

PRESS TECH AGRI-PRESS 600 SOLIDS SEPARATOR PERFORMANCE TEST RESULTS USING  
THE UNIVERSITY OF TENNESSEE TESTING PROTOCOL

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## INTRODUCTION

Confined animal production systems utilizing hydraulic-flush manure collection and transport systems use different methods of solids separation to achieve an effluent low enough in total solids to be recycled as flush water. Mechanical solids separators provide one method of solids reduction for flush systems. The performance of mechanical manure solids separators can vary dramatically with different total solids input concentrations. To properly size and install mechanical manure solids separation units, the separators' performance characteristics must be known for the manure slurry found at the farm in question. The results of these performance tests provide information a planner can use to estimate the expected through-put of material, the resulting mass of solids to be removed and the total solids (TS) content of the recovered solids expected from a given manure slurry. This is important information when sizing process sumps and solids storage areas; it is critical to selecting a unit that can be operated in the time frame desired by the producer. The nutrient partitioning data can be used by nutrient management planners to estimate the mass of nutrients remaining with the recovered solids.

In an effort to provide comparable performance data with a common basis for the selection of mechanical separators, the Biosystems Engineering and Environmental Science Department at The University of Tennessee has developed a standard testing protocol for mechanical manure solids separators. This protocol is designed to provide consultants, engineers and producers with separator performance data across a range of manure total solids input concentrations. The University of Tennessee Biosystems Engineering and Environmental Science Department has the capability to provide field-scale performance testing of manure solids separators with either dairy or swine manure slurries at two university experiment station locations.

The results of the separator performance testing are a comprehensive analysis of the unit, including; press-liquor flow rates over a range of influent total solids (TS) concentrations and the resulting press-cake moisture content, dry-mass capture efficiency, and nutrient partitioning of total kjeldahl nitrogen (TKN), total phosphorus (TP), soluble phosphorus (SP), and potassium (K) between the solids and liquid effluents from the separator.

## UNIT DESCRIPTION

This report presents the results from testing a *PressTech* Agri-Press 600 screw-press (*Press Technology & Manufacturing, Inc.*, Springfield, OH) preceded by a *Bauer* Hydro-sieve static screen (Springfield, OH). The Agri-Press 600 screw-press had a 6-inch diameter continuous flight screw. Two screens were tested on the Agri-Press, a 0.006" wedge-wire screen and a 0.125" round perforated screen. The *Bauer* Hydro-sieve static screen used a 0.060" screen 28" in width and 50" in length. The static-screen was used to pre-thicken the input slurry fed to the screw-press. Testing was performed on June 25 – 27, 2001 at The University of Tennessee Dairy Experiment Station in Lewisburg, TN.

## SEPARATOR TESTING

For the separator performance tests with dairy waste slurry, raw dairy manure and bedding were collected and stored for 48 hours prior to testing. Recovered dairy manure solids are used as bedding material at the UT Dairy Experiment Station where the testing was conducted. The manure and bedding mixture was approximately 20% TS. Each performance test began with a 500 gal (1890 L) tank containing waste with approximately 10% TS. To make 10% TS slurry, collected manure and bedding were mixed with dilution water for 30 minutes using an electric paddle stirrer. The manure slurry was then pumped from the tank to the separator system using an air driven diaphragm pump (Model #2150, *Graco Husky*, Minneapolis, MN). During the testing, the manure slurry storage tank was agitated using a centrifugal wastewater pump (Model #N267-F, *Zoeller Pump Co.*, Louisville, KY). The Agri-Press unit input rate was limited by the maximum flow-rate that the static-screen could process. All test runs with the Agri-Press were made with the static-screen at full capacity. For this test, the Agri-Press 600 screw-press was operated with a screw speed of 25 rpm. All test runs were made with 33 psi of pressure on the outlet cone. The pressure resulted in a press cake with approximately 70% moisture content, which was the desired press-cake moisture content for this test. If a drier press-cake is desired, the Agri-Press unit can be operated with cone outlet pressures of up to 100 psi.

