CLAIMS

1. Method for the biological treatment of carbon, nitrogen and, optionally, phosphorous in water, in a system of reactors comprising at least two sequencing batch reactors (SBR) disposed in parallel and one moving-bed biofilm reactor (MBBR), wherein said method comprises steps of:

- filling one sequencing batch reactor with water to be treated;
- carrying out anoxic/aerobic biological treatment, in said system of reactors, of the water present in said sequencing batch reactor; and
- removing treated water from said sequencing batch reactor;

said step of anoxic/aerobic biological treatment in said system of reactors comprising:

- biological treatment under predominantly anoxic conditions by a first biomass in said at least two sequencing batch reactors producing a first effluent, said first biomass comprising mainly heterotrophic denitrifying microorganisms;
- a biological treatment under aerobic conditions by a second biomass in said moving-bed biofilm reactor, producing a second effluent, said second biomass comprising a biofilm with predominantly nitrifying biofilm carried on media; and
- a continuous recirculation of said first and second effluents between said at least two sequencing batch reactors and said moving-bed biofilm reactor;

said at least two sequencing batch reactors working sequentially and said moving-bed biofilm reactor working continuously.

2. Method according to claim 1, wherein said step for filling each of said at least two sequencing batch reactors is implemented under anaerobic conditions and/or in that said method furthermore comprises a step of biological treatment under anaerobic conditions in each of said at least two sequencing batch reactors, said step of biological treatment under anaerobic conditions being implemented before said step of anoxic/aerobic biological treatment.

3. Method according to claim 2, wherein said step for filling each of said at least two sequencing batch reactors has a duration of 10 minutes to 4 hours and/or said step of biological treatment under anaerobic conditions has a duration of 10 minutes to 3 hours.

4. Method according to any one of the claims 2 or 3 wherein said first biomass comprises denitrifying polyphosphate accumulative organisms (DPAO).

5. Method according to claim 1, wherein said step of anoxic/aerobic biological treatment has a duration of 1 hour to 8 hours.

6. Method according to claim 1, wherein said first biomass is a suspended or granular biomass or a biofilm carried on media, preferably a biofilm carried on media.

7. Method according to claim 1, wherein the concentration in diatomic oxygen dissolved in said second effluent is from 1 milligram to 6 milligrams per liter.

8. Method according to claim 7, wherein said step of anoxic/aerobic biological treatment is implemented with each sequencing batch reactor sequentially.

9. Installation for the biological treatment of carbon, nitrogen and, optionally, phosphorous in water to be treated, comprising a moving-bed biofilm reactor (MBBR) and at least two sequencing batch reactors (SBR) disposed in parallel, wherein:

- said at least two sequencing batch reactors comprise means for leading in said water to be treated, means for removing treated water and means for recirculating a first effluent from said at least two sequencing batch reactors towards said moving-bed biofilm reactor;
- said moving-bed biofilm reactor comprises means of aerating and means of recirculating a second effluent from said moving-bed biofilm reactor to said at least two sequencing batch reactors.

10. Installation according to claim 9, wherein said moving-bed biofilm reactor comprises stirring means and/or in that said at least two sequencing batch reactors comprise stirring means.

11. Installation according to any one of the claims 9 and 10, wherein said at least two sequencing batch reactors are suspended biomass or granular biomass sequencing batch reactors or sequencing batch moving-bed biofilm reactors (SBMBBR), preferably sequencing batch moving-bed biofilm reactors (SBMBBR).

12. Installation according to claim 11, wherein said at least two sequencing batch moving-bed biofilm reactors and/or said moving-bed biofilm reactor comprise(s) a perforated screen used to retain biofilm carrier media.