crystalline form of azilsartan or azilsartan medoxomil monopotassium salt, or a pharmaceutically acceptable salt thereof prepared by process of present invention and a pharmaceutically acceptable carrier.

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FIG. 1

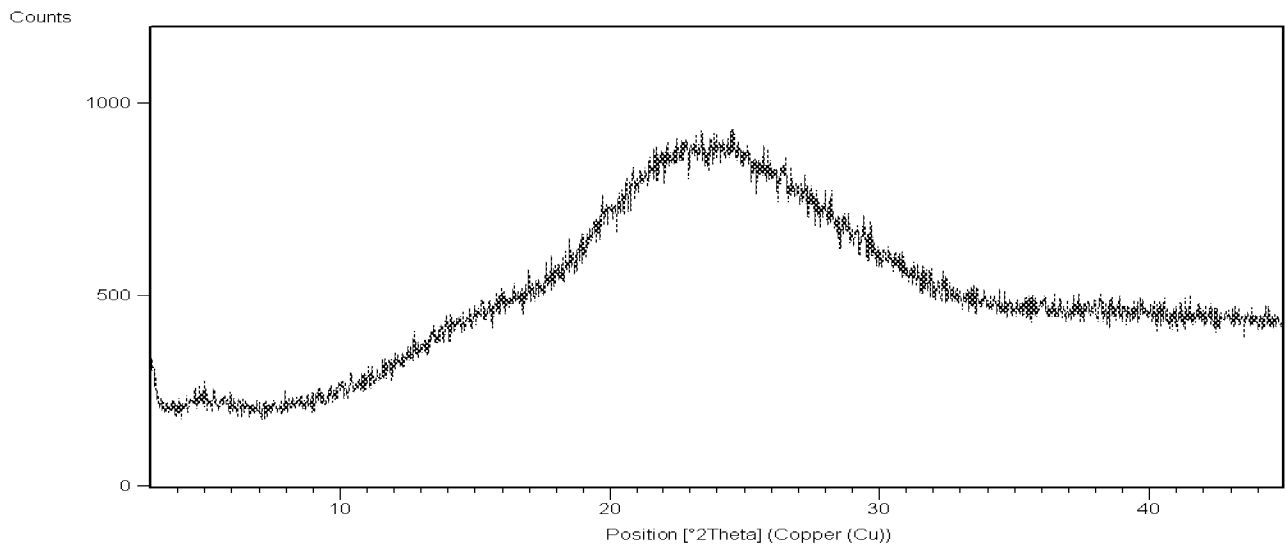


FIG. 2

