

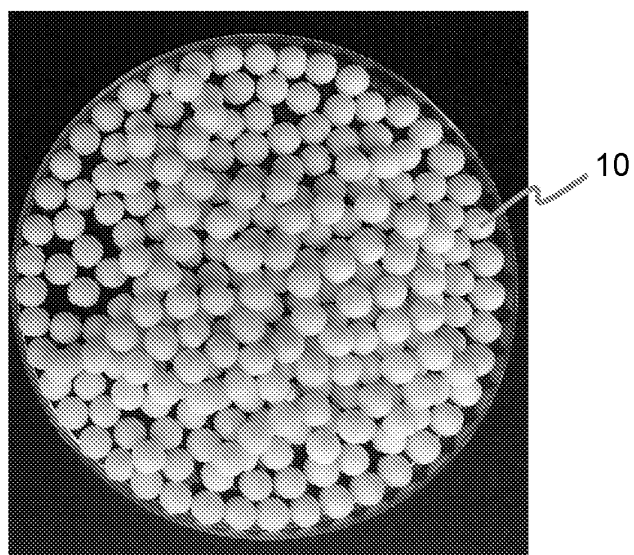


FIG. 1

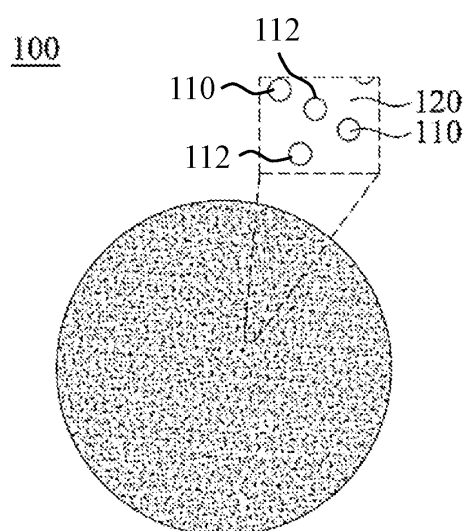


FIG. 2

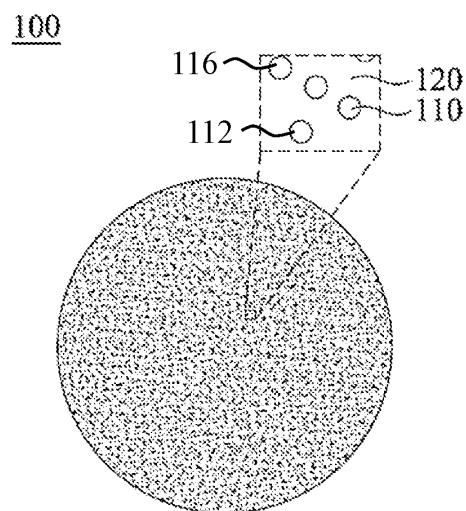


FIG. 3

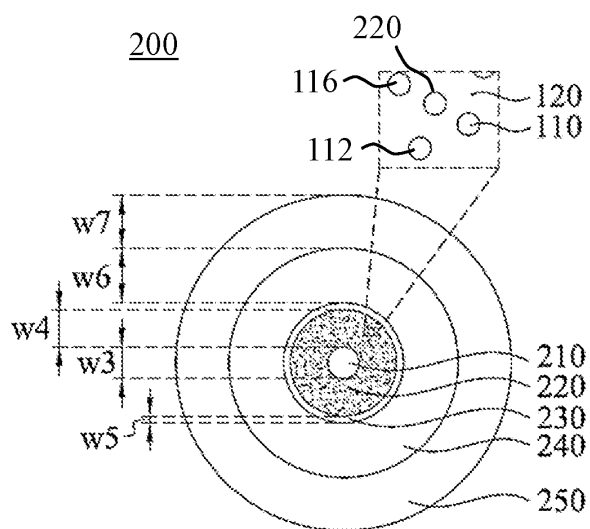


FIG. 4

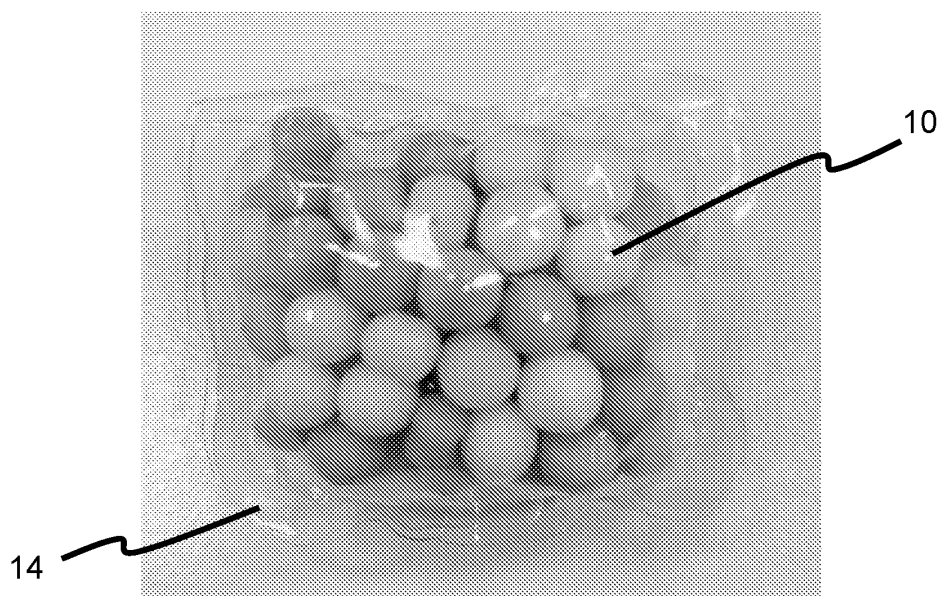


FIG. 5

				Inventive Examples					
				1	2	3	4	5	6
Project	Ingredient	Classification	Specific Component	w/w%					
A	Anionic surfactant	alkyl ester sulfonate surfactant	secondary alkyl sulfonate and/or methyl ester sulfonate	3.000	4.000	6.000	12.000	9.000	12.000
B	Anionic surfactant	alkyl sulphate surfactant	sodium laureth sulfate	15.000	16.000	19.000	16.000	21.000	23.000
A/B Ratio				0.200	0.250	0.316	0.750	0.429	0.522
A+B Total				18.000	20.000	25.000	28.000	30.000	35.000
C	Molding agent	polyhydric alcohol	glycerin, sorbitol, and/or propylene glycol	5.000	4.000	3.500	3.000	3.000	2.500
D	Disintegrant		carboxymethyl cellulose, tartaric acid, and/or citric acid	1.000					
E	Irritating flavor agent or additive		denatonium benzoate	0.001					
F	Fragrance		orange oil	0.500					
G	Enzyme	enzyme	protease, lipase, cellulase, amylase, mannanase, and/or pectinase	0.500					
