FIGURE 1

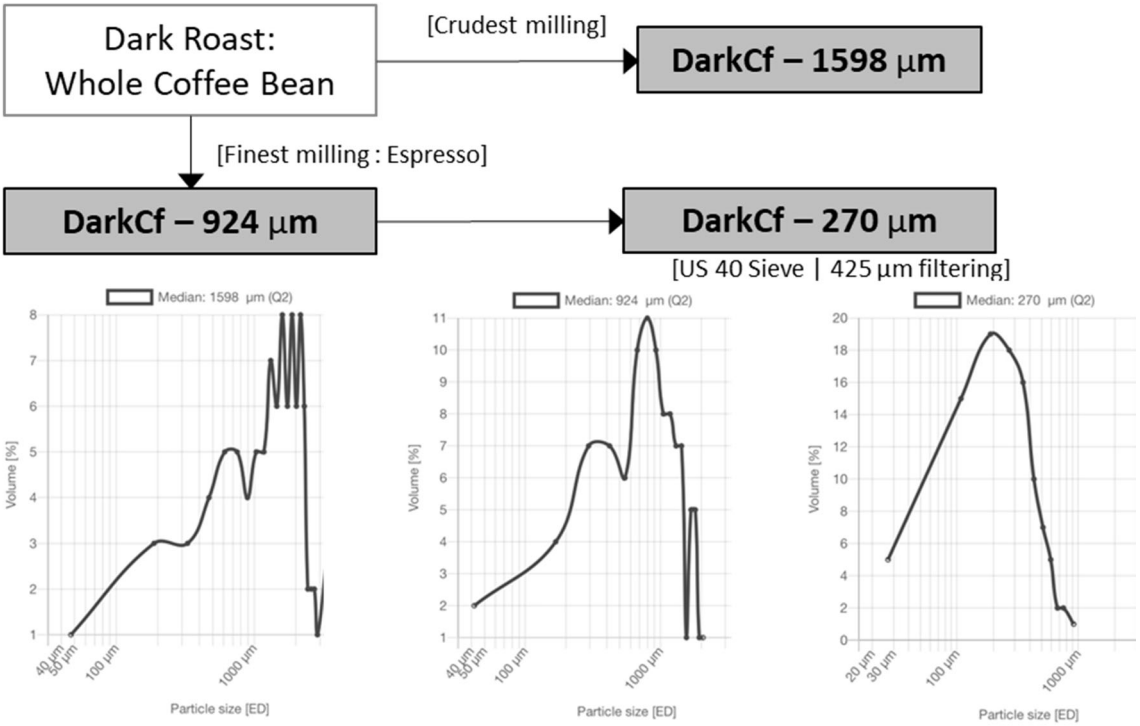

Dark Roast:
Whole Coffee Bean
[Crudest milling]
DarkCf – 1598 μm
[Finest milling : Espresso]
DarkCf – 924 μm
DarkCf – 270 μm
[US 40 Sieve | 425 μm filtering]
Median: 1598 μm (Q2)
Median: 924 μm (Q2)
Median: 270 μm (Q2)
Volume [%]
Particle size [ED]
40 μm
50 μm
100 μm
1000 μm
20 μm
30 μm