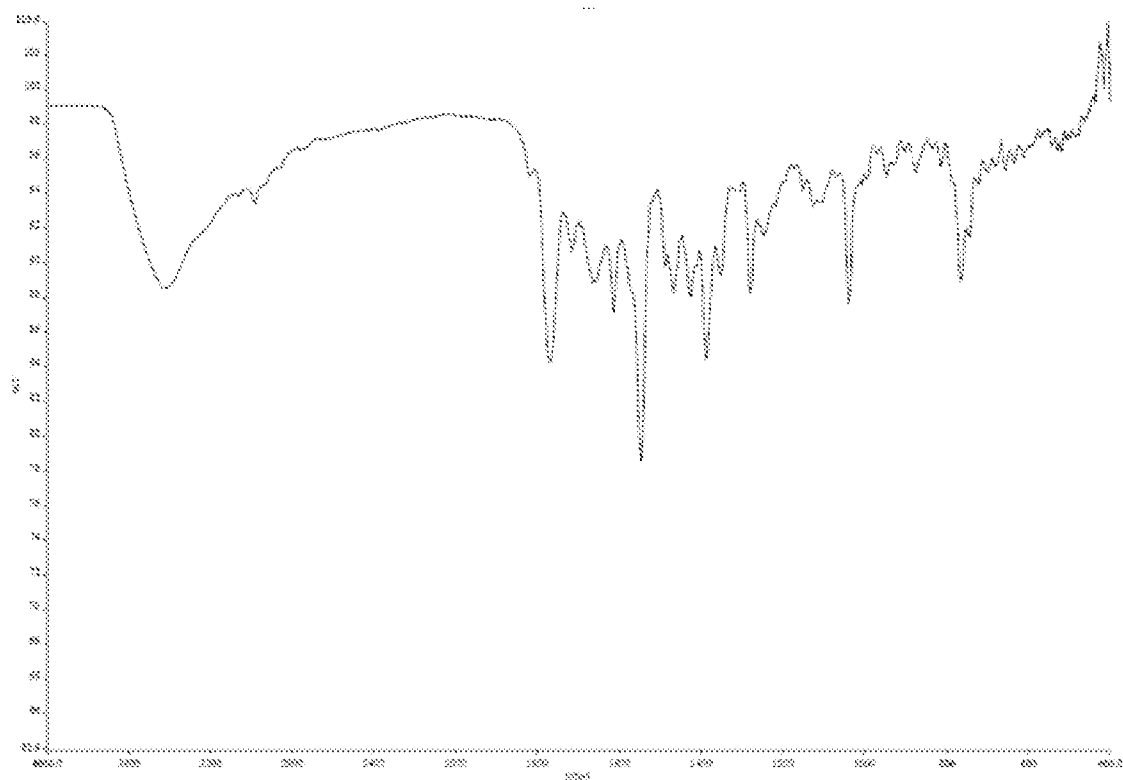


FIG. 3

TGA

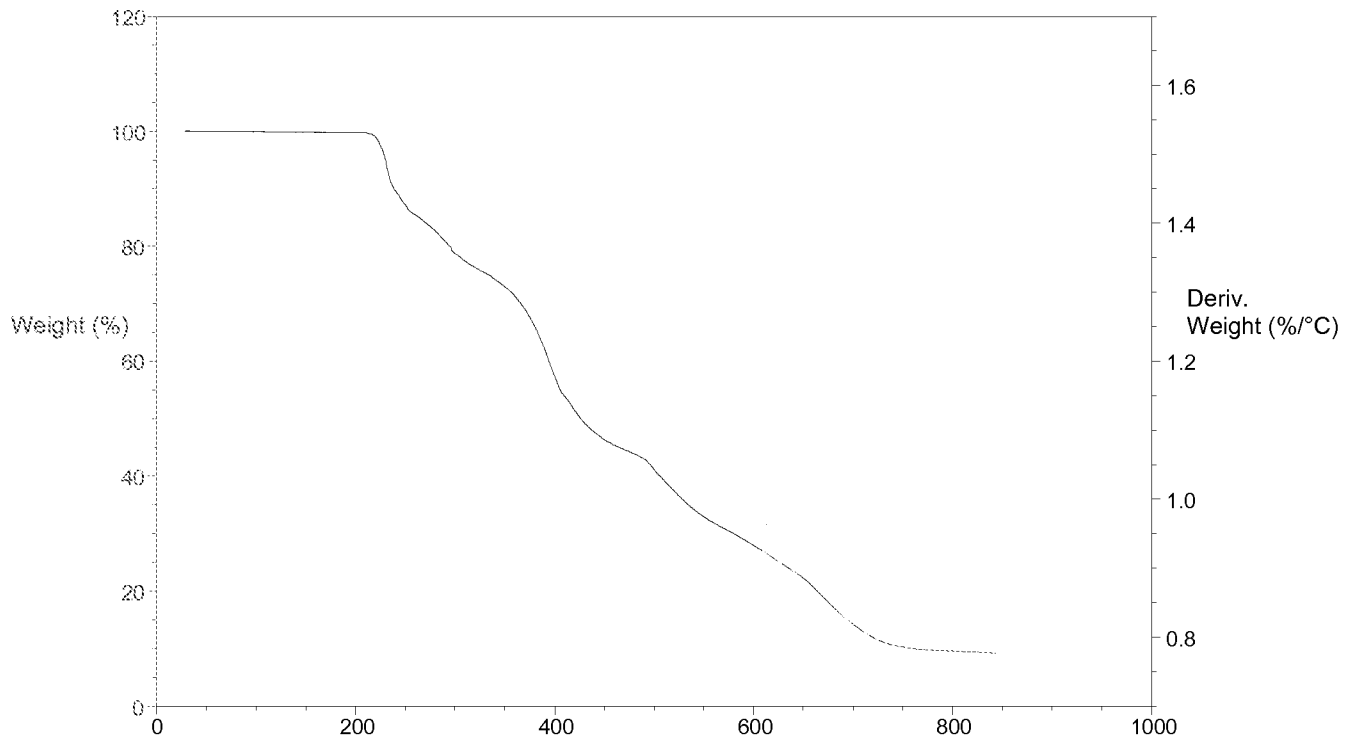


FIG. 4

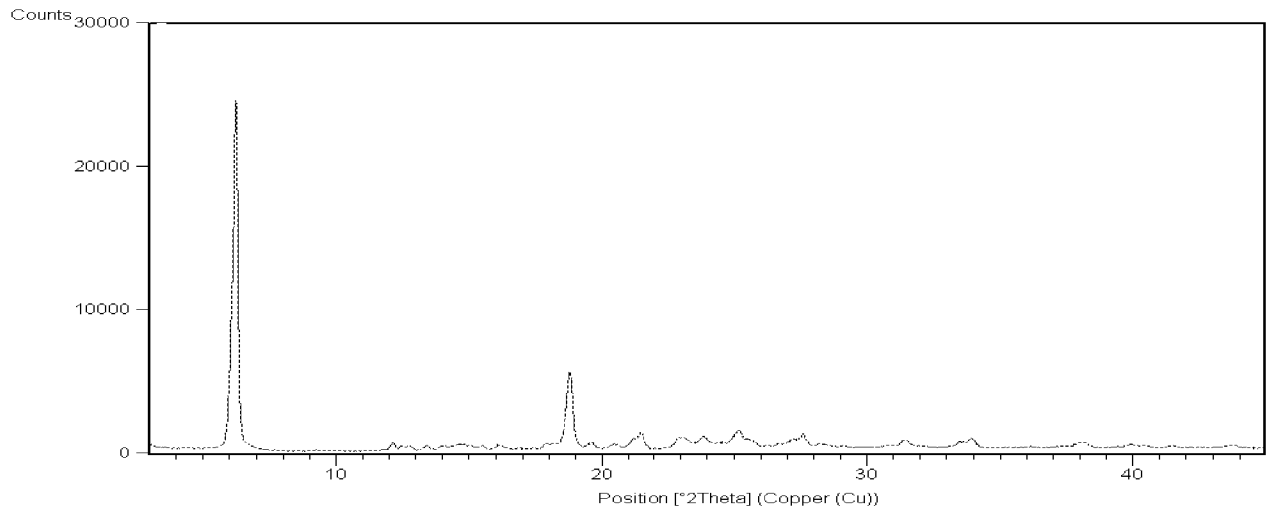