H	Builder	alkali agent	sodium bicarbonate	20.000					
I		alkali agent	sodium sulfate	to 100					
Characteristics		Measurement Method							
Cohesiveness (g/mm) target 1000-4000		Take an appropriate powder weight of 70g and compress it with a force of 10kg for 30 sec. Compress and destroy the powder column to obtain cohesion. Consolidation Force: 10Kg Consolidation Time: 30sec Max Tracking Speed: 1.00 mm/sec		1879	2021	2231	3254	2875	3004
Sphericity R2/R1 target 0.95-1.0		R1: the longest side of the particle R2: the shorted side of the particle The closer the ratio is to 1, the closer to the spherical shape. 100 averages		0.98	0.98	0.99	0.99	0.98	0.98
Granule Average Size (the mold is 6mm)		Take 100 measurements of particle diameters		6.01	6.00	6.01	6.00	6.00	6.01
Granule Average Size (the mold is 20mm)		Take 100 measurements of particle diameters		20.00	20.00	20.00	20.00	20.00	20.00
Dissolution rate (min:sec) target is <6:00		20g in 60L water @ 25°C with 500rpm		3:30	3:30	3:45	4:00	3:45	4:00
Detergency improvement %		Compared with washing powder		33%	44%	55%	62%	66%	77%