FIGURE 2

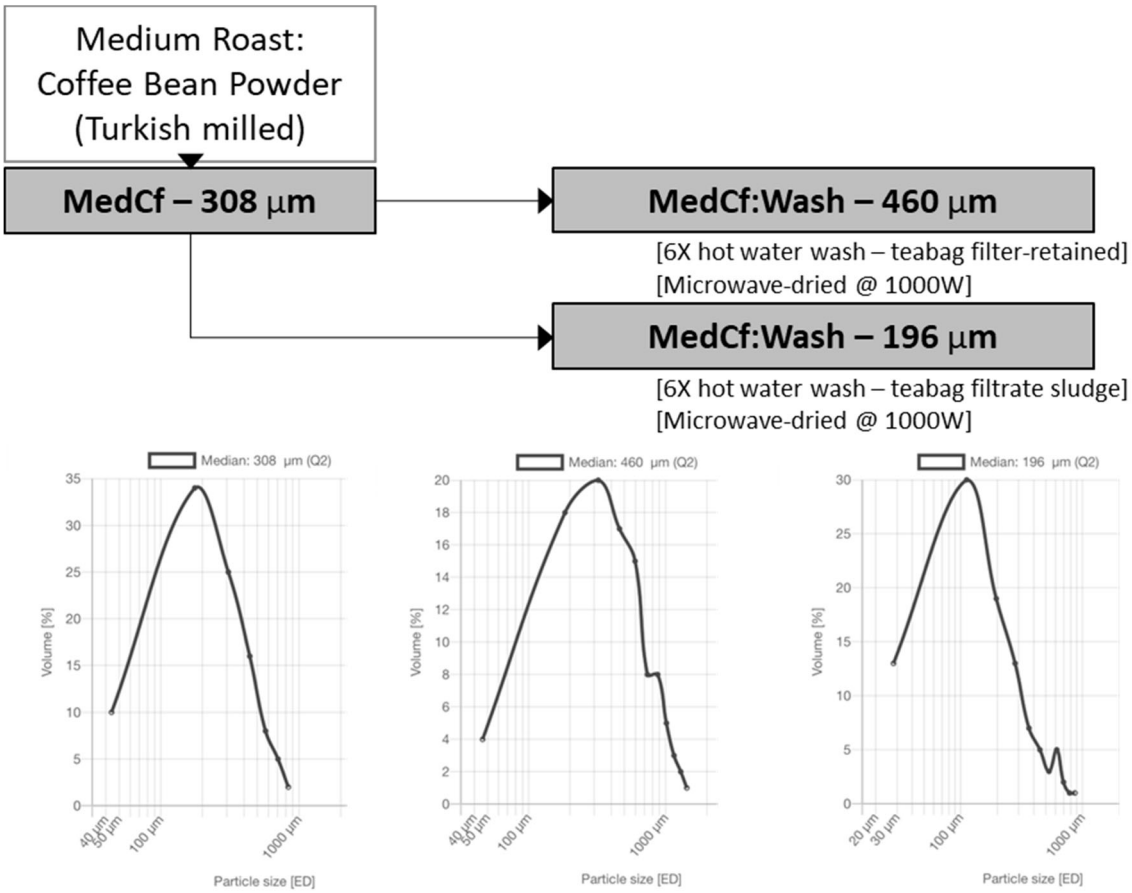

Medium Roast:
Coffee Bean Powder
(Turkish milled)
MedCf – 308 μm
MedCf:Wash – 460 μm
[6X hot water wash – teabag filter-retained]
[Microwave-dried @ 1000W]
MedCf:Wash – 196 μm
[6X hot water wash – teabag filtrate sludge]
[Microwave-dried @ 1000W]
Median: 308 μm (Q2)
Median: 460 μm (Q2)
Median: 196 μm (Q2)
Volume [%]
Particle size [ED]
40 μm
50 μm
100 μm
1000 μm
20 μm
30 μm

FIGURE 3

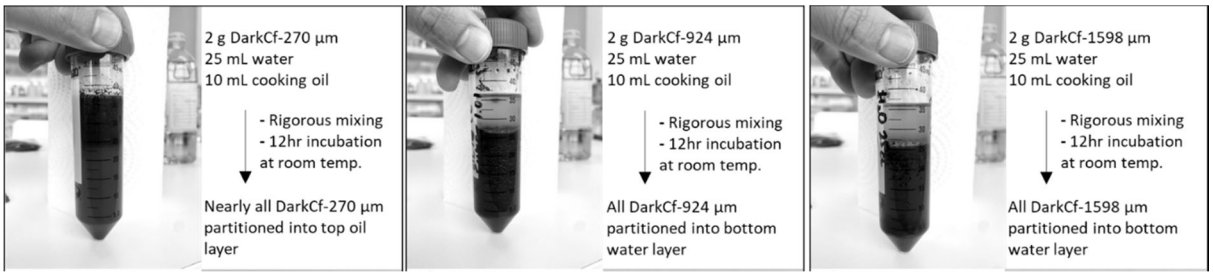
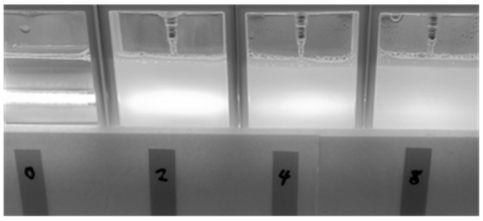