FIG. 5

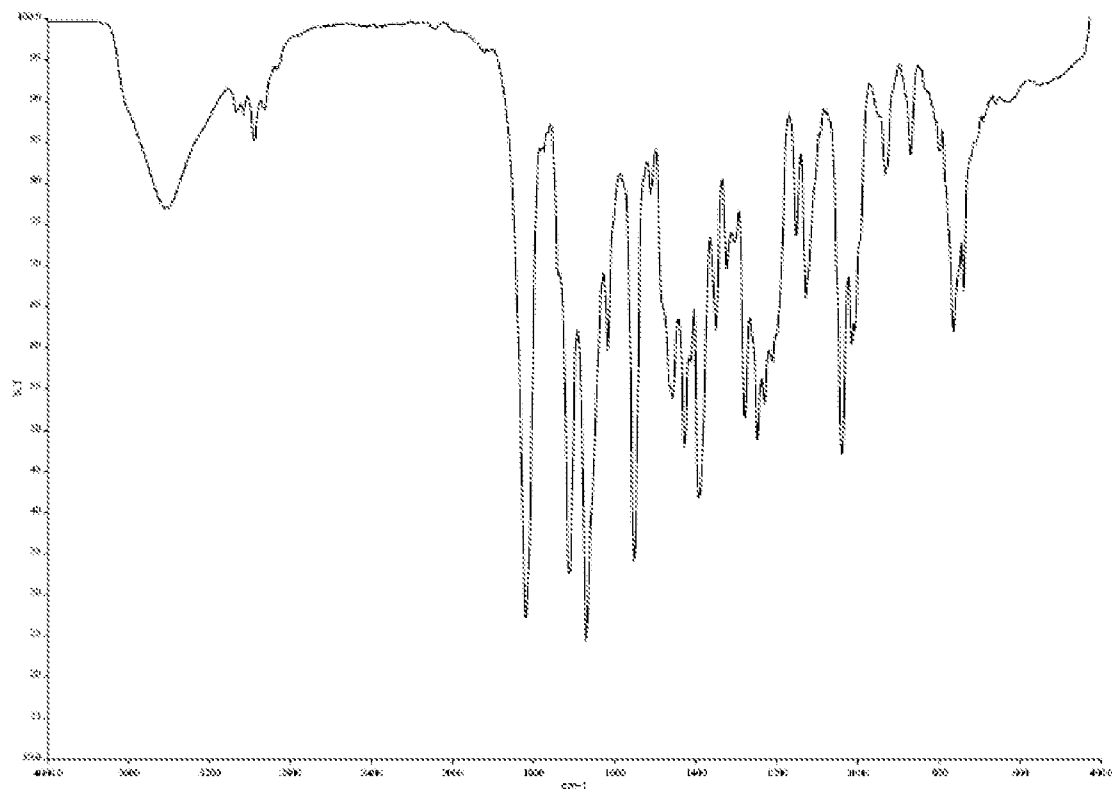


FIG. 6

TGA

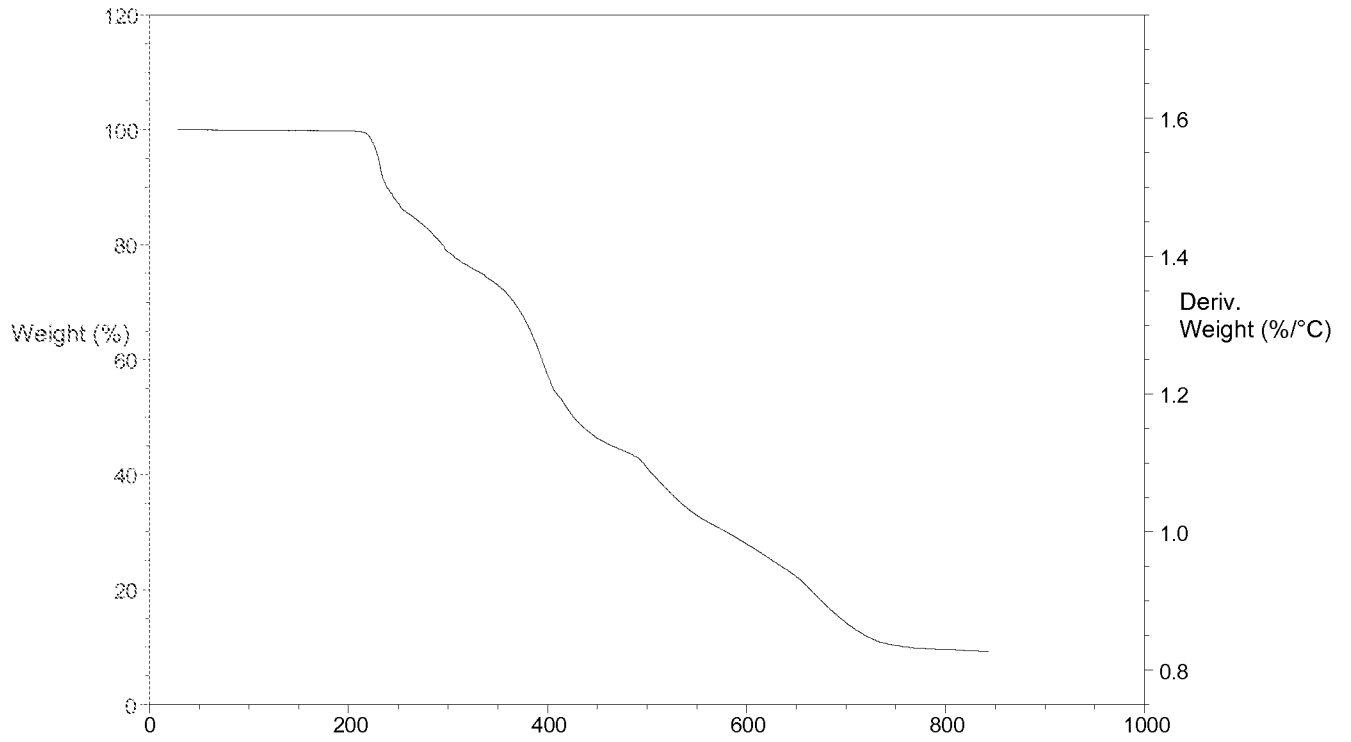


FIG. 7

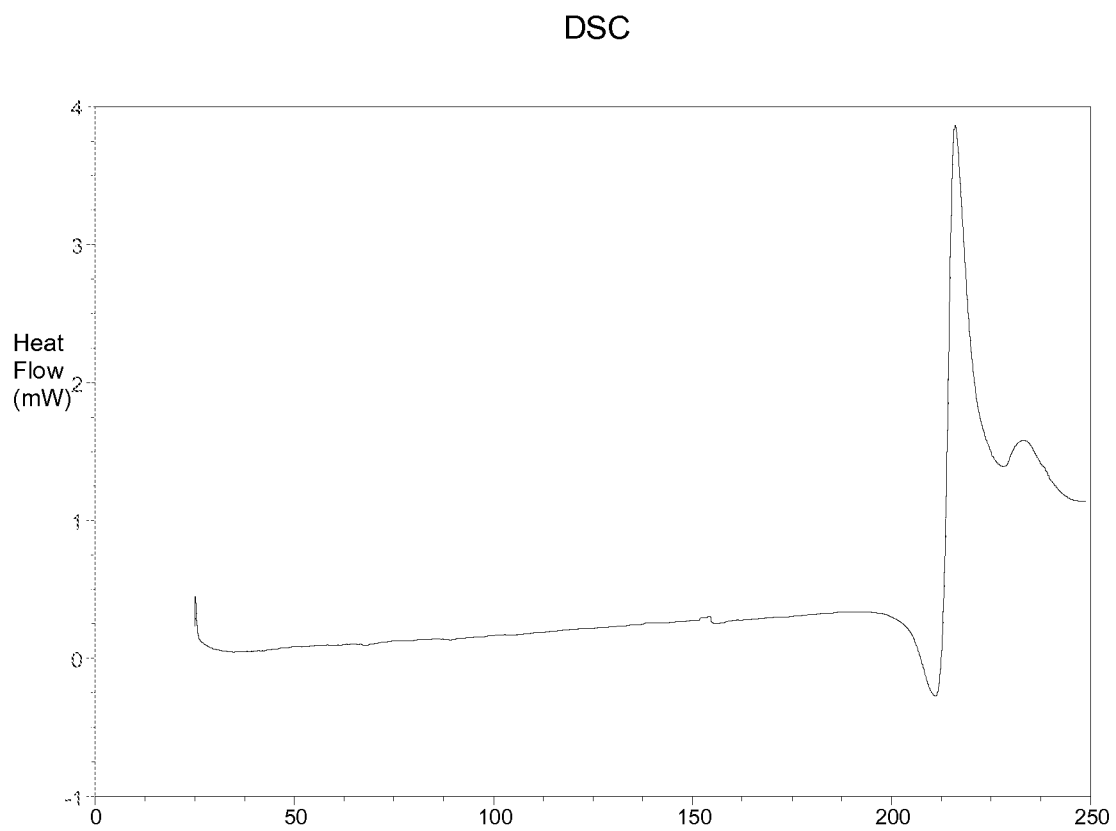


