apparent pro-arrhythmic potential, could potentially be used to treat acute and recurrent atrial fibrillation in the presence of organic heart disease, prolonged QR syndrome, and ventricular arrhythmias, including premature ventricular contractions (PVCs), ventricular tachycardia (VT), and ventricular fibrillation (VF), in either acute- or chronic-administration settings owing to their ability to be formulated into intravenous and oral dosing formulations.

SUMMARY

[0004a] In one aspect of the present disclosure, there is provided a crystalline form of a mono ethane-1,2-disulfonic acid salt (monoedisylate salt) of sulcardine.

[0005] In some examples, crystalline salts of sulcardine and salt formers other than sulfuric acid are provided. A "salt former" is a compound (*e.g.*, an acid counterion) which may be used to create a salt with, for example, sulcardine.

[0006] In some examples, provided herein is a solid form comprising an acid salt of sulcardine, wherein the acid is ethane-1,2-disulfonic acid, naphthalene-1,5-disulfonic acid, 1-hydroxy-2-naphthoic acid, naphthalene-2-sulfonic acid, hydrochloric acid, or hydrobromic acid. In some examples, the solid form is crystalline. In some examples, the solid form is amorphous.

[0007] In further examples, crystalline salts of sulcardine and halide salt formers are provided.

[0008] In additional examples, crystalline salts of sulcardine and a sulfonic acid salt former are provided.

[0009] In other examples, salts of sulcardine and mononaphthalene salt formers are provided.

What is claimed is:

1. A crystalline form of a mono ethane-1,2-disulfonic acid salt (monoedisylate salt) of sulcardine.

2. The crystalline monoedisylate salt of claim 1, wherein the salt is a monohydrate.

3. The crystalline monoedisylate salt of claim 1, wherein the salt is a dihydrate.

4. The crystalline monoedisylate salt of claim 1, having an x-ray powder diffraction pattern comprising a peak at about 5.2° 2θ.

5. The crystalline monoedisylate salt of claim 4, having an x-ray powder diffraction pattern further comprising one or more peaks at about 9.1° 2θ, about 10.2° 2θ, about 10.8° 2θ, about 11.3° 2θ, about 13.6° 2θ, and about 15.7° 2θ.

6. The crystalline monoedisylate salt of claim 5, having an x-ray powder diffraction pattern further comprising peaks at about 15.7° 2θ, about 16.9° 2θ,and about 23.6° 2θ.

7. The crystalline monoedisylate salt of claim 6, having an x-ray powder diffraction pattern further comprising peaks at about 9.1° 2θ and about 11.3° 2θ.

8. The crystalline monoedisylate salt of sulcardine of claim 1, characterized by x-ray powder diffraction pattern presented in FIG. 28.

9. The crystalline monoedisylate salt of claim 3, wherein the salt provides an in vivo plasma profile comprising a median Cmax of higher than 4,570 ng/mL with a Tmax of within 0.5 hours post administration when orally administered to a subject.

10. The crystalline monoedisylate salt of claim 1, having an x-ray powder diffraction pattern comprising a peak at about 14.2° 2θ.

11. The crystalline monoedisylate salt of claim 10, having an x-ray powder diffraction pattern further comprising two peaks between 9.0° 2θ and 9.8° 2θ.

12. The crystalline monoedisylate salt of claim 10, having an x-ray powder diffraction pattern further comprising one or more peaks at about 9.2° 2θ, about 9.6° 2θ, about 10.4° 2θ, about 13.8° 2θ, and about 14.9° 2θ.

13. The crystalline monoedisylate salt of claim 10, having an x-ray powder diffraction pattern further comprising peaks at about 18.8° 2θ, about 20.2° 2θ, and about 21.2° 2θ.

14. The crystalline monoedisylate salt of sulcardine of claim 1, characterized by an x-ray powder diffraction pattern presented in FIG. 26.