Samples were collected from the influent and effluent points of each unit. These included side-hill influent, side-hill effluent liquor, side-hill effluent cake (same as screw-press influent), screw-press press-liquor, and screw-press press-cake. Test duration at each slurry input TS concentration was based on the time required to recover approximately 50 gal (190 L) of side-hill effluent liquor or press-liquor from the system. Resulting press-cake and liquor volumes were weighed using a *Tru-test* load cell (Model #703, *Tru-test*, Mineral Wells, TX). After testing the system at 10% TS, the manure slurry in the tank was diluted to approximately 8% TS, and the system tested again. Subsequently, tests were performed with approximately 6, 4, 2 and 1% TS influents. Samples were analyzed for total and volatile solids using Standard Method 2540. G (*Standard Methods*, 1998), SP using QuikChem method 12-115-01-1-H (*Lachat Instruments*, Milwaukee, WI), TP using QuikChem method 13-115-01-1-B (*Lachat Instruments*, Milwaukee, WI), TKN using QuikChem method 13-107-06-2-D (*Lachat Instruments*, Milwaukee, WI).

## RESULTS

*Press-Tech* provided a manure separation system for testing that utilized a static-screen pre-thickening unit and an Agri-Press 600 screw-press unit. The results presented here are for the overall system performance, not the performance of the screw-press alone. The system was tested with both a 0.006" wedge wire screen and a 0.125" round perforated screen installed in the Agri-Press separator. The static-screen unit preceding the Agri-Press was equipped with a 0.060" screen for all tests. Information concerning the performance of the static-screen or screw-press only can be found in Appendices A & B of this report. Appendix A provides the complete data set from the test. Appendix B provides graphs of the data set.

### System Results with 0.006" wedge wire screen in Agri-Press Unit

System testing, while the Agri-Press was equipped with a 0.006" screen, was conducted using dairy manure slurries with TS system input concentrations ranging from 1.2 to 8.5%. The press-liquor flow rate through the separator system increased as influent TS concentration decreased (Figure 1). In this report, press-liquor flow rate is the sum of the side-hill liquor and the screw-press liquor. For flow rates from each device, see Appendix A. The press-liquor flow rate of 44.1 gpm occurred at an influent TS concentration of 1.2%. At a slurry influent concentration of 8.5% TS, the system achieved a press-liquor flow rate of 6.4 gpm. The screw-press maintained a constant press-cake moisture consistency throughout the test (Figure 1). The average TS concentration of the press cake was approximately 30% ( $\pm$  5%).

The dry-mass capture efficiency of the separator system remained fairly constant over the range of slurry influent concentrations tested. The average dry-mass capture efficiency was approximately 32 % ( $\pm$  8.5%) (Figure 2). Dry-mass capture efficiency was calculated as follows:

$$\text{Dry-mass capture efficiency (\%)} = \frac{m_{in} (\%TS_{in}) - m_{PL} (\%TS_{PL})}{m_{in} (\%TS_{in})} \times 100 = \frac{m_{PC} (\%TS_{PC})}{m_{in} (\%TS_{in})} \times 100$$

Where  $m_{in}$  is mass influent,  $m_{PL}$  is mass press-liquor and  $m_{PC}$  is mass press-cake.

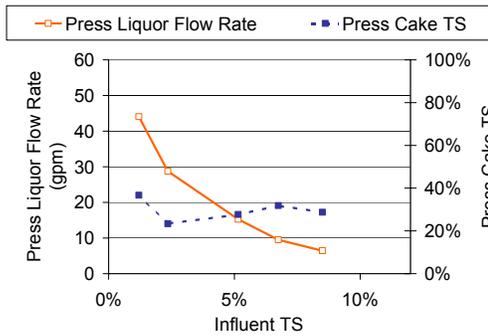


FIGURE 1. Press-Liquor Flow Rate (gpm) and Press-cake Total Solids (TS, %) from the Side Hill / Screw-press Separator System (0.006” screen) as a Function of Influent TS (%) Concentration.

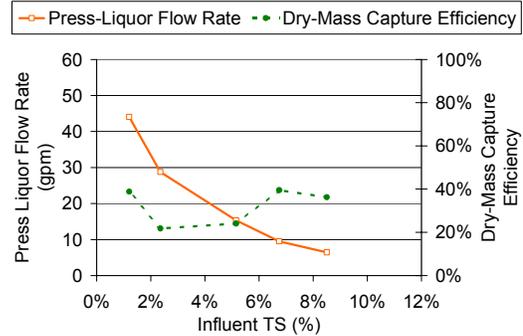


FIGURE 2. Dry-Mass Capture Efficiency by the Side Hill / Screw-press System (0.006” screen) as A Function of Influent Total Solids (%) Concentration.

