9. The solids separator as claimed in any one of claims 1 to 4, wherein the plastic bag (50) is polyhedral or conical and wherein the plastic bag (50), during operation, is placed such that the solids collection region (57) which is tapered at the bottom is formed by the walls of the plastic bag and the apex or corner of the polyhedron or of the cone.

10. The solids separator as claimed in claim 9, wherein the plastic bag (50) is a disphenoid, a regular pyramid, an octahedron or a cube.

11. The solids separator as claimed in any one of claims 1 to 4, wherein the plastic bag or plastic bottle (50) has a rectangular cross section, wherein the downwardly tapered solids collection region (57) ends in a neck which is closed with a cover or stopper, wherein the cover or stopper has all passages 80, 84, 89.

12. The solids separator as claimed in any one of claims 1 to 11, comprising a container for receiving the plastic bag 50, wherein the container comprises at least:
    - an interior for receiving the plastic bag 50, wherein the interior is adapted to the shape of the plastic bag 50 by means of walls which are adapted to the shape of the plastic bag 50 and enclose the interior and delimit it from the exterior, an opening for introducing the plastic bag 50 from the top into the container.

13. A bioreactor system comprising a bioreactor connected to a solids separator as claimed in any one of claims 1 to 12.

14. A method for retaining and recirculating solids, in particular cells, in a solids separator according to claims 1-12, comprising a flow-bearing vessel, wherein solids-containing medium is supplied continuously or batchwise to the vessel, and solids-free medium is removed from the vessel, characterized in that the vessel is a flow-bearing sterilizable plastic bag or plastic bottle which, in the lower region, has faces set at an incline, favorably a solids collection region (57) which is tapered conically at the bottom for collecting the solids with the aid of gravity.