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MICRO-90[®] DEFOAMER EVALUATION WITH 2% MICRO-90[®] & XFO-970

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SUMMARY

XFO-970 can be recommended for use at 0.25% as an effective defoamer in 2% Micro-90[®] without sacrificing detergency, pH, or leaving an oily residue.

PURPOSE

To determine if XFO-970 from Ivanhoe Industries can be used as a defoamer for 2% Micro-90[®] that could be recommended to customers.

INTRODUCTION

Ivanhoe Industries performed tests to determine which of their defoamers would work best in 2% Micro-90[®]. XFO-970 was recommended for use at 0.25-0.4% in 2% Micro-90[®]. Adding the XFO-970 to Micro-90[®] concentrate at their recommendation would result in a minimum of 12.5% XFO-970 in Micro-90[®] concentrate. This cannot be done because the defoamer added at that level nearly halves the water percentage of Micro-90[®] concentrate and is not soluble. Therefore, the tests were conducted by adding the defoamer at 0.25% and Micro-90[®] at 2%. Foam levels, detergency, pH, and residue tests were conducted to evaluate the defoamer.

EXPERIMENTAL

1. Materials and reagents
 - a. Micro-90[®] lot #151021
 - b. XFO-970 (Ivanhoe Industries)
 - c. Tap water
 - d. pH meter (Oakton)
 - e. Graduated cylinders
 - f. 1x3 inch stainless steel 304 coupons
 - g. Bathroom soiled tiles
 - h. Kitchen soiled tiles
 - i. Mineral soiled tiles



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SET-UP

1. Solutions
 - a. The test solution was composed of 2% Micro-90[®] and 0.25% XFO-970.
 - b. A 2% Micro-90[®] solution was used as a control.
 - c. pH was taken for both solutions.

2. Foam
 - a. The foam was tested by pouring 100g of either 2% Micro-90[®] or 2% Micro-90[®] + 0.25% XFO-970 into a graduated cylinder and vigorously shaking 10 times.
 - b. The initial foam reading was recorded in mL.

3. Residue
 - a. 10 drops of each solution was placed on its own respective coupon. The coupons sat at room temperature for 5 days to dry. Pictures were taken before and after rinsing.

4. Soil:
 - a. Bathroom Soil
 - i. Bathroom soil was made 2/5/2016. It was cured in an 80°C oven for 3 hours and then sat at room temperature until use on 2/8/2016. The tiles were soaked for 2 minutes and rinsed under a lightly flowing faucet 20 times.
 - b. Kitchen Soil
 - i. Kitchen soil was made 2/1/2016, solidified at room temperature, and used 2/4/2016. The tiles were soaked in either solution for 60 minutes and rinsed under a lightly flowing faucet 20 times.
 - c. Mineral Soil
 - i. Mineral soil was made 2/5/2016. After applying the soil to the tiles, the tiles sat at room temperature for one hour before being placed in the 80°C oven for 5 hours. The tiles then sat at room temperature until 2/8/2016 when they were used. The tiles were soaked for 45 minutes and rinsed under a lightly flowing faucet 20 times.



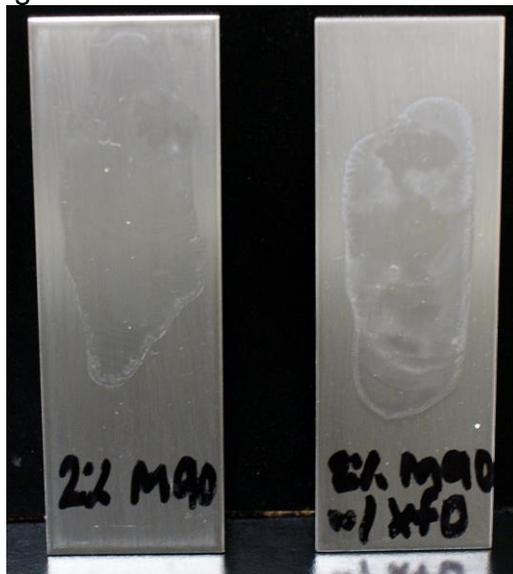
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RESULTS & DISCUSSION

1. pH:
 - a. The pH of 2% Micro-90[®] in tap water was 9.59. The pH of 2% Micro-90[®] + 0.25% XFO-970 was 9.51. The addition of the defoamer does not really affect the pH level.
2. Residue:
 - a. Before rinsing, a residue was clearly present on both coupons. After rinsing and lightly scrubbing, no residue was present.
 - b. Before rinsing:



- c. After rinsing:





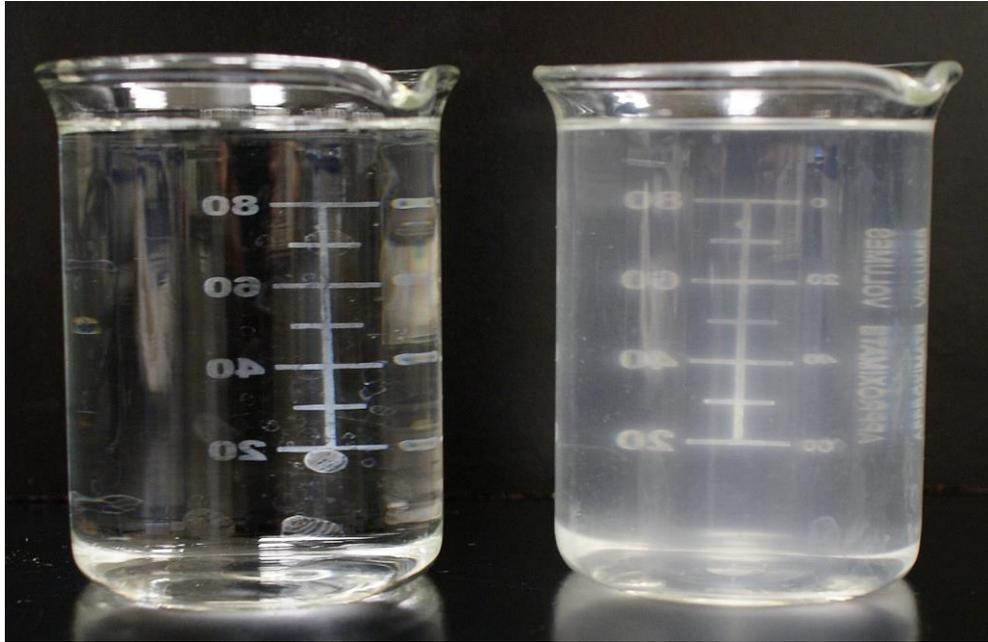
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3. Appearance:

- a. The addition of XFO-970 affects the clarity of the Micro-90[®], causing it to become cloudy. Looking into the beaker with defoamer, one may see slight oil swirls, but after sitting out overnight, there was no additional separation; the solution appeared the same.



Left: 2% Micro-90[®]; right: 2% Micro-90[®] + 0.25% XFO-970.



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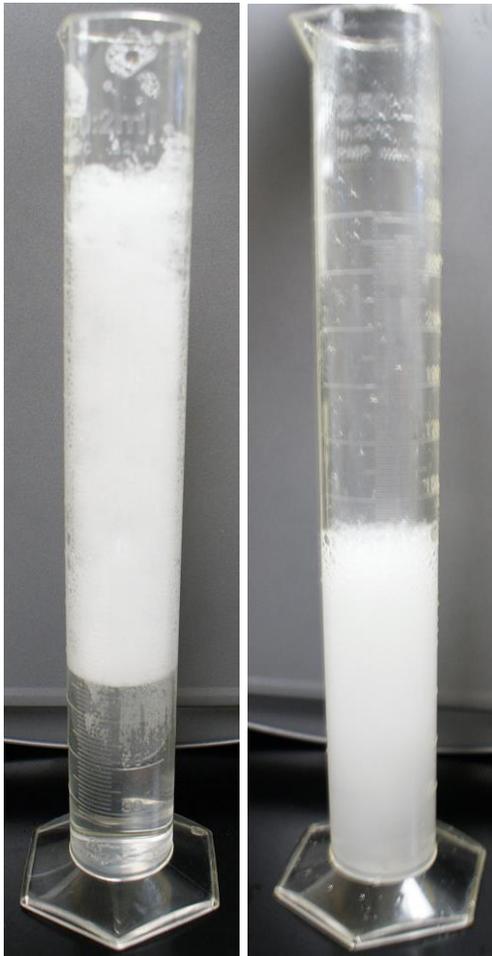
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4. Foam:

- a. The foam for 100g 2% Micro-90® in the graduated cylinder reached 250 mL after being shaken 10 times. The foam for 2% Micro-90® + 0.25% XFO-970 approached somewhere between 130-150 mL but immediately began to collapse.