FIG. 8

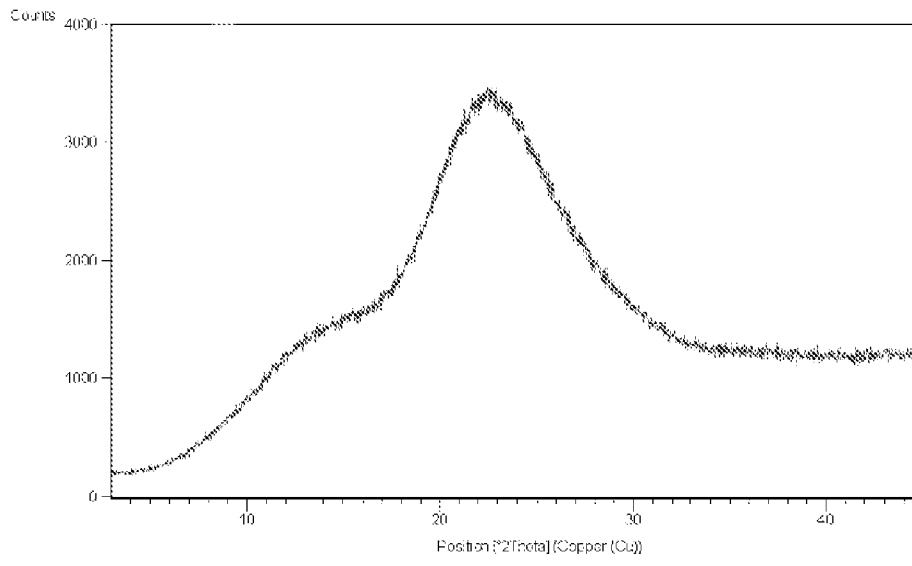


FIG. 9

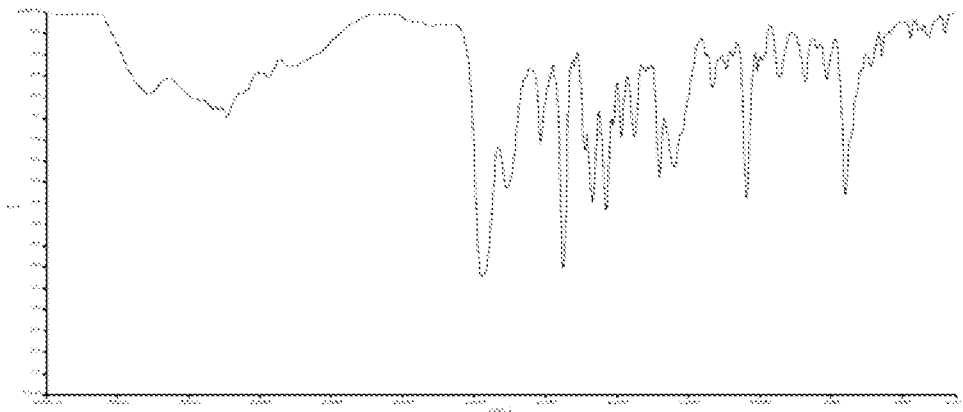


FIG. 10

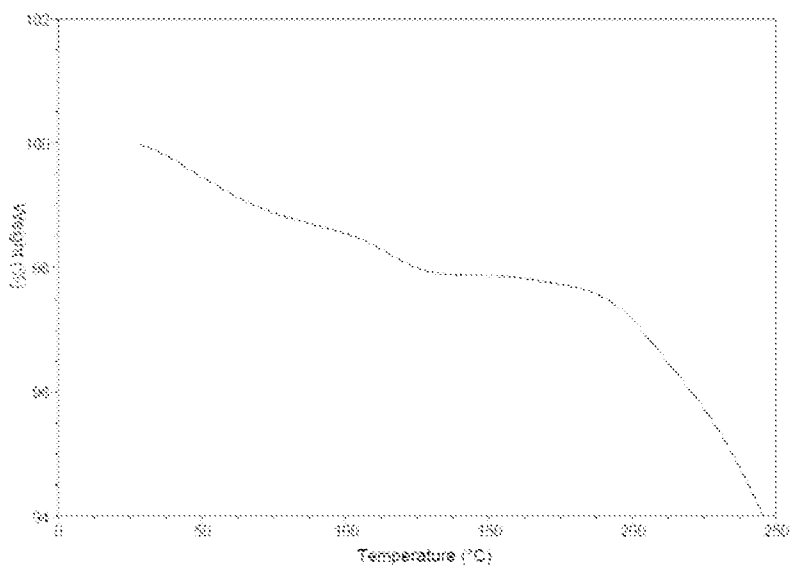


FIG. 11

