Title: Optimization of Spore Forming Bacteria Flooding for Enhanced Oil Recovery in North Sea Chalk Reservoir

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Abstract

Little has been done to study microbial enhanced oil recovery (MEOR) in chalk reservoirs. The present study focused on core flooding experiments to see microbial plugging and its effect on oil recovery. A pressure tapped core holder with pressure ports at 1.2 cm, 3.8 cm, and 6.3 cm from the inlet was used for this purpose. A spore forming bacterium, *Bacillus licheniformis* 421, was used as it was shown to be a good candidate in the previous study. Bacterial spore can penetrate deeper into the chalk rock, squeezing through the pore throats. Our results show that *B. licheniformis* 421 when injected as a secondary technique can recover 4% more of the original oil in place (OOIP) as compared with the seawater flooding. Furthermore, when applied as tertiary technique it can recover 1.4% OOIP of the residual oil. The effective permeability decreased in the first two sections of the core (0-1.2 cm and 1.2-3.8 cm) during bacteria injection. Further seawater flooding after three days shut in period showed that permeability gradually increased in the first two sections of the core and started to decrease in the third section of the core (3.8-6.3 cm). Complete plugging was never observed in our experiments.

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