What is claimed is:

1. A drug solution with a reduced dissolved oxygen content,

the drug solution being contained and sealed in a drug solution container formed of a plastic material having an oxygen permeability of not lower than 200 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH within 12 hours after a steam sterilization process or a hot water sterilization process and having a steady-state oxygen permeability of not higher than 100 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH,

the drug solution having been subjected to the steam sterilization process or the hot water sterilization process,

the drug solution having a dissolved oxygen concentration of not higher than 2 ppm when the oxygen permeability of the plastic material reaches the steady-state level after the steam sterilization process or the hot water sterilization process.

2. A reduced-dissolved-oxygen-content drug solution as set forth in claim 1, which is stored in an environment having deoxidization means after the steam sterilization process or the hot water sterilization process.

3. A reduced-dissolved-oxygen-content drug solution as set forth in claim 1, which comprises an oxidation-prone drug solution.

4. A reduced-dissolved-oxygen-content drug solution as set forth in claim 1, which comprises at least one solution selected from the group consisting of an amino acid containing solution, a vitamin containing saccharide solution and a lipid-soluble vitamin containing solution.

5. A reduced-dissolved-oxygen-content drug solution as set forth in claim 4,

wherein the amino acid containing solution contains at least one amino acid selected from the group consisting of L-leucine, L-isoleucine, L-valine, L-lysine, L-threonine, L-tryptophan, L-methionine, L-cysteine, L-phenylalanine, L-tyrosine, L-arginine, L-histidine, L-alanine, L-proline, L-serine, L-glycine, L-aspartic acid and L-glutamic acid.

6. A reduced-dissolved-oxygen-content drug solution as set forth in claim 4,

wherein the vitamin containing saccharide solution contains a saccharide, and a water-soluble vitamin selected from the group consisting of vitamin B_1, vitamin B_2, vitamin B_6, vitamin B_{12}, vitamin C, folic acid, niacin, biotin and a pantothenic compound.

7. A reduced-dissolved-oxygen-content drug solution as set forth in claim 4,

wherein the lipid-soluble vitamin containing solution contains at least one lipid-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K.

8. A production method for a drug solution with a reduced dissolved oxygen content, the method comprising the steps of:

filling and sealing a drug solution in a drug solution container formed of a plastic material having an oxygen permeability of not lower than 200 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH within 12 hours after a steam sterilization process or a hot water sterilization process and having a steady-state oxygen permeability of not higher than 100 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH;

subjecting the drug solution container to a steam sterilization process or a hot water sterilization process; and

reducing a dissolved oxygen concentration of the drug solution to not higher than 2 ppm by storing the drug solution container in an environment having deoxidization means until the oxygen permeability of

the plastic material reaches the steady-state level.

9. A reduced-dissolved-oxygen-content drug solution production method as set forth in claim 8,

wherein the environment having the deoxidization means is an environment enclosed in an outer package provided with the deoxidization means and having an oxygen barrier property.

10. A reduced-dissolved-oxygen-content drug solution production method as set forth in claim 8,

wherein the deoxidization means is an oxygen scavenger.

11. A drug solution containing pack with a reduced dissolved oxygen content, comprising:

a drug solution container formed of a plastic material having an oxygen permeability of not lower than 200 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH within 12 hours after a steam sterilization process or a hot water sterilization process and having a steady-state oxygen permeability of not higher than 100 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH; and

a drug solution contained and sealed in the drug solution container;

wherein the drug solution contained and sealed in the drug solution container has been subjected to

the steam sterilization process or the hot water sterilization process, and to a deoxidization process for reducing a dissolved oxygen concentration of the drug solution to not higher than 2 ppm when the oxygen permeability of the plastic material reaches the steady-state level after the steam sterilization process or the hot water sterilization process.

12. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 11, which is stored in an environment having deoxidization means after the steam sterilization process or the hot water sterilization process.

13. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 11,

wherein the drug solution comprises an oxidation-prone drug solution.

14. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 13,

wherein the drug solution comprises at least one solution selected from the group consisting of an amino acid containing solution, a vitamin containing saccharide solution and a lipid-soluble vitamin containing solution.

15. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 11,

wherein the drug solution container includes a plurality of container portions isolated from each other by a removable partition,

wherein an amino acid containing solution is contained in one of the container portions, and a saccharide solution is contained in another one of the container portions.

16. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 11,

wherein the drug solution container includes a plurality of container portions isolated from each other by a removable partition,

wherein one of the container portions is a small bag provided in another one of the container portions.

17. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 16,

wherein a lipid-soluble vitamin containing solution or a fat emulsion is contained in the small bag.

18. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 16,

wherein the small bag is partitioned into two compartments,

wherein a lipid-soluble vitamin containing solution is contained in one of the two compartments,

and a micronutrient metal element drug solution is contained in the other compartment.

19. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 14,

wherein the amino acid containing solution contains at least one amino acid selected from the group consisting of L-leucine, L-isoleucine, L-valine, L-lysine, L-threonine, L-tryptophan, L-methionine, L-cysteine, L-phenylalanine, L-tyrosine, L-arginine, L-histidine, L-alanine, L-proline, L-serine, L-glycine, L-aspartic acid and L-glutamic acid.

20. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 14,

wherein the vitamin containing saccharide solution contains a saccharide, and at least one water-soluble vitamin selected from the group consisting of vitamin B_1, vitamin B_2, vitamin B_6, vitamin B_{12}, vitamin C, folic acid, niacin, biotin and a pantothenic compound.

21. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 14,

wherein the lipid-soluble vitamin containing solution contains at least one lipid-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K.

22. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 18,

wherein the micronutrient metal element drug solution contains at least one element selected from the group consisting of iron, manganese, zinc, copper, selenium, molybdenum, cobalt and chromium.

23. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 15,

wherein the plurality of container portions isolated from each other by the removable partition includes two container portions disposed in opposed relation on opposite sides of the removable partition, and a small bag disposed in one of the two container portions,

wherein the small bag is further partitioned into two compartments,

wherein an amino acid containing solution which contains at least one amino acid selected from the group consisting of L-leucine, L-isoleucine, L-valine, L-lysine, L-threonine, L-tryptophan, L-methionine, L-cysteine, L-phenylalanine, L-tyrosine, L-arginine, L-histidine, L-alanine, L-proline, L-serine, L-glycine, L-aspartic acid and L-glutamic acid is contained in the one container portion,

wherein a vitamin containing saccharide

solution which contains a saccharide and at least one water-soluble vitamin selected from the group consisting of vitamin B_1, vitamin B_2, vitamin B_6, vitamin B_{12}, vitamin C, folic acid, niacin, biotin and a pantothenic compound is contained in the other container portion,

wherein a lipid-soluble vitamin containing solution which contains at least one lipid-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K is contained in one of the compartments of the small bag,

wherein a micronutrient metal element drug solution containing at least one element selected from the group consisting of iron, manganese, zinc, copper, selenium, molybdenum, cobalt and chromium is contained in the other compartment of the small bag.

24. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 23,

wherein a solution mixture obtained by mixing the solutions contained in the two container portions and the two compartments contains 0.4 to 20.0 g/L of L-leucine, 0.2 to 14.0 g/L of L-isoleucine, 0.1 to 16.0 g/L of L-valine, 0.2 to 14.0 g/L of L-lysine, 0.1 to 8.0 g/L of L-threonine, 0.04 to 3.0 g/L of L-tryptophan, 0.1 to 8.0 g/L of L-methionine, 0.01 to 2.0 g/L of

L-cysteine, 0.2 to 12.0 g/L of L-phenylalanine, 0.01 to 2 g/L of L-tyrosine, 0.2 to 14.0 g/L of L-arginine, 0.1 to 8.0 g/L of L-histidine, 0.2 to 14.0 g/L of L-alanine, 0.1 to 10.0 g/L of L-proline, 0.1 to 6.0 g/L of L-serine, 0.1 to 12.0 g/L of L-glycine, 0.01 to 4.0 g/L of L-aspartic acid, 0 to 6.0 g/L of L-glutamic acid, 20 to 800 g/L of glucose, 400 to 6500 IU/L of vitamin A, 0.5 to 10.0 μg/L of cholecalciferol as vitamin D, 1.0 to 20.0 mg/L of tocopherol acetate as vitamin E, 0.2 to 4.0 mg/L of phytonadione as vitamin K, 0.4 to 30.0 mg/L of thiamine hydrochloride as vitamin B_1, 0.5 to 6.0 mg/L of riboflavin as vitamin B_2, 0.5 to 8.0 mg/L of pyridoxine hydrochloride as vitamin B_6, 0.5 to 50.0 μg/L of cyanocobalamin as vitamin B_{12}, 5.0 to 80.0 mg/L of nicotinamide as a nicotinic compound, 1.5 to 35.0 mg/L of pantothenic acid as a pantothenic compound, 50 to 800 μg/L of folic acid, 12 to 200 mg/L of ascorbic acid as vitamin C, 5 to 120 μg/L of biotin, 10 to 160 mEq/L of sodium ions, 1 to 40 mEq/L of magnesium ions, 5 to 80 mEq/L of potassium ions, 1 to 40 mEq/L of calcium ions, 10 to 160 mEq/L of chloride ions, 0 to 5 mEq/L of iodide ions, and 1 to 40 mmol/L of phosphate ions.