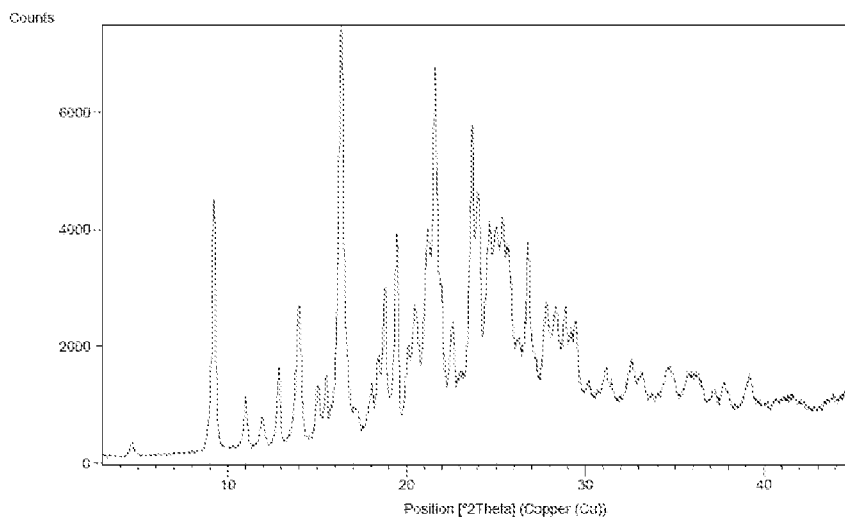


FIG. 12

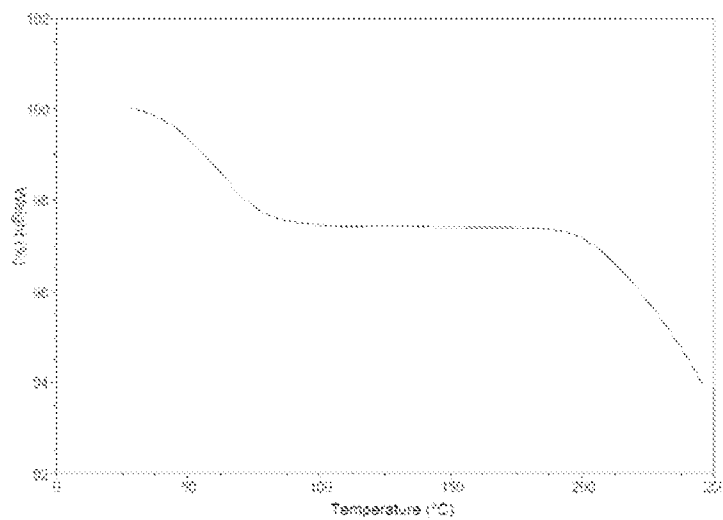


FIG. 13

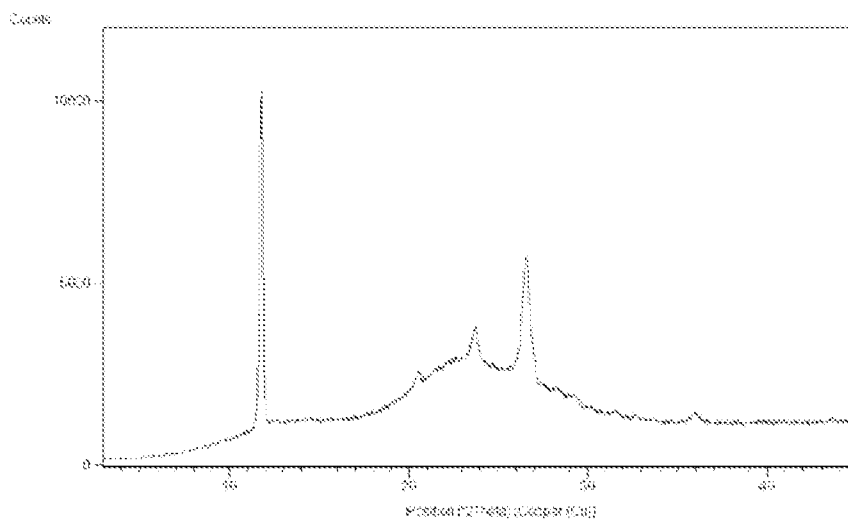


FIG. 14

