

Fig.1

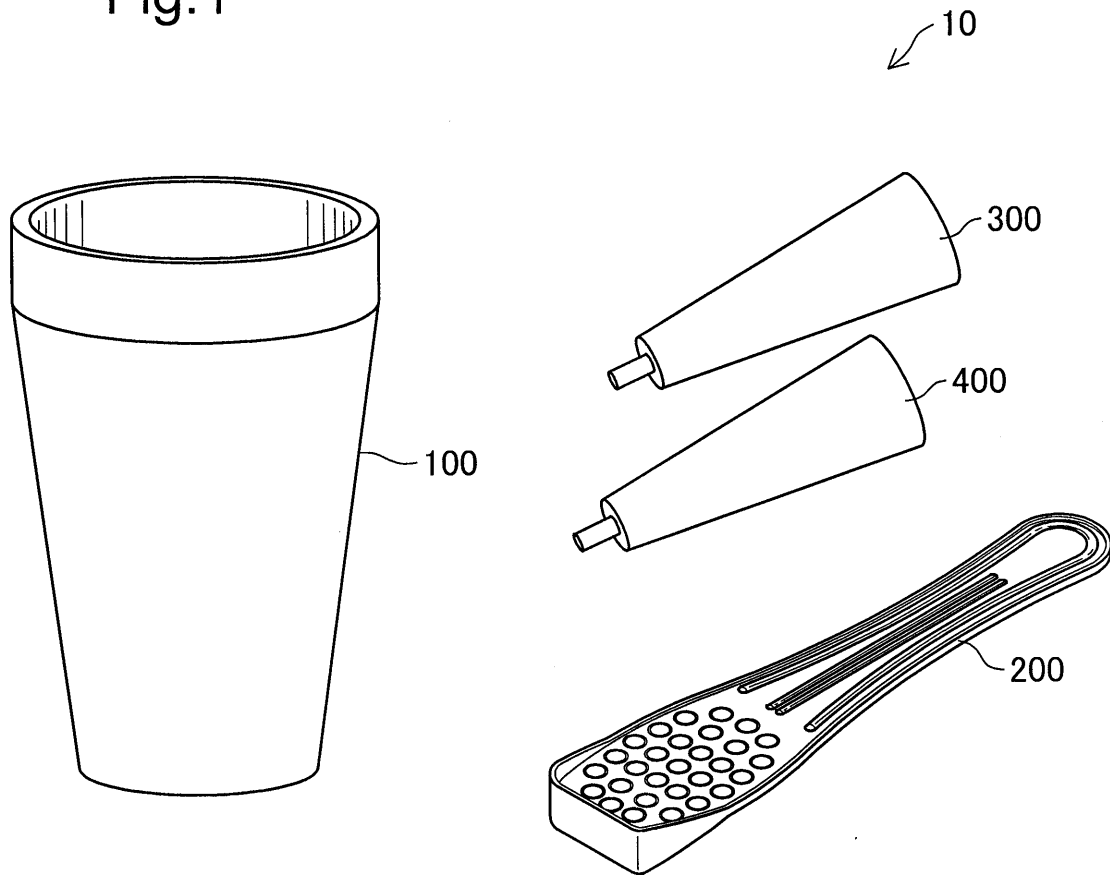


Fig.2

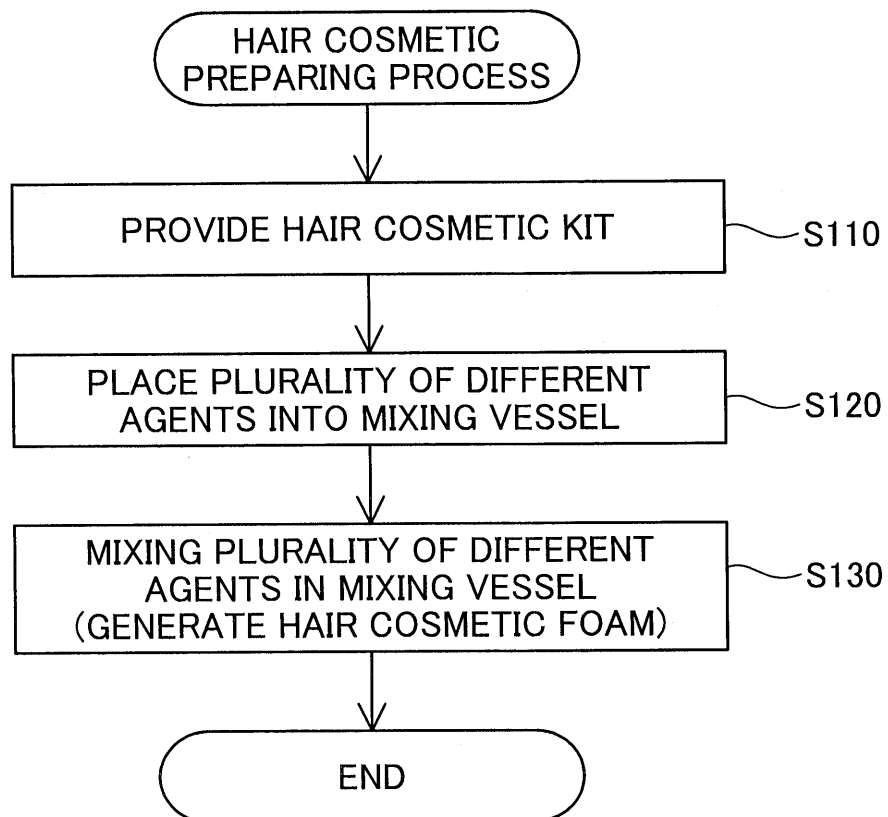


Fig.3

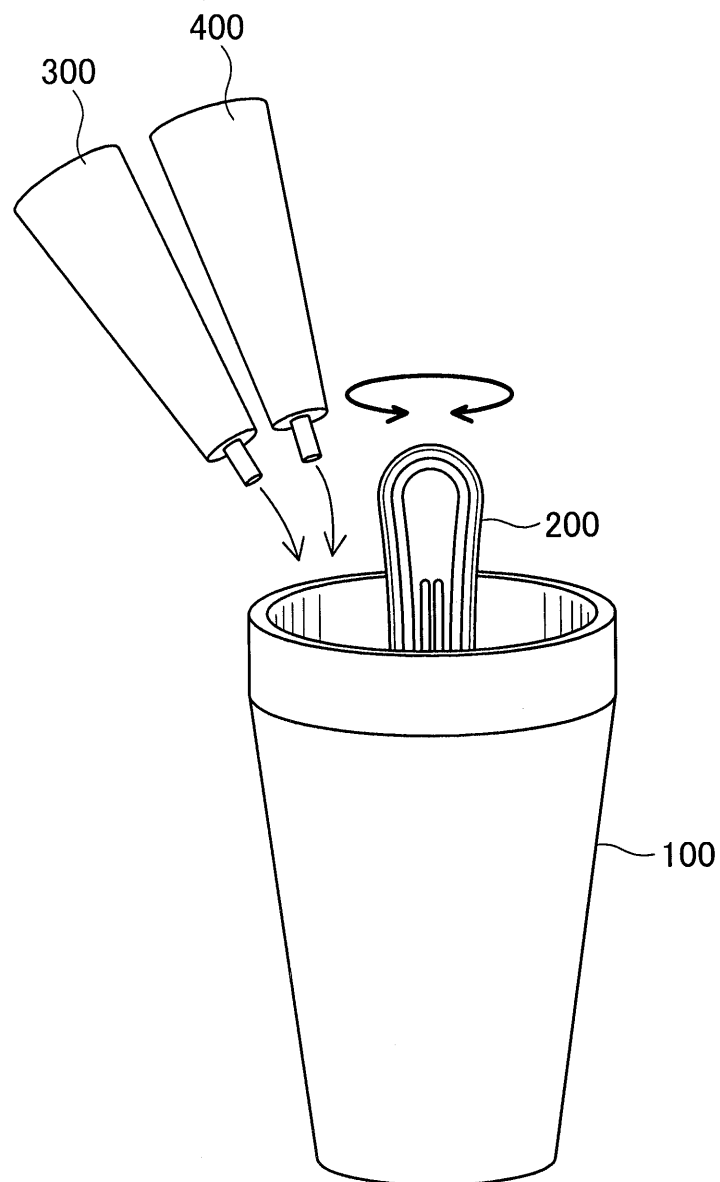


Fig.4

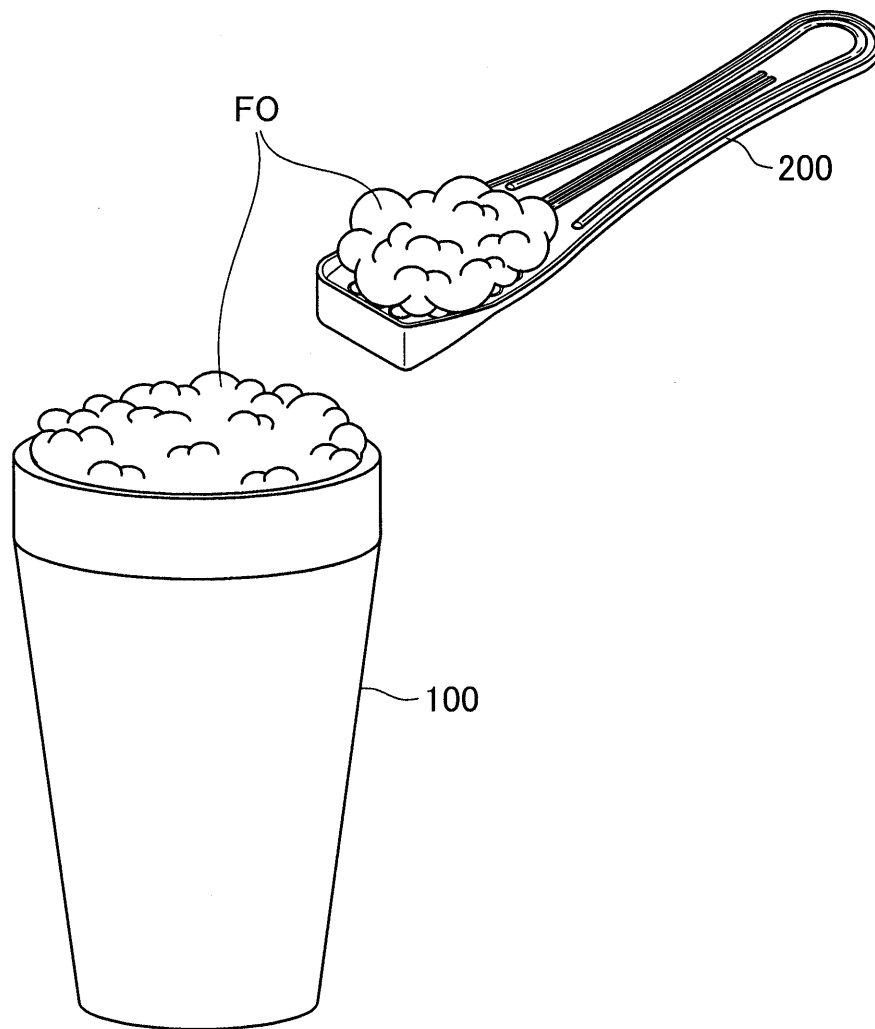


Fig.5

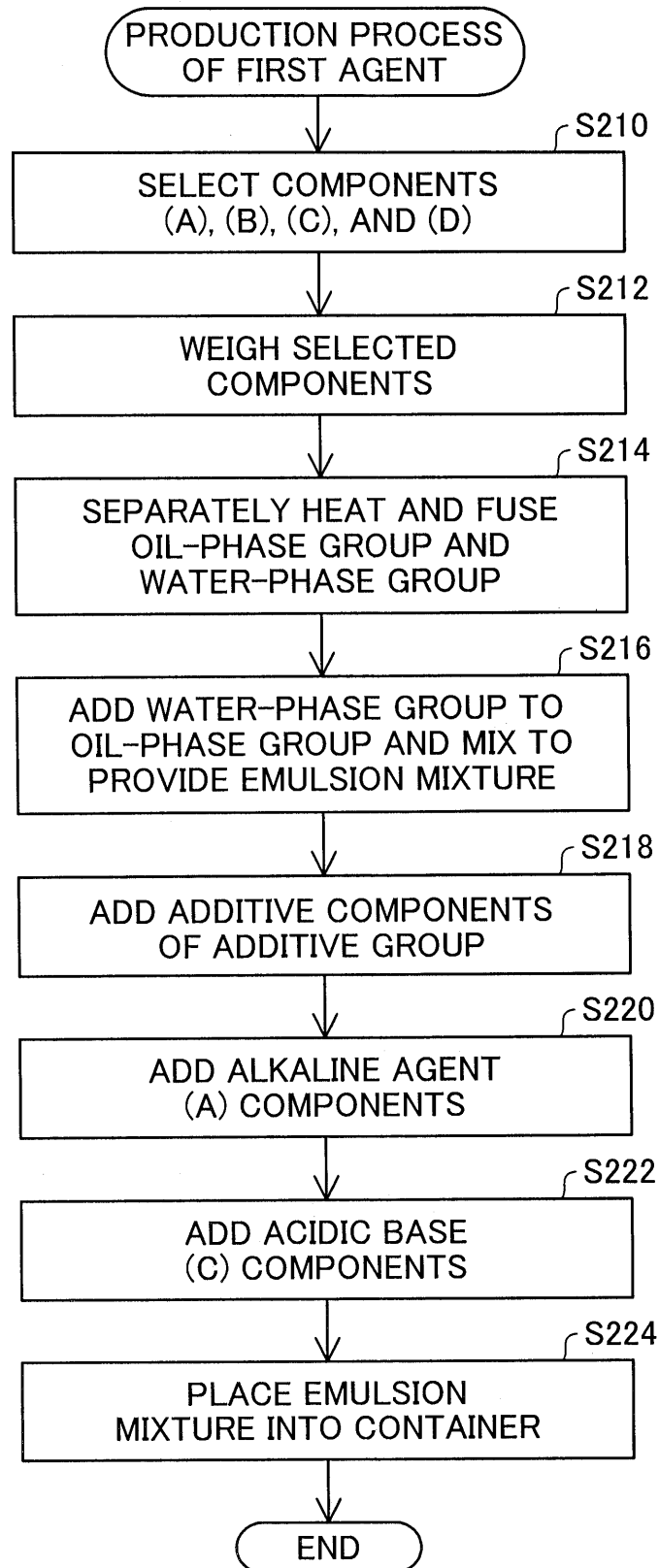


Fig.6

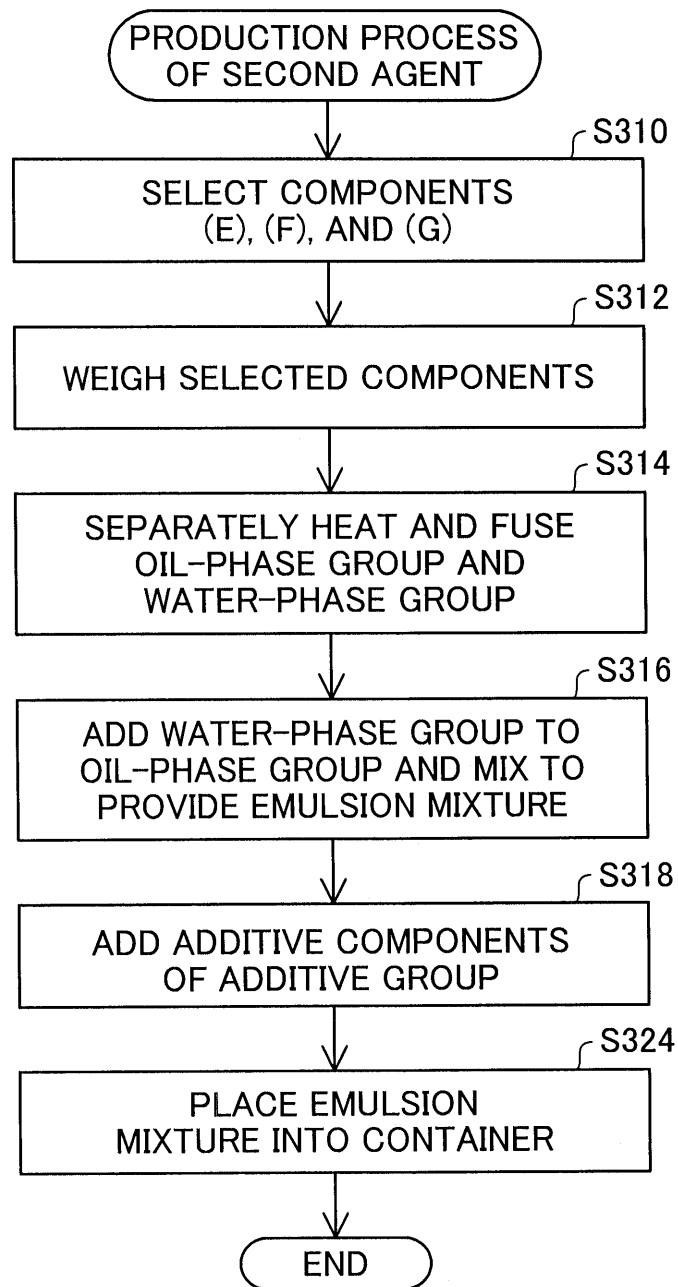


Fig.7

| % by weight                                              | Samples           |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #10               | #11               | #12               | #13               | #14               | #15               | #16               | #17               | #18               | #19               |
| Agent 1                                                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              |
| Cetyl alcohol                                            | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              |
| Potassium carbonate                                      | 10.00             | 10.00             | —                 | —                 | 10.00             | 10.00             | 10.00             | —                 | —                 | 10.00             |
| Ammonium hydrogen carbonate                              | 10.00             | 10.00             | 3.00              | 3.00              | 10.00             | 10.00             | 10.00             | 3.00              | 3.00              | 10.00             |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| Carboxy vinyl polymer                                    | 0.60              | 1.80              | 0.50              | 1.50              | 0.50              | 4.00              | 4.80              | 0.01              | 4.00              | 4.50              |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

"q.s." means quantum sufficit (sufficient quantity).