The claims defining the invention are as follows:

1. A drug solution with a reduced dissolved oxygen content,

the drug solution being contained and sealed in a drug solution container formed of a plastic material having an oxygen permeability of not lower than 200 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH within 12 hours after a steam sterilization process or a hot water sterilization process and having a steady-state oxygen permeability of not higher than 100 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH,

the drug solution having been subjected to the steam sterilization process or the hot water sterilization process,

the drug solution having a dissolved oxygen concentration of not higher than 2 ppm when the oxygen permeability of the plastic material reaches the steady-state level after the steam sterilization process or the hot water sterilization process, wherein the drug solution is stored in an environment having deoxidization means after the steam sterilization process or the hot water sterilization process.

2. A reduced-dissolved-oxygen-content drug solution as set forth in claim 1, which comprises an oxidation-prone drug solution.

3. A reduced-dissolved-oxygen-content drug solution as set forth in claim 1, which comprises at least one solution selected from the group consisting of an amino acid containing solution, a vitamin containing saccharide solution and a lipid-soluble vitamin containing solution.

4. A reduced-dissolved-oxygen-content drug solution as set forth in claim 3,

wherein the amino acid containing solution contains at least one amino acid selected from the group consisting of L-leucine, L-isoleucine, L-valine, L-lysine, L-threonine, L-tryptophan, L-methionine, L-cysteine, L-phenylalanine,

L-tyrosine, L-arginine, L-histidine, L-alanine, L-proline, L-serine, glycine, L-aspartic acid and L-glutamic acid.

5. A reduced-dissolved-oxygen-content drug solution as set forth in claim 3,

wherein the vitamin containing saccharide solution contains a saccharide, and a water-soluble vitamin selected from the group consisting of vitamin B_1, vitamin B_2, vitamin B_6, vitamin B_{12}, vitamin C, folic acid, niacin, biotin and a pantothenic compound.

6. A reduced-dissolved-oxygen-content drug solution as set forth in claim 3,

wherein the lipid-soluble vitamin containing solution contains at least one lipid-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K.

7. A production method for a drug solution with a reduced dissolved oxygen content, the method comprising the steps of:

filling and sealing a drug solution in a drug solution container formed of a plastic material having an oxygen permeability of not lower than 200 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH within 12 hours after a steam sterilization process or a hot water sterilization process and having a steady-state oxygen permeability of not higher than 100 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH;

subjecting the drug solution container to a steam sterilization process or a hot water sterilization process; and

reducing a dissolved oxygen concentration of the drug solution to not higher than 2 ppm by storing the drug solution container in an environment having deoxidization means until the oxygen permeability of the plastic material reaches the steady-state level.

8. A reduced-dissolved-oxygen-content drug solution

production method as set forth in claim 7,

wherein the environment having the deoxidization means is an environment enclosed in an outer package provided with the deoxidization means and having an oxygen barrier property.

9. A reduced-dissolved-oxygen-content drug solution production method as set forth in claim 7,

wherein the deoxidization means is an oxygen scavenger.

10. A drug solution containing pack with a reduced dissolved oxygen content, comprising:

a drug solution container formed of a plastic material having an oxygen permeability of not lower than 200 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH within 12 hours after a steam sterilization process or a hot water sterilization process and having a steady-state oxygen permeability of not higher than 100 $cm^3/m^2 \cdot 24h \cdot atm$ at a temperature of 25°C at a humidity of 60%RH; and

a drug solution contained and sealed in the drug solution container;

wherein the drug solution contained and sealed in the drug solution container has been subjected to the steam sterilization process or the hot water sterilization process, and to a deoxidization process for reducing a dissolved oxygen concentration of the drug solution to not higher than 2 ppm when the oxygen permeability of the plastic material reaches the steady-state level after the steam sterilization process or the hot water sterilization process,

wherein the drug solution is stored in an environment having deoxidization means after the steam sterilization process or the hot water sterilization process.

11. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 10,

wherein the drug solution comprises an oxidation-prone drug solution.

12. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 11,

wherein the drug solution comprises at least one solution selected from the group consisting of an amino acid containing solution, a vitamin containing saccharide solution and a lipid-soluble vitamin containing solution.

13. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 10,

wherein the drug solution container includes a plurality of container portions isolated from each other by a removable partition,

wherein an amino acid containing solution is contained in one of the container portions, and a saccharide solution is contained in another one of the container portions.

14. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 10,

wherein the drug solution container includes a plurality of container portions isolated from each other by a removable partition,

wherein one of the container portions is a small bag provided in another one of the container portions.

15. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 14,

wherein a lipid-soluble vitamin containing solution or a fat emulsion is contained in the small bag.

16. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 14,

wherein the small bag is partitioned into two compartments,

wherein a lipid-soluble vitamin containing solution is contained in one of the two compartments, and a micronutrient metal element drug solution is contained in the other compartment.

17. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 12,

wherein the amino acid containing solution contains at least one amino acid selected from the group consisting of L-leucine, L-isoleucine, L-valine, L-lysine, L-threonine, L-tryptophan, L-methionine, L-cysteine, L-phenylalanine, L-tyrosine, L-arginine, L-histidine, L-alanine, L-proline, L-serine, glycine, L-aspartic acid and L-glutamic acid.

18. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 12,

wherein the vitamin containing saccharide solution contains a saccharide, and at least one water-soluble vitamin selected from the group consisting of vitamin B_1, vitamin B_2, vitamin B_6, vitamin B_{12}, vitamin C, folic acid, niacin, biotin and a pantothenic compound.

19. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 12,

wherein the lipid-soluble vitamin containing solution contains at least one lipid-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K.

20. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 16,

wherein the micronutrient metal element drug solution contains at least one element selected from the group consisting of iron, manganese, zinc, copper, selenium, molybdenum, cobalt and chromium.

21. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 13,

wherein the plurality of container portions isolated from each other by the removable partition includes two container portions disposed in opposed relation on opposite sides of the

removable partition, and a small bag disposed in one of the two container portions,

wherein the small bag is further partitioned into two compartments,

wherein an amino acid containing solution which contains at least one amino acid selected from the group consisting of L-leucine, L-isoleucine, L-valine, L-lysine, L-threonine, L-tryptophan, L-methionine, L-cysteine, L-phenylalanine, L-tyrosine, L-arginine, L-histidine, L-alanine, L-proline, L-serine, glycine, L-aspartic acid and L-glutamic acid is contained in the one container portion,

wherein a vitamin containing saccharide solution which contains a saccharide and at least one water-soluble vitamin selected from the group consisting of vitamin B_1, vitamin B_2, vitamin B_6, vitamin B_{12}, vitamin C, folic acid, niacin, biotin and a pantothenic compound is contained in the other container portion,

wherein a lipid-soluble vitamin containing solution which contains at least one lipid-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K is contained in one of the compartments of the small bag,

wherein a micronutrient metal element drug solution containing at least one element selected from the group consisting of iron, manganese, zinc, copper, selenium, molybdenum, cobalt and chromium is contained in the other compartment of the small bag.

22. A reduced-dissolved-oxygen-content drug solution containing pack as set forth in claim 21,

wherein a solution mixture obtained by mixing the solutions contained in the two container portions and the two compartments contains 0.4 to 20.0 g/L of L-leucine, 0.2 to 14.0 g/L of L-isoleucine, 0.1 to 16.0 g/L of L-valine, 0.2 to 14.0 g/L of L-lysine, 0.1 to 8.0 g/L of L-threonine, 0.04 to 3.0 g/L of L-tryptophan, 0.1 to 8.0 g/L of L-methionine, 0.01 to 2.0 g/L of L-cysteine, 0.2 to 12.0 g/L of L-phenylalanine, 0.01 to 2 g/L of L-tyrosine, 0.2 to 14.0 g/L of L-arginine, 0.1 to 8.0 g/L of

L-histidine, 0.2 to 14.0 g/L of L-alanine, 0.1 to 10.0 g/L of L-proline, 0.1 to 6.0 g/L of L-serine, 0.1 to 12.0 g/L of glycine, 0.01 to 4.0 g/L of L-aspartic acid, 0 to 6.0 g/L of L-glutamic acid, 20 to 800 g/L of glucose, 400 to 6500 IU/L of vitamin A, 0.5 to 10.0 μg/L of cholecalciferol as vitamin D, 1.0 to 20.0 mg/L of tocopherol acetate as vitamin E, 0.2 to 4.0 mg/L of phytonadione as vitamin K, 0.4 to 30.0 mg/L of thiamine hydrochloride as vitamin B_1, 0.5 to 6.0 mg/L of riboflavin as vitamin B_2, 0.5 to 8.0 mg/L of pyridoxine hydrochloride as vitamin B_6, 0.5 to 50.0 μg/L of cyanocobalamin as vitamin B_{12}, 5.0 to 80.0 mg/L of nicotinamide as a nicotinic compound, 1.5 to 35.0 mg/L of pantothenic acid as a pantothenic compound, 50 to 800 μg/L of folic acid, 12 to 200 mg/L of ascorbic acid as vitamin C, 5 to 120 μg/L of biotin, 10 to 160 mEq/L of sodium ions, 1 to 40 mEq/L of magnesium ions, 5 to 80 mEq/L of potassium ions, 1 to 40 mEq/L of calcium ions, 10 to 160 mEq/L of chloride ions, 0 to 5 mEq/L of iodide ions, and 1 to 40 mmol/L of phosphate ions.

23. A drug solution with a reduced dissolved oxygen content according to claim 1, substantially as herein described.

24. A production method for a drug solution with a reduced dissolved oxygen content according to claim 7, substantially as herein described.

25. A drug solution containing pack with a reduced dissolved oxygen content according to claim 10, substantially as herein described.