FIG. 6A

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				Inventive Examples					
				7	8	9	10	11	12
Project	Ingredient	Classification	Specific Component	w/w%					
A	Anionic surfactant	alkyl ester sulfonate surfactant	secondary alkyl sulfonate and/or methyl ester sulfonate	15.000	12.000	18.000	21.000	18.000	10.000
B	Anionic surfactant	alkyl sulphate surfactant	sodium laureth sulfate	25.000	36.000	27.000	29.000	38.000	50.000
A/B Ratio				0.600	0.333	0.667	0.724	0.474	0.200
A+B Total				40.000	48.000	45.000	50.000	56.000	60.000
C	Molding agent	polyhydric alcohol	glycerin, sorbitol, and/or propylene glycol	2.000	1.500	1.500	15.000	1.500	1.000
D	Disintegrant		carboxymethyl cellulose, tartaric acid, and/or citric acid	1.000					
E	Irritating flavor agent or additive		denatonium benzoate	0.001					
F	Fragrance		orange oil	0.500					
G	Enzyme	enzyme	protease, lipase, cellulase, amylase, mannanase, and/or pectinase	0.500					
H	Builder	alkali agent	sodium bicarbonate	20.000					
I		alkali agent	sodium sulfate	to 100					
Characteristics		Measurement Method							
Cohesiveness (g/mm) target 1000-4000		Take an appropriate powder weight of 70g and compress it with a force of 10kg for 30 sec. Compress and destroy the powder column to obtain cohesion. Consolidation Force: 10Kg Consolidation Time: 30sec Max Tracking Speed: 1.00 mm/sec		3398	2709	3543	3669	3102	2501
Sphericity R2/R1 target 0.95-1.0		R1: the longest side of the particle R2: the shorted side of the particle The closer the ratio is to 1, the closer to the spherical shape. 100 averages		0.95	0.93	0.95	0.93	0.9	0.9
Granule Average Size (the mold is 6mm)		Take 100 measurements of particle diameters		6.00	6.00	6.01	5.90	5.90	5.90
Granule Average Size (the mold is 20mm)		Take 100 measurements of particle diameters		20.30	19.70	19.80	19.80	19.50	19.60
Dissolution rate (min:sec) target is <6:00		20g in 60L water @ 25°C with 500rpm		4:15	4:30	4:45	5:00	5:30	5:45
Detergency improvement %		Compared with washing powder		88%	106%	99%	110%	123%	132%

FIG. 6B

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				Inventive Examples	Comparative Studies					
				13	1a	1b	1c	4a	13a	
Project	Ingredient	Classification	Specific Component	w/w%						
A	Anionic surfactant	alkyl ester sulfonate surfactant	secondary alkyl sulfonate and/or methyl ester sulfonate	20.000	2.000	2.000	2.000	13.000	20.000	
B	Anionic surfactant	alkyl sulphate surfactant	sodium laureth sulfate	40.000	13.000	13.000	16.000	15.000	45.000	
A/B Ratio				0.500	0.154	0.154	0.125	0.867	0.444	
A+B Total				60.000	15.000	15.000	18.000	28.000	65.000	
C	Molding agent	polyhydric alcohol	glycerin, sorbitol, and/or propylene glycol	1.000	5.000	8.000	5.000	3.000	1.000	
D	Disintegrant		carboxymethyl cellulose, tartaric acid, and/or citric acid	1.000	1.000					
E	Imitating flavor agent or additive		denatonium benzoate	0.001	0.001					
F	Fragrance		orange oil	0.500	0.500					
G	Enzyme	enzyme	protease, lipase, cellulase, amylase, mannanase, and/or pectinase	0.500	0.500					
H	Builder	alkali agent	sodium bicarbonate	20.000	20.000					
I		alkali agent	sodium sulfate	to 100	to 100					
Characteristics		Measurement Method								
Cohesiveness (g/mm) target 1000-4000		Take an appropriate powder weight of 70g and compress it with a force of 10kg for 30 sec. Compress and destroy the powder column to obtain cohesion. Consolidation Force: 10Kg Consolidation Time: 30sec Max Tracking Speed: 1.00 mm/sec		3707	988	1500	992	5009	4804	
Sphericity R2/R1 target 0.95-1.0		R1: the longest side of the particle R2: the shorted side of the particle The closer the ratio is to 1, the closer to the spherical shape. 100 averages		0.9	0.3	>5	0.7	0.99	>5	
Granule Average Size (the mold is 6mm)		Take 100 measurements of particle diameters		5.90	<3	NA	NA	6.00	NA	
Granule Average Size (the mold is 20mm)		Take 100 measurements of particle diameters		19.50	< 10	NA	NA	20.00	NA	
Dissolution rate (min:sec) target is <6:00		20g in 60L water @ 25°C with 500rpm		5:45	NA	NA	NA	7:00	>8:00	
Detergency improvement %		Compared with washing powder		132%	NA	NA	NA	NA	NA	

FIG. 6C

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