CLAIMS

1. A wastewater treatment process comprising at least one biological oxidation step in a single biological treatment unit, wherein ozone (O3) and an adsorbent compound (PAC) are introduced, ozonation and adsorption being each induced at least, upstream of the single biological treatment unit, or in the single biological treatment unit, or downstream of the single biological treatment unit, given that downstream of the single biological treatment unit, at most either the ozone introduction, or the adsorbent compound introduction is performed,

the single biological treatment unit comprising a settler or float type separator, downstream of the biological reactor and a circuit for recirculating a fraction of the sludge from the settling step to the biological reactor, the ozone and/or adsorbent compound introduction being carried out in the recirculation circuit or in the separator, or in both,

the biological oxidation step being carried out in a single biological treatment unit comprising a fluidised movable bed reactor or a membrane bioreactor,

the ozone being introduced in proportions between 1.5 and 15 mg/L,

the adsorbent compound being introduced in proportions between 5 and 20 mg/L.

2. The wastewater treatment process according to claim 1, wherein downstream of the single biological treatment unit, no ozone or adsorbent compound introduction is performed, such that the ozone and the adsorbent compound are each respectively introduced

either upstream of the single biological treatment unit, or in the single biological treatment unit.

3. The wastewater treatment process according to any of claims 1 and 2, wherein the adsorbent compound introduction is carried out downstream of the ozone introduction.

4. The wastewater treatment process according to any of claims 1 to 3, wherein the adsorbent compound includes grain or micro grain powdered activated carbon.

5. The wastewater treatment process according to claim 1, wherein the ozone and/or adsorbent compound introduction is carried out in the biological reactor.

6. A wastewater treatment facility for implementing a process in accordance with one of claims 1 to 5, and comprising:

- a single biological treatment unit provided with at least one biological reactor arranged to carry out at least one biological oxidation step,
- a wastewater inlet circuit feeding the single biological treatment unit with wastewater,
- a circuit for discharging wastewater off said single biological treatment unit, and

further comprising at least a first and a second device to introduce ozone and an adsorbent compound respectively, in the inlet circuit or in the discharge circuit, or in the single biological treatment unit, the discharge circuit being at most in fluid communication with either of the first or second introduction device,

the biological reactor being a fluidised movable bed reactor or a membrane bioreactor,

the single biological treatment unit further comprising a separator downstream of the biological reactor, the separator being of the settler or float type, and at least either of the first or second introduction device being in communication with the separator,

the wastewater treatment facility further comprising a circuit for recirculating a fraction of the sludge from the separator to the biological reactor, at least either of the first or the second introduction device being in communication with the recirculation circuit.

7. The wastewater treatment facility according to claim 6, wherein the first and the second introduction device are arranged to introduce ozone and an adsorbent compound respectively, in the inlet circuit or in the single biological treatment unit.

8. The wastewater treatment facility according to any of claims 6 and 7, wherein the first ozone introduction device is arranged upstream of the second adsorbent introduction device.

9. The wastewater treatment facility according to claim 6, further comprising downstream of the single biological treatment unit, as the first or second introduction device, a contactor arranged to contact water at the outlet of said unit with either the ozone, or the adsorbent compound.

10. The wastewater treatment facility according to claim 6, wherein either or both of the first or second ozone or adsorbent introduction device are in communication with the biological reactor.