At an influent TS concentration of 8.5%, 11% of the influent manure mass was recovered in the press-cake, on a wet-weight basis. However, 16.6% of the influent SP, 20.9% of the influent TP and 22.3% of the influent TKN were recovered in the press-cake on a wet-weight basis (Figure 3). Because the percentage of nutrients recovered in the press-cake was greater than the percentage of mass recovered in the press-cake, nutrients were being partitioned into the press-cake. As the influent TS concentration decreases, the previous statement is true for all but one case. At 5.2% influent TS, the percentage of recovered SP is slightly less than the percentage of recovered manure mass. This data point may be attributed to sample handling or analyses error. Percentage of influent constituent recovered in the press-cake was calculated as follows:

$$\text{Percentage in press cake} = \frac{m_{PC-constituent}}{m_{in-constituent}} \times 100$$

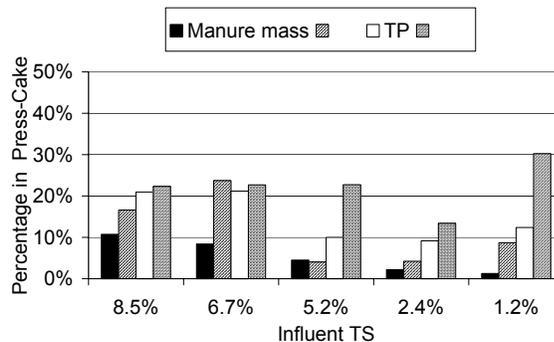


FIGURE 3. Nutrient Partitioning: Percentage of Influent Constituent Recovered in the Press-Cake, on a Wet Basis.

System Results with 0.125” round perforated screen in Agri-Press Unit

While the screw-press contained the 0.125” screen, the system was tested with TS influent concentrations ranging from 1.3 to 11.8%. The separator system press-liquor flow rate increased as influent TS concentration decreased (Figure 4). The maximum press-liquor flow rate of 34.8 gpm occurred at an influent TS concentration of 1.3%. At an influent concentration of 11.8% TS, the system achieved a press-liquor flow rate of 3.9 gpm. The system maintained a press-cake with a TS concentration of 34% ( $\pm 2.4\%$ ) while the influent TS range was between 1.3 and 11% (Figure 4). However, at an influent TS of 11.8% the press-cake TS dropped to 16.6%; this was likely the result of an unsatisfactory cake being built after the machine purged during a previous test.

Generally, the dry-mass capture efficiency of the separator system increased with an increasing influent TS concentration. With a 1.3% TS influent, the dry-mass capture efficiency was 18%, while at 11.8% TS influent the dry-mass capture efficiency was 32% (Figure 5).

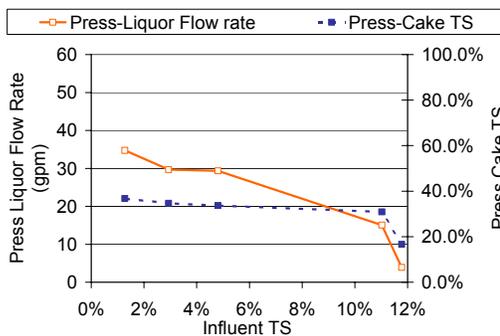


FIGURE 4. Press-liquor Flow Rate (gpm) and Press-cake Total Solids (TS, %) from the Side Hill / Screw-press Separator System (0.125” screen) as a Function of Influent TS (%) Concentration.

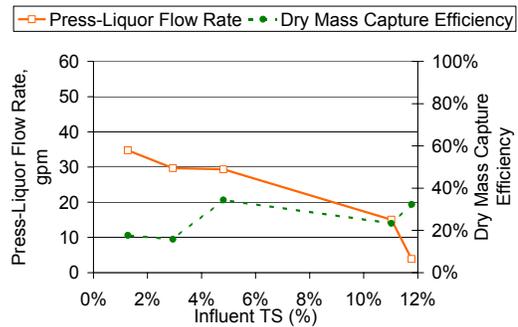


FIGURE 5. Dry-Mass Capture Efficiency by the Side Hill / Screw-press System (0.125” screen) as a Function of Influent Total Solids (%) Concentration.

When the influent TS concentration was 11.8%, SP and TKN were not preferentially partitioned into the press cake. As indicated above, abnormalities in this run may have been the result of the screw-press purging during a previous test. In all other data sets taken using the 0.125” screen, SP, TP and TKN were preferentially partitioned into the press-cake, as shown in Figure 6.