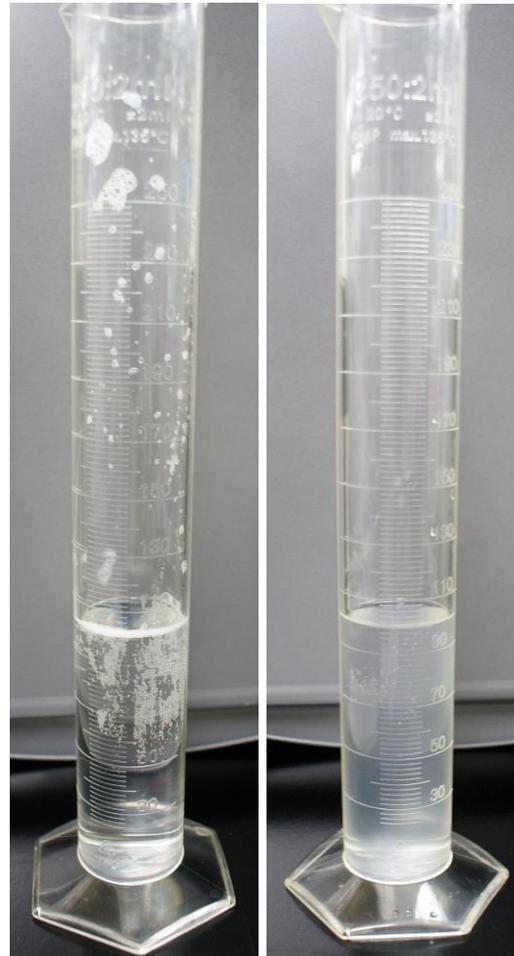
Initial:



Left: 2% Micro-90®, 250mL;
Right: 2% Micro-90® + 0.25% XFO-970, 140 mL.

*Taken a few seconds after shaking.

Final:



Left: 2% Micro-90® after 90 seconds;
Right: 2% Micro-90® + 0.25% XFO-970 after 10 seconds

*Time it took to collapse back to 100 mL



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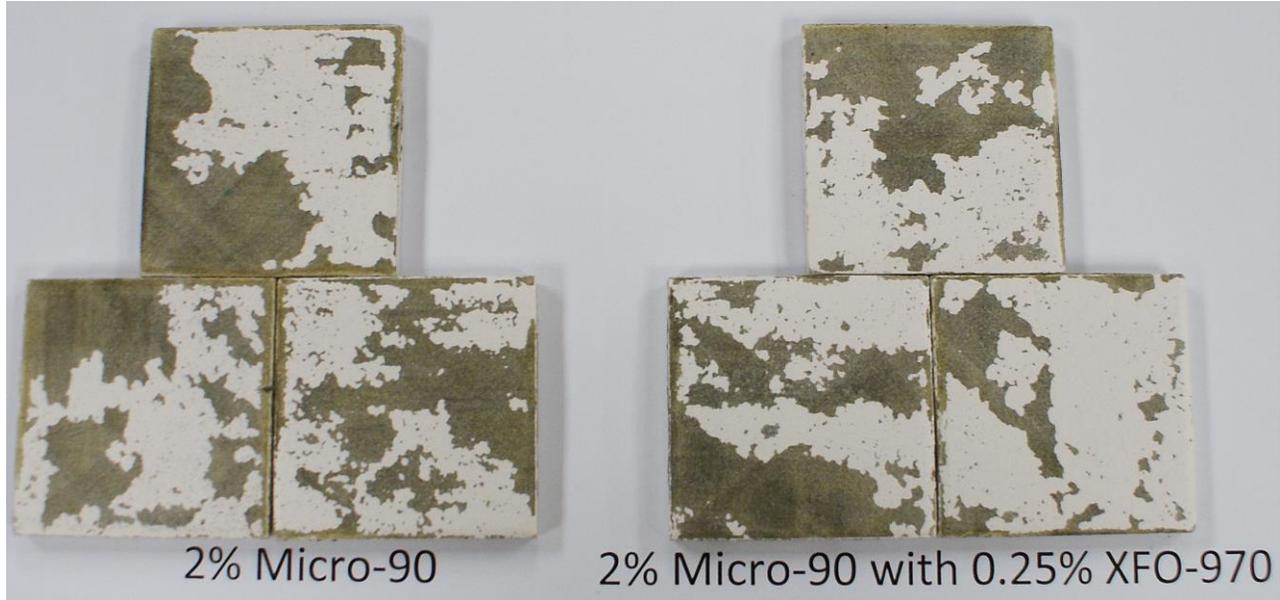
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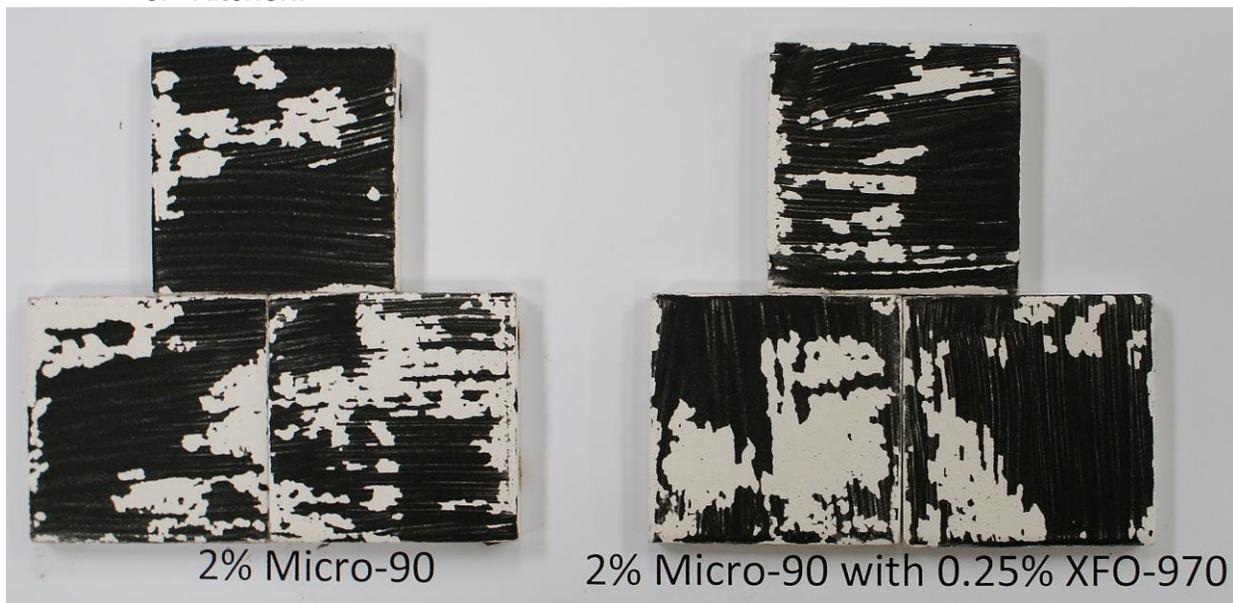
5. Detergency