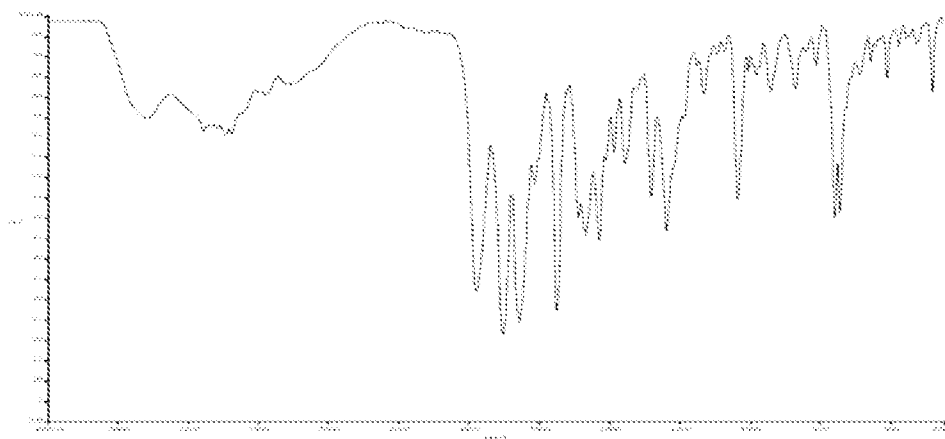


FIG. 15

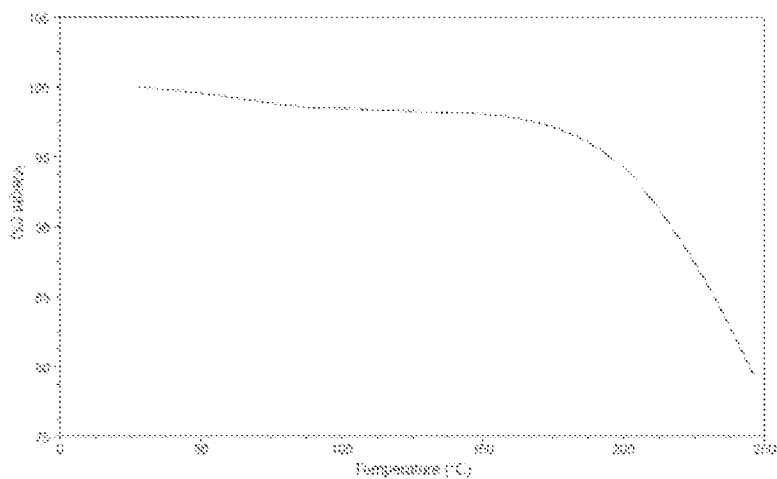


FIG. 16

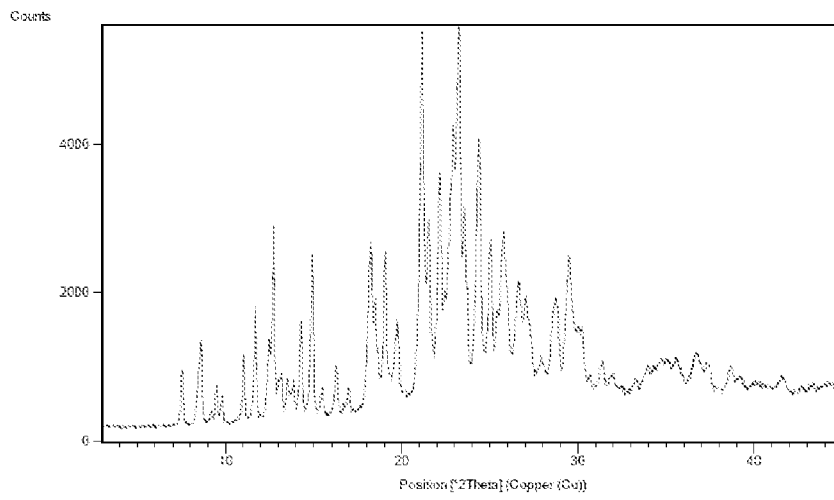


FIG. 17

