CLAIMS

~~1. An extended-time release method for a toilet cleaner, which acts on inside of a toilet bowl, the method comprising the following steps:~~

~~mixing water with the toilet cleaner to form an initial solution when water enters the toilet bowl;~~

~~starting release of the initial solution while water level in the toilet bowl returns to normal; and~~

~~continuing the release of the initial solution after the water level in the toilet bowl returns to normal, a mixed liquid of the initial solution and the water in the toilet bowl is defined as a primary solution.~~

~~2. The extended-time release method for the toilet cleaner according to claim 1, wherein the method comprising the following steps:~~

~~mixing the water with the toilet cleaner to form the initial solution when the water enters the toilet bowl; starting the release of the initial solution while the water level in the toilet bowl returns to normal; and~~

~~continuing the release of the initial solution after the water level in the toilet bowl returns to normal until the release ends,~~

~~wherein the mixed liquid of the initial solution and the water in the toilet bowl is defined as the primary solution.~~

~~3. The extended-time release method for the toilet cleaner according to claim 1, wherein the toilet cleaner is placed in a housing, the method comprising the following steps:~~

~~forming the initial solution with a density ρ1 in the housing by the toilet cleaner before water enters the housing; and~~

~~diluting the initial solution by the water to become a replacement solution with a density ρ2 when water enters the housing again,~~

~~wherein the replacement solution slowly flows out of a side opening of the housing and enters the toilet bowl.~~

~~4. The extended-time release method for the toilet cleaner according to claim 2 or 3, wherein, in the above method, a volume of the initial solution is not less than 10 ml, and a content of effective ingredients of the toilet cleaner in the primary solution is not less than 2 ppm.~~

~~5. The extended-time release method for the toilet cleaner according to claim 4, wherein solubility of the toilet cleaner in the initial solution in water at 25 °C is not more than 10 g/L, or the solubility of the toilet cleaner in the initial solution in water at 20 °C is not more than 5 g/L.~~

~~6. The extended-time release method for the toilet cleaner according to claim 4, wherein a relationship between a solute content m1 of the primary solution and a solute content m0 of the initial solution is: m1/m0=0.5 to 1.~~

~~7. The extended-time release method for the toilet cleaner according to claim 2 or 3, wherein, in the method,~~

~~a time from the water entering the bowl to the water level in the bowl returning to~~

normal is defined as a toilet flushing time t1;

a time from a beginning of the release of the initial solution to an end of the release is defined as an initial solution outflow time t3; and

a time from the water level in the bowl returning to normal to the end of the release of the initial solution is defined as an initial solution partially extended release time t4;

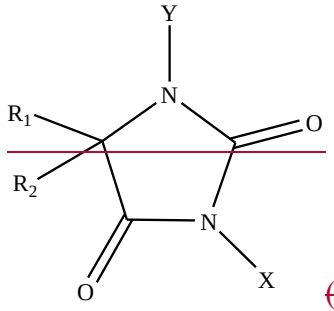
wherein t4 = t3-t1; and/or

wherein t4 ≥ 3 minutes, and/or t4 ≥ t1; and/or

wherein t3 ≤ 40 minutes, and/or t3 ≥ 2t1.

8. The extended-time release method for the toilet cleaner according to claim 7, wherein t3 = 4 to 25 minutes.

9. The extended-time release method for the toilet cleaner according to any one of claims 1 to 8, wherein effective bleaching components released by the toilet cleaner itself or the toilet cleaner after being dissolved in water contains a chemical substance having a structural formula (1):

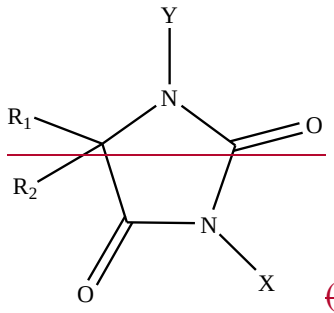


(1)

wherein R_1 and R_2 are each independently selected from any one of C_1-C_6 alkyl substituents and hydrogen group, and at least one of R_1 and R_2 is a C_1-C_6 alkyl; X and

~~Y are each independently selected from any one of bromine, chlorine and hydrogen, and at least one of X and Y is a halogen element.~~

~~10. The extended-time release method for the toilet cleaner according to any one of claims 1 to 8, wherein the effective bleaching components released by the toilet cleaner itself or the toilet cleaner after being dissolved in water contains a chemical substance having a structural formula (2):~~



~~(2)~~

~~wherein R_1 and R_2 are each independently selected from C_1-C_2 alkyl substituents, X and Y are each independently selected from any one of bromine, chlorine and hydrogen, and at least one of X and Y is a halogen element.~~

~~1~~1. An extended-time release device for a toilet cleaner, which is suitable for use in a toilet bowl (500), comprising:

a bowl hook (300) configured to be hung on an upper rim of the toilet bowl (500);

a housing hook (200) connected with the bowl hook (300); and

a housing (100) hung at a bottom of the housing hook (200),

wherein the housing (100) is configured to place the toilet cleaner, an upper portion of the housing (100) is provided with a water inlet (130), and a lower portion

of the housing (100) is provided with a gap for water to flow out; and

flexibility of the housing hook (200) is greater than that of the bowl hook (300).