2 g DarkCf-270 µm
25 mL water
10 mL cooking oil
- Rigorous mixing
- 12hr incubation at room temp.
Nearly all DarkCf-270 µm partitioned into top oil layer
2 g DarkCf-924 µm
25 mL water
10 mL cooking oil
- Rigorous mixing
- 12hr incubation at room temp.
All DarkCf-924 µm partitioned into bottom water layer
2 g DarkCf-1598 µm
25 mL water
10 mL cooking oil
- Rigorous mixing
- 12hr incubation at room temp.
All DarkCf-1598 µm partitioned into bottom water layer

FIGURE 4

Colorless emulsion standards

1. Prepare 30 mL water with 0.5% BKC in 50 mL centrifuge tubes.
2. Add cooking oil equivalent to 0%, 2%, 4% or 8% v/v into each tube.
3. Shake rigorously for 30 seconds.
4. Filter using tea bags.
5. pH checked to be 7.
6. Transfer into 50 mL reading cassettes.

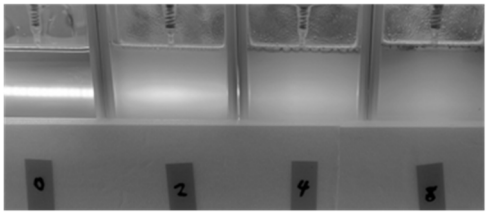


0% 2% 4% 8%

Cooking oil % in water (v/v)

Coffee-color emulsion standards

1. Prepare 30 mL water with 0.5% BKC and 1.5g MedCf-308 µm in 50 mL centrifuge tubes. RT Incubate 12h, then filter using tea bag.
2. Add cooking oil equivalent to 0%, 2%, 4% or 8% v/v into each tube.
3. Shake rigorously for 30 seconds.
4. Filter using tea bags
5. pH checked to be 7.
6. Transfer into 50 mL reading cassettes.



0% 2% 4% 8%

Cooking oil % in water (v/v)

Compare against standards

Compare against standards

Sample preparation for emulsion removal tests

1. Prepare 30 mL water with 0.5% BKC and 8% cooking oil in 50 mL centrifuge tubes.
2. Add applicable amount of test article each the tube.
3. Shake rigorously for 30 seconds. RT incubate for 12h.
4. Filter using tea bags.
5. pH checked to be 7.
6. Transfer into 50 mL reading cassettes.