"adjusted to total" means a quantity added to adjust the total volume.

Fig.8

| % by weight                  | Samples           |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                              | #10               | #11               | #12               | #13               | #14               | #15               | #16               | #17               | #18               | #19               |
| Agent 2                      |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Cetyl alcohol                | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether  | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate         | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              |
| Etidronic acid               | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol               | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             |
| DGME                         | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)      | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             |
| Purified water               | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid =1-hydrogenethane-1,1-diphosphonic acid

DGME: diethylene glycol monoethyl ether

"adjusted to total" means a quantity added to adjust the total volume.

Fig.9

| Performances                               | Samples |        |       |        |     |        |              |       |        |              |
|--------------------------------------------|---------|--------|-------|--------|-----|--------|--------------|-------|--------|--------------|
|                                            | #10     | #11    | #12   | #13    | #14 | #15    | #16          | #17   | #18    | #19          |
| Viscosity of Agent Mixture (mPa·s at 20°C) | 1,560   | 26,000 | 3,600 | 25,600 | 750 | 75,400 | Over 100,000 | 1,200 | 82,600 | Over 100,000 |
| Foam Retention                             | A       | A      | A     | A      | C   | C      | D            | C     | C      | D            |
| Dripping during Application                | A       | A      | A     | A      | D   | A      | A            | D     | A      | A            |
| Dripping during Exposure                   | A       | A      | A     | A      | D   | A      | A            | D     | A      | A            |
| Affinity to Hair                           | A       | A      | A     | A      | A   | C      | D            | A     | C      | D            |

Fig.10

| % by weight                                              | Samples           |                   |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #20               | #21               | #22               | #23               | #24               |
| Agent 1                                                  |                   |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              |
| Cetyl alcohol                                            | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              |
| Stearyl alcohol                                          | —                 | —                 | —                 | —                 | —                 |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              |
| Potassium carbonate                                      | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Ammonium hydrogen carbonate                              | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| Carboxy vinyl polymer                                    | 1.80              | —                 | 0.80              | —                 | —                 |
| Acrylic acid-alkyl methacrylate copolymer                | —                 | 1.60              | 0.80              | —                 | —                 |
| Sodium carboxymethylcellulose                            | —                 | —                 | —                 | 2.40              | —                 |
| Xanthane gum                                             | —                 | —                 | —                 | —                 | 3.00              |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

“q.s.” means quantum sufficiat (sufficient quantity).

“adjusted to total” means a quantity added to adjust the total volume.

Fig.11

| % by weight                  | Samples           |                   |                   |                   |
|------------------------------|-------------------|-------------------|-------------------|-------------------|
|                              | #20               | #21               | #22               | #23               |
| Agent 2                      |                   |                   |                   |                   |
| Cetyl alcohol                | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol             | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether  | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate         | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid              | 5.00              | 5.00              | 5.00              | 5.00              |
| Etidronic acid               | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol               | 0.037             | 0.037             | 0.037             | 0.037             |
| DGMEE                        | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)      | 16.60             | 16.60             | 16.60             | 16.60             |
| Purified water               | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid = 1-hydrogenethane-1,1-diphosphonic acid

DGMEE: diethylene glycol monoethyl ether

"adjusted to total" means a quantity added to adjust the total volume.

Fig.12

| Performances                               | Samples |        |        |        |        |
|--------------------------------------------|---------|--------|--------|--------|--------|
|                                            | #20     | #21    | #22    | #23    | #24    |
| Viscosity of Agent Mixture (mPa·s at 20°C) | 25,600  | 24,600 | 27,600 | 24,200 | 21,000 |
| Foam Retention                             | A       | A      | A      | A      | A      |
| Dispersibility of Thickener                | A       | A      | A      | C      | D      |

Fig.13

| % by weight                                              | Samples           |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #30               | #31               | #32               | #33               |
| Agent 1                                                  |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | q.s.              | q.s.              | q.s.              |
| Cetyl alcohol                                            | 7.50              | 7.50              | 7.50              | 7.50              |
| Stearyl alcohol                                          | —                 | —                 | —                 | —                 |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              |
| Ammonium hydrogen carbonate                              | 3.00              | 3.00              | 3.00              | 3.00              |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 3.00              |
| Potassium hydroxide                                      | 12.00             | —                 | 12.00             | —                 |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              |
| Carboxy vinyl polymer                                    | 1.50              | —                 | —                 | —                 |
| Sodium carboxymethylcellulose                            | —                 | —                 | 2.40              | —                 |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

“q.s.” means quantum sufficit (sufficient quantity).

