CLAIMS

1. A method for treating a wastewater effluent comprising carbon pollution, nitrogen pollution and phosphorus pollution, in a sequencing batch reactor (SBR), said SBR comprising:

- a chamber capable of containing a wastewater-sludge mixture comprising various levels, with each level being defined by a sludge concentration and/or density;
- a sludge bed, comprising polyphosphate-accumulating organisms, located at the bottom of the chamber, above which a sludge blanket level is defined;
- means for determining a minimum level and a maximum level for extracting sludge in the chamber;
- extraction means capable of extracting sludge at variable levels between the minimum extraction level and the maximum extraction level;

said method comprising:

- a step of supplying the SBR, during which an amount of effluent to be treated is introduced near the bottom of the chamber, in the sludge bed, preferably via a distribution network covering the bottom of the chamber;
- a reaction sequence comprising:
    - at least a first anaerobic step, during which the polyphosphate-accumulating organisms capture the carbon pollution and release phosphorus compounds;
    - optionally, a second step of (partial and/or total) denitrification under anoxic conditions, with this step being implemented only in the case of an NOx concentration that is greater than a predetermined threshold;
    - a third aeration step, allowing the dephosphatation of the effluent by the polyphosphate-accumulating organisms to be carried out, with the aeration being controlled so as to simultaneously carry out either (partial or total) nitrification, or (partial or total) nitritation;
- a decanting step, during which sludge is deposited at the bottom of the chamber and the content of the chamber clarifies in the vicinity of its surface;

- a recovery step, during which a clarified fraction is drawn off from the content of the chamber, with said recovery and supply steps taking place simultaneously, so as to keep the level of the content of the chamber substantially constant during the recovery and supply steps;
- a step of extracting at least a portion of the light sludge with a sludge index that is greater than 100 mL/g and a decanting speed of less than 2 m/h at a predetermined level between the minimum extraction level and the maximum extraction level, preferably in the vicinity of the sludge blanket; and
- a step of measuring the sludge blanket, and wherein the step of extracting at least a portion of the light sludge is carried out when the measurement of the sludge blanket is substantially equal to a predetermined distance from the sludge extraction level.

2. The treatment method as claimed in claim 1, wherein the step of extracting at least a portion of the light sludge is carried out during the supply step and/or during the decanting step.

3. The treatment method as claimed in any one of claims 1 to 2, comprising, during the reaction sequence, a step of injecting air into the chamber.

4. The treatment method as claimed in any one of claims 1 to 3, wherein the third aeration step is followed by a step of post-denitrification under anoxic conditions, preferably implemented when the third step is a total or partial nitrification step; or the third aeration step is followed by a step of denitritation under anoxic conditions, preferably implemented when the third step is a total or partial nitritation step; or the third aeration step is followed by a step of deammonification under anoxic conditions, preferably implemented when the third step is a partial nitritation step.

5. The treatment method as claimed in any one of claims 1 to 4, wherein the decanting step is preceded by a step of injecting air into the chamber.

6. The treatment method as claimed in any one of claims 1 to 5, comprising a step of densifying sludge using a densification device inside the chamber.

7. The treatment method as claimed in any one of claims 1 to 6, further comprising a step of controlling the duration of the third aeration step as a function of the level of carbon, nitrogen and phosphorus pollution of the wastewater effluent.