FIGURE 5

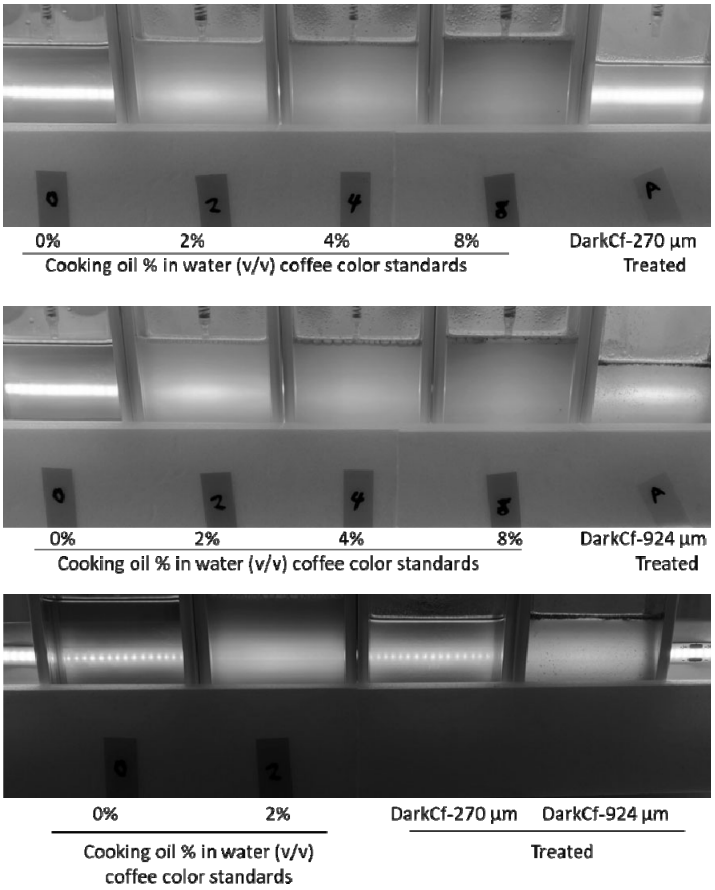


Figure 1. Particle size reduction enhanced oil emulsion removal capacity by fresh dark roast coffee grounds as indicated by reduced light scattering.

FIGURE 6

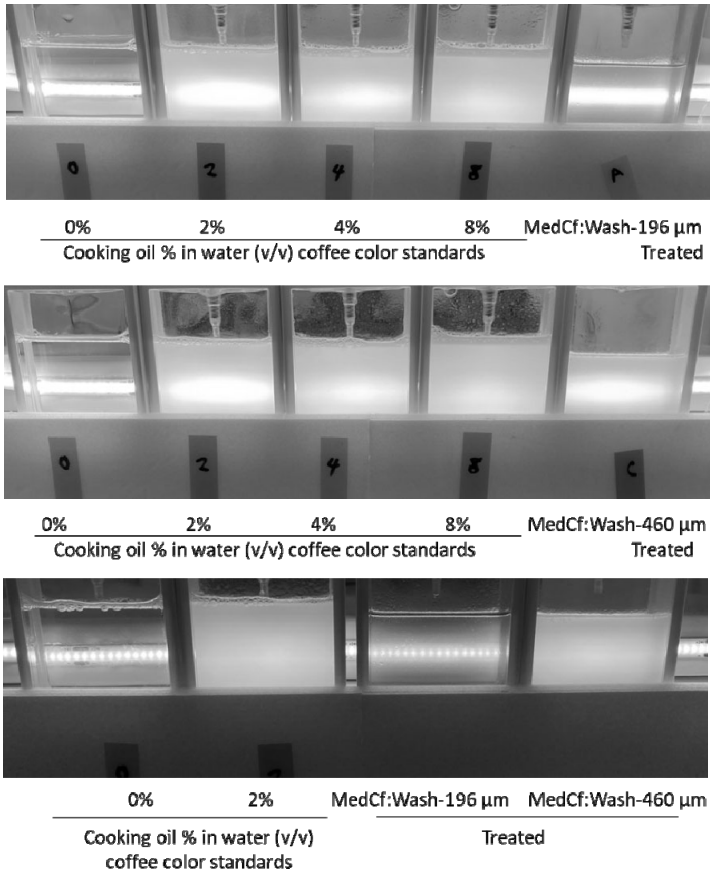
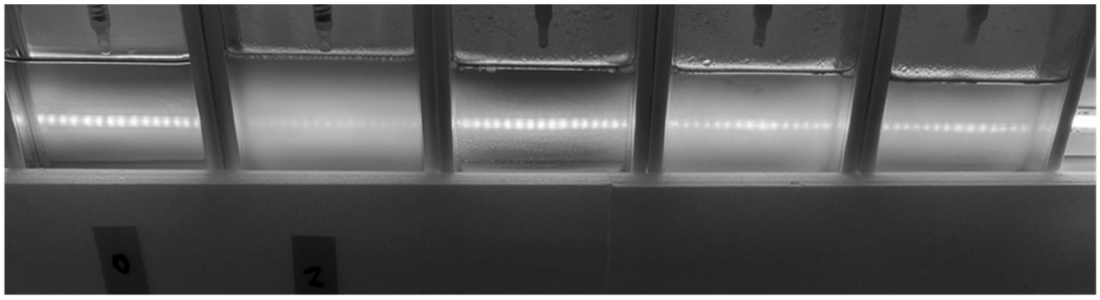


Figure 2. Medium roast and 6x washed spent coffee grounds also displayed enhanced oil emulsion capacity upon particle size reduction as indicated by reduced light scattering.