“adjusted to total” means a quantity added to adjust the total volume.

Fig.14

| % by weight                   | Samples           |                   |                   |                   |
|-------------------------------|-------------------|-------------------|-------------------|-------------------|
|                               | #30               | #31               | #32               | #33               |
| Agent 2                       |                   |                   |                   |                   |
| Cetyl alcohol                 | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol              | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether   | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate          | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate  | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid               | 15.00             | 5.00              | 15.00             | 5.00              |
| Etidronic acid                | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol                | 0.037             | 0.037             | 0.037             | 0.037             |
| DGMEE                         | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)       | 16.60             | 16.60             | 16.60             | 16.60             |
| Carboxy vinyl polymer         | —                 | 1.50              | —                 | —                 |
| Sodium carboxymethylcellulose | —                 | —                 | —                 | 2.40              |
| Purified water                | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid = 1-hydrogenethane-1,1-diphosphonic acid

DGMEE: diethylene glycol monoethyl ether

“adjusted to total” means a quantity added to adjust the total volume.

Fig.15

| Performances                               | Samples |        |        |        |
|--------------------------------------------|---------|--------|--------|--------|
|                                            | #30     | #31    | #32    | #33    |
| pH of Agent 1                              | 13.80   | 8.80   | 13.90  | 8.80   |
| pH of Agent 2                              | 0.98    | 1.10   | 0.98   | 1.11   |
| pH of Agent Mixture                        | 6.95    | 6.70   | 7.01   | 6.75   |
| Viscosity of Agent 1 (mPa·s at 20°C)       | 93,600  | 38,000 | 94,300 | 38,000 |
| Viscosity of Agent 2 (mPa·s at 20°C)       | 2,100   | 10,600 | 2,100  | 45,200 |
| Viscosity of Agent Mixture (mPa·s at 20°C) | 22,100  | 23,900 | 21,500 | 22,000 |
| Foam Retention                             | A       | A      | A      | A      |
| Dispersibility of Thickener                | A       | A      | D      | D      |

Fig.16

| % by weight                                              | Samples           |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #40               | #41               | #42               | #43               | #44               | #45               | #46               | #47               | #48               | #49               | #50               |                   |                   |                   |
| Agent 1                                                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              |                   |                   |                   |
| Cetyl alcohol                                            | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | q.s.              | q.s.              | q.s.              |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | q.s.              | q.s.              | q.s.              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | q.s.              | q.s.              | q.s.              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | q.s.              | q.s.              | q.s.              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | q.s.              | q.s.              | q.s.              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | q.s.              | q.s.              | q.s.              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | q.s.              | q.s.              | q.s.              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | q.s.              | q.s.              | q.s.              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | q.s.              | q.s.              | q.s.              |
| Potassium carbonate                                      | —                 | 10.00             | 20.00             | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Ammonium hydrogen carbonate                              | 3.00              | 10.00             | —                 | 20.00             | —                 | —                 | —                 | —                 | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Sodium carbonate                                         | —                 | —                 | —                 | —                 | 2.00              | —                 | —                 | —                 | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Sodium hydrogen carbonate                                | —                 | —                 | —                 | —                 | —                 | 20.00             | —                 | —                 | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Potassium hydrogen carbonate                             | —                 | —                 | —                 | —                 | —                 | —                 | 20.00             | —                 | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Calcium carbonate                                        | —                 | —                 | —                 | —                 | —                 | —                 | —                 | 2.00              | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Barium carbonate                                         | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | 2.00              | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Propylene carbonate                                      | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | 20.00             | —                 | q.s.              | q.s.              | q.s.              |
| Ethylene carbonate                                       | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | q.s.              | q.s.              | q.s.              |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | q.s.              | q.s.              | q.s.              |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | q.s.              | q.s.              | q.s.              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | q.s.              | q.s.              | q.s.              |
| Carboxy vinyl polymer                                    | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | q.s.              | q.s.              | q.s.              |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | q.s.              | q.s.              | q.s.              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

"q.s." means quantum sufficit (sufficient quantity).

"adjusted to total" means a quantity added to adjust the total volume.

Fig.17

| % by weight                  | Samples           |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                              | #40               | #41               | #42               | #43               | #44               | #45               | #46               | #47               | #48               | #49               | #50               |
| Agent 2                      |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Cetyl alcohol                | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether  | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate         | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              |
| Etidronic acid               | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol               | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             |
| DGMEE                        | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)      | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             |
| Purified water               | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid = 1-hydrogenethane-1,1-diphosphonic acid

DGMEE: diethylene glycol monoethyl ether

“adjusted to total” means a quantity added to adjust the total volume.

