REFERENCES

Amauri, C.H. et al. 2002. The effects of intermittent permeate flow and crossflow on membrane coalescence of oil-in-water emulsions. Desalination 144 : 185-191.

Hwalll, S. and Clayton, J. R. . 1984. The Flow Mechanism of Dilute, Stable Emulsions in Porous Media. Industrial Engineering Chemistry Fundamental 23 : 342-347.

Ian, D., and Sydney R. (2002). Colloidal Dispersions, Suspensions, Emulsions, And Foams. New York : John Wiley and Sons.

James, R. M. et al. (1976). Granular Packed Bed Coalescer: Influence of Packing Wettability on Coalescence. Environmental Science & Technology 10 : 1044-1046.

Jingquan, L. and Yongan, Gu. (2004). Coalescence of oil-in-water emulsions in fibrous and granular beds. Separation and Purification Technology 05 : 1-12.

John, C. B. (1993). Wettability. 49 vols. Surfactant science series. New York : Marcel Dekker.

Kenneth, J. L. (1983). Demulsification, Industrial Applications. New York : Marcel Dekker.

Laurier, L. S. (1992). Emulsions Fundamentals and Applications in the Petroleum Industry. 231 vols. Advances in Chemistry Series. Washington, DC : American Chemical Society.

Lloyd, A. S. and Simon, L. G. (1972). Experiments in Coalescence by Flow through Fibrous Mats. Industrial Engineering Chemistry Fundamental 11,1 : 73-83.

Lloyd, A. S. and Yeang-Po, S. (1977). Coalescence of Oil-in-Water Suspensions by Flow through Porous Media. Industrial Engineering Chemistry Fundamental 16,2 : 272-282.

Nianxi, Y. and Masliyah, H. (1995). Characterization and demulsification of solids-stablized oil-in-water emulsions Part 2. Demulsification by the addition of fresh oil. Colloids and Surfaces A 96 : 243-252.

Nianxi, Y. et al. (1996). Demulsification of solids-stabilized oil-in-water emulsions. Colloids and Surfaces A 117 : 15-25.

Nianxi, Y. et al. (1997). Continuous Demulsification of Solids-Stabilized Oil-in-Water Emulsions by the Addition of Fresh Oil. Materials and Interfaces 36 : 2634-2640.

Radmila, M. et al. (1997). Effect of Working Conditions on Bed Coalescence of an Oil-in-Water Emulsion Using a Polyurethane Foam Bed. Industrial & Engineering Chemistry Research 36 : 4949-4953.

Robert, M. and Eckhart, B. (1997). Separation of liquid-liquid Dispersions by Flow through Fibre Beds. Filtration and Separation 05 : 369-376.

Sharifi, H. and Shaw, J.M. (1996). Secondary Drop Production in Packed-Bed Coalescers. Pergamon 51,21 : 4817-4826.

Walsh, d.c. et al. 1996. The Effect of Solid and Liquid Aerosol Particle Loading on Fibrous Filter Material Performance. Pergamon 27 : s617-s618.

APPENDICES

Appendix A

Table A1. Results of gravity separation experiment.

Media	Temperature	Time (min)	Oil Content (wt%)			
			1st Exp.	2nd Exp.	3Rd Exp.	4th Exp.
Palm Fiber	60	0	0.794	0.826	0.823	0.852
		20	0.773	0.802	0.809	0.777
		40	0.765	0.773	0.802	0.776
		60	0.757	0.753	0.748	0.772
		80	0.747	0.705	0.721	0.767
		100	0.726	0.697	0.726	0.762
	70	0	0.838	0.814	0.791	0.845
		20	0.836	0.752	0.766	0.816
		40	0.834	0.707	0.718	0.809
		60	0.823	0.705	0.715	0.772
		80	0.805	0.646	0.696	0.749
		100	0.792	0.637	0.651	0.717
	80	0	0.825	0.804	0.813	0.813
		20	0.767	0.785	0.777	0.747
		40	0.737	0.761	0.749	0.720
		60	0.687	0.741	0.746	0.702
		80	0.668	0.702	0.716	0.678
		100	0.650	0.670	0.707	0.646
Synthetic Fiber	60	0	0.859	0.792	0.821	0.821
		20	0.770	0.736	0.779	0.779
		40	0.737	0.779	0.760	0.760
		60	0.714	0.725	0.743	0.743
		80	0.711	0.761	0.728	0.728
		100	0.702	0.726	0.713	0.713
	70	0	0.772	0.780	0.788	0.776
		20	0.719	0.759	0.779	0.772
		40	0.673	0.646	0.749	0.700
		60	0.667	0.637	0.728	0.683
		80	0.634	0.617	0.708	0.675
		100	0.619	0.608	0.692	0.664
	80	0	0.866	0.833	0.765	0.820
		20	0.814	0.800	0.741	0.809
		40	0.757	0.788	0.725	0.752
		60	0.751	0.738	0.716	0.749
		80	0.766	0.663	0.644	0.729
		100	0.732	0.642	0.631	0.731
Pumice Stone	60	0	0.775	0.794	0.817	0.880
		20	0.756	0.761	0.738	0.840
		40	0.691	0.785	0.693	0.798
		60	0.713	0.778	0.692	0.781
		80	0.649	0.775	0.686	0.764
		100	0.628	0.772	0.632	0.757
	70	0	0.858	0.762	0.803	0.856
		20	0.848	0.757	0.786	0.833
		40	0.731	0.750	0.774	0.739
		60	0.711	0.753	0.720	0.723
		80	0.711	0.743	0.743	0.719
		100	0.753	0.757	0.748	0.691
	80	0	0.818	0.816	0.816	0.804
		20	0.808	0.787	0.787	0.783
		40	0.733	0.743	0.743	0.706
		60	0.774	0.733	0.733	0.729
		80	0.707	0.696	0.696	0.683
		100	0.777	0.686	0.686	0.678

