of the packing rod may be offset to a central axis, thereby to generate a vortex flow of the formulation. Also preferably, the at least portion of the inner wall of the nozzle body is formed to have a cross section perpendicular to the injection direction continuously or step-wisely reducing towards the injection direction.

[0011] The gel material preferably has a viscosity of 2500 mPas or less~~more~~, and more preferably 1000 mPas~~—or more~~. Preferably a spray angle of the formulation sprayed from the nozzle orifice is in a range 45 degrees and 60 degrees,
an average particle size of formulation droplets sprayed from the nozzle orifice is in a range 50 microns and 80 microns. Also preferably, counts of formulation droplets sprayed from the nozzle orifice having the particle size in a range between 10 to 100 microns are 70% or more of the total counts of the particle.

Advantages of Invention

[0012] According to the present invention, it is advantageous to achieve the given spray characteristics (a particle size distribution, an uniform spray geometry, and a spray angle) required to obtain a pharmaceutical benefits of the formulation comprising the gel material containing viscosity modification agent and carboxy vinyl polymer of which viscosity is modified by applying an exogenous shear force.

6. The rhinal spray nozzle according to claim 5, wherein the vortex-flow generation member is formed so that a flow direction of the formulation from the grooves of the packing rod is offset to a central axis, thereby to generate a vortex flow of the formulation.

7. The rhinal spray nozzle according to claim 5 or 6, wherein the at least portion of the inner wall of the nozzle body is formed to have a cross section substantially perpendicular to the injection direction which is continuously or step-wisely reduced towards the injection direction.

8. The rhinal spray nozzle according to any one of preceding claims, wherein the gel material has a viscosity of 2500 mPas or less~~more~~.

9. The rhinal spray nozzle according to claim 8, wherein the gel material has a viscosity of 1000 mPas~~ or more~~.

10. The rhinal spray nozzle according to any one of preceding claims, wherein a spray angle of the formulation sprayed from the nozzle orifice is in a range 45 degrees and 60 degrees.