Fig.18

| Performances                 | Samples |     |     |     |     |     |     |     |     |     |     |
|------------------------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                              | #40     | #41 | #42 | #43 | #44 | #45 | #46 | #47 | #48 | #49 | #50 |
| Foam Formation during Mixing | A       | A   | A   | A   | A   | A   | A   | A   | A   | D   | D   |
| Solubility of Carbonate      | A       | A   | A   | A   | A   | A   | A   | D   | D   | D   | C   |

Fig.19

| % by weight                                              | Samples           |                   |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #60               | #61               | #62               | #63               | #64               |
| Agent 1                                                  |                   |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | —                 | q.s.              | q.s.              | q.s.              |
| Cetyl alcohol                                            | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              |
| Potassium carbonate                                      | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Ammonium hydrogen carbonate                              | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 3.00              | 13.00             |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| Carboxy vinyl polymer                                    | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

"q.s." means quantum sufficit (sufficient quantity).

"adjusted to total" means a quantity added to adjust the total volume.

Fig.20

| % by weight                  | Samples           |                   |                   |                   |
|------------------------------|-------------------|-------------------|-------------------|-------------------|
|                              | #60               | #61               | #62               | #64               |
| Agent 2                      |                   |                   |                   |                   |
| Cetyl alcohol                | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol             | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether  | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate         | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid              | 25.0              | 5.00              | 0.02              | 0.02              |
| Etidronic acid               | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol               | 0.037             | 0.037             | 0.037             | 0.037             |
| DGMEE                        | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)      | 16.60             | 16.60             | 16.60             | 16.60             |
| Purified water               | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid =1-hydrogenethane-1,1-diphosphonic acid  
 DGMEE: diethylene glycol monoethyl ether  
 "adjusted to total" means a quantity added to adjust the total volume.

Fig.21

| Performances                 | Samples |      |      |      |
|------------------------------|---------|------|------|------|
|                              | #60     | #61  | #62  | #63  |
| pH of Agent Mixture          | 6.00    | 7.50 | 9.00 | 5.00 |
| Color Brightness             | B       | B    | A    | D    |
| Foam Formation during Mixing | A       | A    | B    | A    |
|                              |         |      |      | D    |

Fig.22

| Samples | % by weight | Foam Formation<br>during Mixing | Overflow<br>from Vessel | Usability |
|---------|-------------|---------------------------------|-------------------------|-----------|
| #610    | 1.00        | D                               | B                       | A         |
| #611    | 5.00        | C                               | B                       | A         |
| #612    | 10.00       | B                               | B                       | A         |
| #613    | 20.00       | B                               | C                       | A         |
| #614    | 30.00       | A                               | C                       | B         |
| #615    | 40.00       | A                               | D                       | C         |

Fig.23

| % by weight                                              | Samples           |                   |                   |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #70               | #71               | #72               | #73               | #74               | #75               |
| Agent 1                                                  |                   |                   |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              |
| Cetyl alcohol                                            | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              | 7.50              |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              |
| Ammonium hydrogen carbonate                              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 4.00              | 3.00              | 5.00              |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| Carboxy vinyl polymer                                    | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

“q.s.” means quantum sufficit (sufficient quantity).

“adjusted to total” means a quantity added to adjust the total volume.

Fig.24

| % by weight                  | Samples           |                   |                   |                   |                   |                   |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                              | #70               | #71               | #72               | #73               | #74               | #75               |
| Agent 2                      |                   |                   |                   |                   |                   |                   |
| Cetyl alcohol                | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether  | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate         | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid              | 40.0              | 12.0              | 5.00              | 0.50              | 50.00             | 0.01              |
| Etidronic acid               | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol               | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             |
| DGME                         | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)      | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             |
| Purified water               | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid = 1-hydrogenethane-1,1-diphosphonic acid

DGME: diethylene glycol monoethyl ether

"adjusted to total" means a quantity added to adjust the total volume.