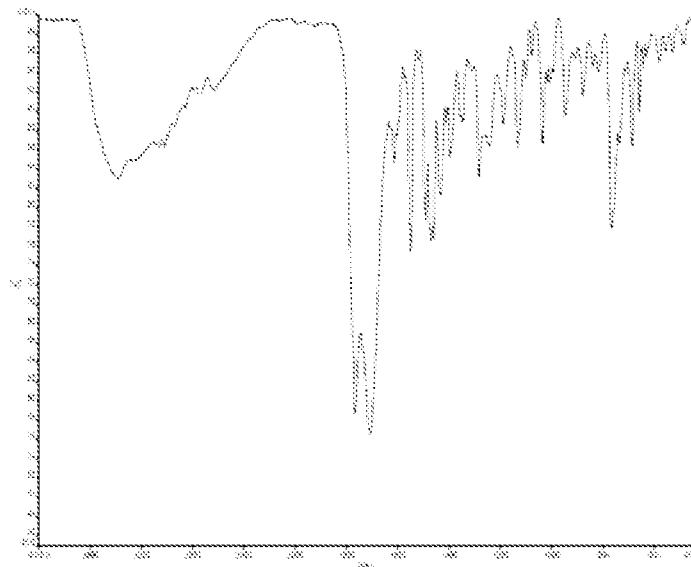


FIG. 18

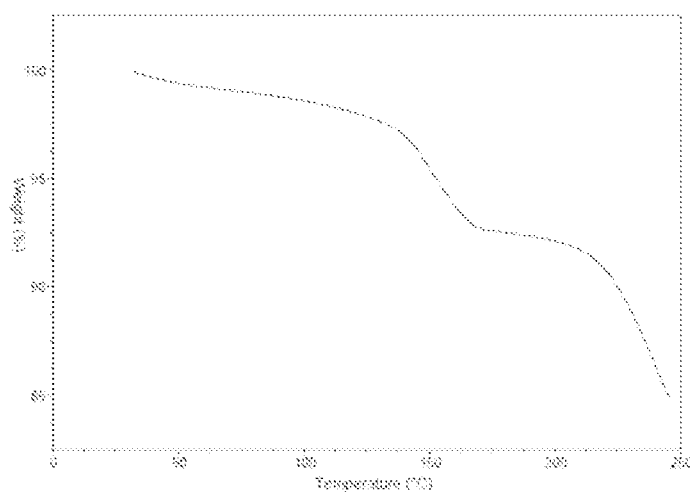


FIG. 19

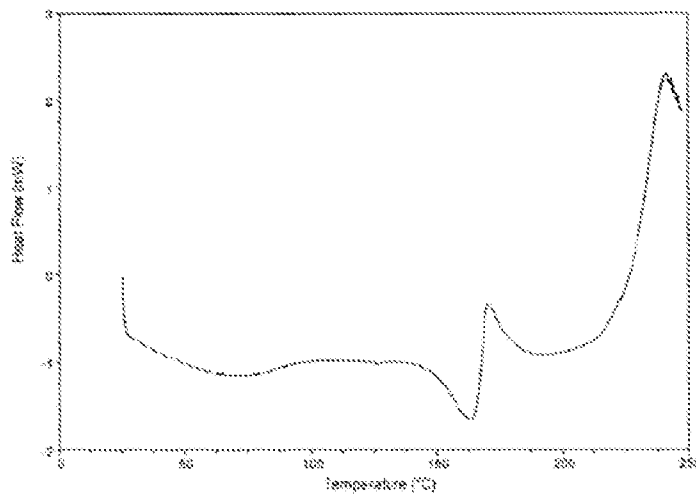


FIG. 20