FIGURE 7

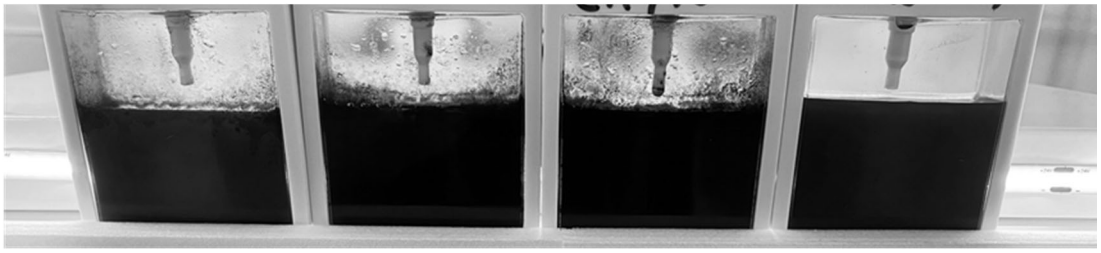


0% 2% 0.5g/30mL 1.0g/30mL 1.5g/30mL

Cooking oil % in water (v/v) coffee color standards

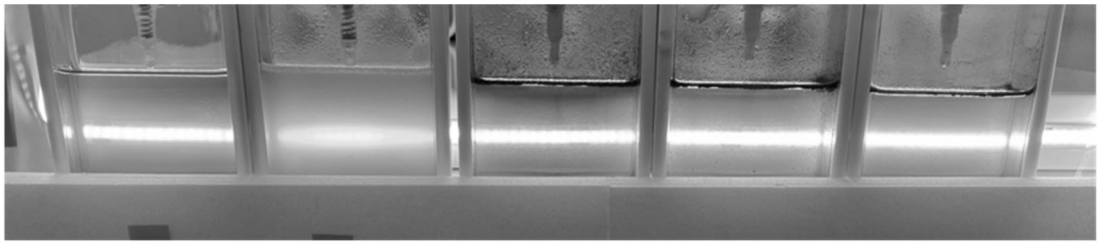
MedCf-308 µm Treatment dose

FIGURE 8



0.5g/30mL	1.0g/30mL	1.5g/30mL	0.5g/30mL
Activated bamboo charcoal in 8% v/v oil-water emulsion with 0.5% BKC			Activated bamboo charcoal in water with 0.5% BKC. NO OIL.

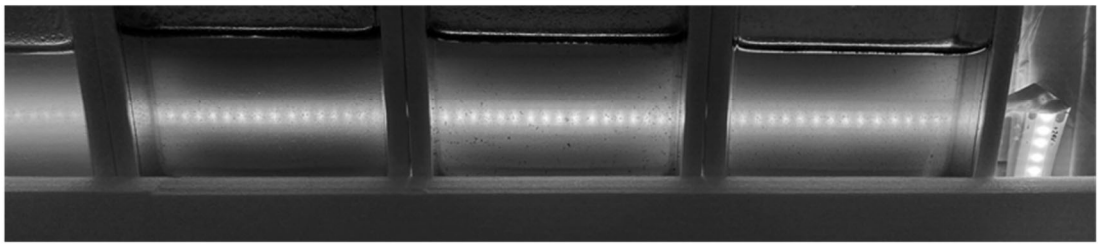
FIGURE 9



0% 2% 0.5g/30mL 1.0g/30mL 1.5g/30mL

Cooking oil % in water (v/v) coffee color standards

MedCf-308/AC mix 5:1 Treatment dose



0.5g/30mL 1.0g/30mL 1.5g/30mL

MedCf-308/AC mix 5:1 Treatment dose