Table A2. Results of flowing through a packed column experiments.

Media	Temperature	Time(min)	Oil Content(wt%) of Flow Velocity(mm/sec)			
			0.12	0.25	0.40	0.50
Palm Fiber	60	0	0.850	0.847	0.854	0.875
		20	0.763	0.786	0.674	0.589
		40	0.718	0.677	0.467	0.429
		60	0.662	0.514	0.384	0.354
		80	0.563	0.414	0.378	0.345
		100	0.483	0.360	0.340	0.336
	70	0	0.843	0.785	0.854	0.788
		20	0.668	0.744	0.739	0.609
		40	0.661	0.628	0.638	0.515
		60	0.610	0.510	0.572	0.432
		80	0.582	0.417	0.452	0.373
		100	0.572	0.389	0.399	0.377
	80	0	0.753	0.832	0.805	0.834
		20	0.698	0.768	0.651	0.699
		40	0.656	0.723	0.579	0.618
		60	0.595	0.691	0.566	0.572
		80	0.565	0.584	0.565	0.558
		100	0.537	0.537	0.562	0.524
Synthetic Fiber	60	0	0.911	0.815	0.839	0.846
		20	0.864	0.735	0.783	0.797
		40	0.790	0.711	0.772	0.756
		60	0.786	0.697	0.717	0.726
		80	0.744	0.652	0.606	0.628
		100	0.736	0.648	0.588	0.589
	70	0	0.747	0.735	0.720	0.732
		20	0.734	0.713	0.687	0.698
		40	0.730	0.711	0.663	0.667
		60	0.698	0.663	0.638	0.651
		80	0.650	0.621	0.567	0.556
		100	0.617	0.613	0.543	0.542
	80	0	0.771	0.812	0.831	0.855
		20	0.759	0.814	0.822	0.819
		40	0.740	0.806	0.814	0.791
		60	0.736	0.793	0.788	0.779
		80	0.705	0.737	0.735	0.776
		100	0.688	0.689	0.724	0.757
Pumice Stone	60	0	0.751	0.809	0.848	0.809
		20	0.711	0.758	0.790	0.787
		40	0.670	0.716	0.740	0.774
		60	0.628	0.676	0.728	0.716
		80	0.548	0.635	0.682	0.671
		100	0.519	0.584	0.666	0.657
	70	0	0.821	0.893	0.876	0.849
		20	0.766	0.840	0.843	0.835
		40	0.681	0.762	0.804	0.833
		60	0.648	0.718	0.758	0.799
		80	0.630	0.703	0.739	0.728
		100	0.612	0.671	0.714	0.716
	80	0	0.905	0.819	0.849	0.809
		20	0.793	0.784	0.782	0.772
		40	0.739	0.752	0.768	0.764
		60	0.700	0.714	0.746	0.721
		80	0.692	0.674	0.740	0.717
		100	0.687	0.655	0.735	0.706

Table A3 Palm oil content in oil-in-water emulsion from empty column experiments and from gravity separation experiments

Time (min)	Oil Content (wt%)					
	60 Celsius		70 Celsius		80 Celsius	
	Empty Column	Gravity Separation	Empty Column	Gravity Separation	Empty Column	Gravity Separation
0	0.845	0.814	0.850	0.845	0.868	0.858
20	0.787	0.773	0.823	0.816	0.859	0.802
40	0.775	0.765	0.822	0.809	0.857	0.779
60	0.770	0.754	0.786	0.772	0.791	0.777
80	0.758	0.737	0.782	0.749	0.755	0.760
100	0.741	0.731	0.726	0.717	0.747	0.745

VITA

Mr. Threetarn Amaralikit was born on July 15, 1975 in Bangkok, Thailand. Education levels are high school in 1990-1992 from Triam Udom Suksa School, Bangkok, and Bachelor Degree in Chemical Engineering From Burapha University in 1996-2000. The last education is studying in Master Degree in Chemical Engineering, Chulalongkorn University that began in 2001.