a. The detergency for all 3 soils does not seem to be sacrificed by adding the defoamer. For the mineral soil, adding the defoamer may have even boosted detergency.

b. Bathroom:



c. Kitchen:



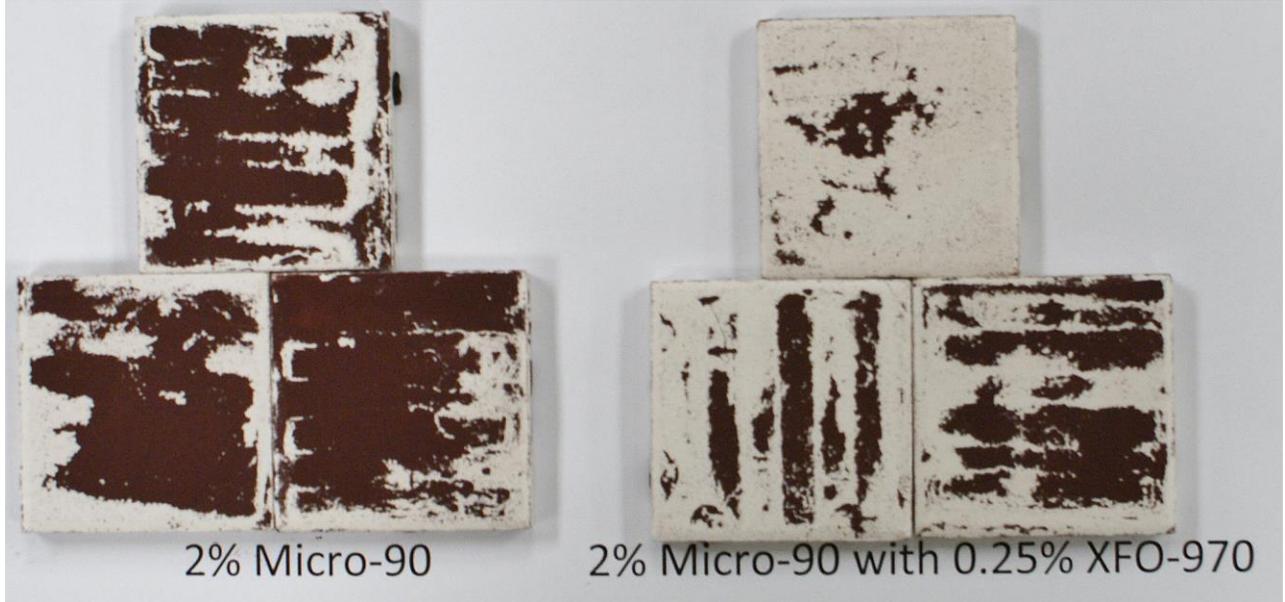


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d. Mineral:



2% Micro-90

2% Micro-90 with 0.25% XFO-970