Fig.25

| Performances                 | Samples |      |      |      |      |      |
|------------------------------|---------|------|------|------|------|------|
|                              | #70     | #71  | #72  | #73  | #74  | #75  |
| pH of Agent Mixture          | 1.00    | 3.25 | 6.80 | 8.80 | 0.57 | 9.30 |
| Foam Formation during Mixing | A       | A    | A    | B    | A    | D    |
| Irritation on Scalp          | C       | A    | A    | A    | D    | A    |

Fig.26

| Samples | % by weight | Foam Formation<br>during Mixing | Overflow<br>from Vessel | Usability |
|---------|-------------|---------------------------------|-------------------------|-----------|
| #710    | 1.00        | C                               | B                       | A         |
| #711    | 1.50        | B                               | B                       | A         |
| #712    | 2.00        | B                               | B                       | A         |
| #713    | 3.00        | A                               | C                       | A         |
| #714    | 5.00        | A                               | D                       | A         |
| #715    | 10.00       | A                               | D                       | A         |

Fig.27

| % by weight                                              | Samples           |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|----------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                                          | #80               | #81               | #82               | #83               | #84               | #85               | #86               | #87               | #88               | #89               |
| Agent 1                                                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Oxidative dye                                            | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              | q.s.              |
| Myristyl alcohol                                         | 5.00              | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 |
| Cetyl alcohol                                            | —                 | 7.50              | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 |
| Stearyl alcohol                                          | —                 | —                 | 7.50              | —                 | —                 | —                 | —                 | —                 | —                 | —                 |
| Behenyl alcohol                                          | —                 | —                 | —                 | 10.00             | —                 | —                 | —                 | —                 | —                 | —                 |
| Caprylic alcohol                                         | —                 | —                 | —                 | —                 | 10.00             | —                 | —                 | —                 | —                 | —                 |
| Lauryl alcohol                                           | —                 | —                 | —                 | —                 | —                 | 10.00             | —                 | —                 | —                 | —                 |
| Tetracosanol                                             | —                 | —                 | —                 | —                 | —                 | —                 | 10.00             | —                 | —                 | —                 |
| Myricyl alcohol                                          | —                 | —                 | —                 | —                 | —                 | —                 | —                 | 10.00             | —                 | —                 |
| Caprylyl alcohol                                         | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | 10.00             | —                 |
| Lacceryl alcohol                                         | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | —                 | 10.00             |
| Polyoxyethylene stearyl ether                            | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              | 4.00              |
| Stearyl trimethyl ammonium chloride                      | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              | 2.00              |
| Tetrasodium edetate tetrahydrate                         | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              | 0.20              |
| Sodium sulfite                                           | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Triethanolamine lauryl sulfate                           | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              | 4.20              |
| Sodium polyoxyethylene alkyl (12,13) ether sulfate (3EO) | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              | 2.55              |
| Sodium lauroyl methyl- $\beta$ -alanine                  | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              | 2.10              |
| Lauramidopropyl betaine                                  | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              | 6.30              |
| Potassium carbonate                                      | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Ammonium hydrogen carbonate                              | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Ammonia water (25%)                                      | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| L-ascorbic acid                                          | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              | 0.30              |
| Diallyl dimethyl ammonium chloride-acrylamide copolymer  | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              | 3.00              |
| Carboxy vinyl polymer                                    | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              | 1.80              |
| Aroma chemical                                           | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              | 0.80              |
| Purified Water                                           | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

"q.s." means quantum sufficinat (sufficient quantity).

"adjusted to total" means a quantity added to adjust the total volume.

Fig.28

| % by weight                  | Samples           |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                              | #80               | #81               | #82               | #83               | #84               | #85               | #86               | #87               | #88               | #89               |
| Agent 2                      |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Cetyl alcohol                | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              | 1.00              |
| Propylene glycol             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             | 10.00             |
| Polyoxyethylene cetyl ether  | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              | 0.50              |
| Sodium cetyl sulfate         | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              | 0.60              |
| Di-sodium hydrogen phosphate | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              | 0.10              |
| Phosphoric acid              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              | 5.00              |
| Etidronic acid               | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             | 0.137             |
| Phenoxyethanol               | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             | 0.037             |
| DGMEE                        | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             | 0.022             |
| Hydrogen peroxide (35%)      | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             | 16.60             |
| Purified water               | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total | adjusted to total |

Etidronic acid = 1-hydrogenethane-1,1-diphosphonic acid

DGMEE: diethylene glycol monoethyl ether

"adjusted to total" means a quantity added to adjust the total volume.

Fig.29

| Performances                | Samples |     |     |     |     |     |     |     |     |     |
|-----------------------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                             | #80     | #81 | #82 | #83 | #84 | #85 | #86 | #87 | #88 | #89 |
| Foam Retention              | A       | A   | A   | A   | B   | B   | B   | B   | C   | C   |
| Dripping during Application | A       | A   | A   | A   | B   | B   | B   | B   | C   | C   |
| Dripping during Exposure    | A       | A   | A   | A   | B   | B   | B   | B   | C   | B   |
| Color Brightening           | A       | A   | A   | B   | C   | B   | B   | C   | D   | D   |
| Dyeing Affinity             | A       | A   | A   | A   | C   | B   | B   | C   | C   | C   |