~~1~~2. The extended-time release device for the toilet cleaner according to claim ~~1~~1, wherein the housing (100) includes a left housing (110) and a right housing (120) that are engaged with each other; the ~~the~~ left housing (110) and/or the right housing (120) is provided with a protrusion portion at an engagement position, and the protrusion portion leaves a gap for water to flow out when the left housing (110) and the right housing (120) are engaged.

~~1~~3. The extended-time release device for the toilet cleaner according to claim ~~1~~1, wherein a limit portion (140) for restricting a movement of the toilet cleaner is provided in the housing (100).

~~1~~4. The extended-time release device for the toilet cleaner according to claim ~~1~~1, wherein the housing hook (200) and the housing (100) are arranged in a rotary connection or a flexible connection.

~~1~~5. The extended-time release device for the toilet cleaner according to claim ~~1~~1, wherein the bowl hook (300) includes a vertical plate (310), a horizontal plate (320), a corner adapter plate (330) and an inclined plate (340) that are sequentially connected, rigidity of the corner adapter plate (330) is not greater than that of the vertical plate (310) or the horizontal plate (320).

~~1~~6. The extended-time release device for the toilet cleaner according to claim ~~1~~5, wherein the flexibility of the vertical plate (310) is arranged to be smaller than that of the inclined plate (340).

~~1~~7. The extended-time release device for the toilet cleaner according to any one of claims ~~1~~1 to ~~1~~6, wherein a bending direction of a connecting end that connects the housing hook (200) with the housing (100) faces rim holes (520) of the toilet bowl (500) when the extended-time release device is mounted to the toilet bowl.

8. An extended-time release method for a toilet cleaner, which acts on inside of a toilet bowl, using the device of claim 1, wherein the toilet cleaner is placed in the housing of the device, the method comprising the following steps:

mixing water with the toilet cleaner to form an initial solution when water enters the toilet bowl;

starting release of the initial solution while water level in the toilet bowl returns to normal; and

continuing the release of the initial solution after the water level in the toilet bowl returns to normal, a mixed liquid of the initial solution and the water in the toilet bowl is defined as a primary solution.

9. The extended-time release method for the toilet cleaner according to claim 8, wherein the method comprising the following steps:

mixing the water with the toilet cleaner to form the initial solution when the water enters the toilet bowl; starting the release of the initial solution while the water level

in the toilet bowl returns to normal; and

continuing the release of the initial solution after the water level in the toilet bowl returns to normal until the release ends,

wherein the mixed liquid of the initial solution and the water in the toilet bowl is defined as the primary solution.

10. The extended-time release method for the toilet cleaner according to claim 8, the method comprising the following steps:

forming the initial solution with a density ρ1 in the housing by the toilet cleaner before water enters the housing again; and

diluting the initial solution by the water to become a replacement solution with a density ρ2 when water enters the housing again,

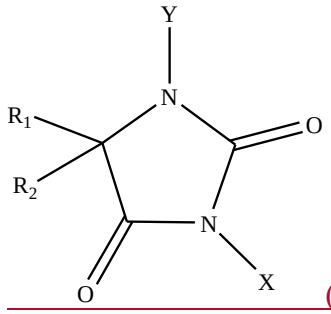
wherein the replacement solution flows out of a side opening of the housing and enters the toilet bowl.

11. The extended-time release method for the toilet cleaner according to claim 9 or 10, wherein, in the above method, a volume of the initial solution is not less than 10 ml, and a content of effective ingredients of the toilet cleaner in the primary solution is not less than 2 ppm.

12. The extended-time release method for the toilet cleaner according to claim 11, wherein solubility of the toilet cleaner in the initial solution in water at 25 °C is not more than 10 g/L, or the solubility of the toilet cleaner in the initial solution in water at 20 °C is not more than 5 g/L.

13. The extended-time release method for the toilet cleaner according to claim 11, wherein a relationship between a solute content m1 of the primary solution and a solute content m0 of the initial solution is: m1/m0=0.5 to 1.

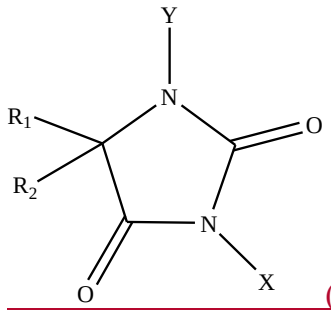
14. The extended-time release method for the toilet cleaner according to any one of claims 8 to 13, wherein effective bleaching components released by the toilet cleaner itself or the toilet cleaner after being dissolved in water contains a chemical substance having a structural formula (1):



(1)

wherein R_1 and R_2 are each independently selected from any one of C_1-C_6 alkyl substituents and hydrogen group, and at least one of R_1 and R_2 is a C_1-C_6 alkyl; X and Y are each independently selected from any one of bromine, chlorine and hydrogen, and at least one of X and Y is a halogen element.

15. The extended-time release method for the toilet cleaner according to any one of claims 8 to 13, wherein the effective bleaching components released by the toilet cleaner itself or the toilet cleaner after being dissolved in water contains a chemical substance having a structural formula (2):



(2)

wherein R_1 and R_2 are each independently selected from C_1-C_2 alkyl substituents, X and Y are each independently selected from any one of bromine, chlorine and hydrogen, and at least one of X and Y is a halogen element.