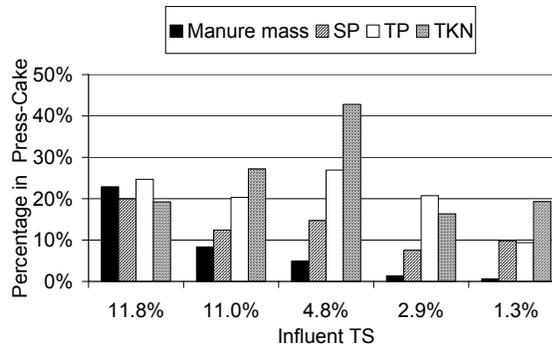


FIGURE 6. Nutrient Partitioning: Percentage of Influent Constituent Recovered in the Press-Cake, on a Wet Basis.

## CONCLUSIONS

The University of Tennessee testing protocol developed for mechanical manure solids separators was used to quantify the performance of a manure solids separation system consisting of a *Bauer* Hydro-sieve static screen followed by a *PressTech* Agri-Press 600, using both a 0.006" wedge wire screen and a 0.125" round perforated screen. The 0.125" perforated screen produced higher press-liquor flow rates than did the 0.006" wedge-wire screen with the exception of the lowest total solids (TS) influent (~ 1% TS). Press-liquor flow rates for this system vary with influent TS concentration and screen size. The flow rates ranged from 3.9 to 44.1 gpm at influent TS concentrations of 11.8 and 1.2%, respectively. The 0.125" screen maintained a higher TS concentration press cake than the 0.006" screen. The average press-cake TS concentration was 34% from the 0.125" screen and 30% from the 0.006" screen. The dry-mass capture efficiency was greater and more consistent when the Agri-Press had the 0.006" screen in place; the average capture efficiency was 32% throughout the testing. When the 0.125" screen was in place the dry-mass capture efficiency varied with influent TS concentration. At 1.3% TS influent, the dry-mass capture efficiency was 18%, while at 11.8% TS influent the dry-mass capture efficiency was 32%. The Agri-Press preferentially partitioned nutrients into the press cake using both screens. The percentages of nutrients recovered from the press-cake during the tests were greater than the percentage of solids recovered in the press-cake.

## VENDER CONTACT INFORMATION

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## REFERENCES

Standard Methods for the Examination of Waste and Wastewater Treatment, 20<sup>th</sup> Edition. 1998. Clesceri L.S., A.E. Greenberg, A.D. Eaton eds. United Book Press Inc., Baltimore, Maryland.

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## **APPENDIX A**

Sample Identification #	Screen Size inches	Initial TS	%TS	%VS	Wet Wt. mass in PC of eff. wet basis		dry mass Dry Wt. of Eff. capture eff.		Vol of eff. (gal)	Run time (min)	Flow rate (gpm)	
					(lb)	%	(lb)	%				
11	Side Hill in	0.006 wedgewire	8.5%	8.5%	78.3%	186.51	11%	15.86	36.22%	22.36	3.10	7.21
16	Side Hill in	0.006 wedgewire	6.7%	6.7%	77.1%	322.74	8%	21.77	39.49%	38.70	3.73	10.37
21	Side Hill in	0.006 wedgewire	5.2%	5.2%	74.7%	558.00	4%	28.76	24.06%	66.91	4.18	16.01
26	Side Hill in	0.006 wedgewire	2.4%	2.4%	82.6%	502.70	2%	11.84	21.77%	60.28	2.05	29.40
31	Side Hill in	0.006 wedgewire	1.2%	1.2%	76.2%	472.68	1%	5.67	38.84%	56.68	1.27	44.63
13	Side Hill liquor	0.006 wedgewire	8.5%	6.1%	82.1%	154.00		9.38		18.47	3.10	5.96
17	Side Hill liquor	0.006 wedgewire	6.7%	4.2%	74.4%	204.00		8.52		24.46	3.73	6.56
22	Side Hill liquor	0.006 wedgewire	5.2%	3.4%	76.2%	451.00		15.40		54.08	4.18	12.94
27	Side Hill liquor	0.006 wedgewire	2.4%	1.9%	68.9%	450.00		8.65		53.96	2.05	26.32
32	Side Hill liquor	0.006 wedgewire	1.2%	0.9%	83.3%	450.00		3.97		53.96	1.27	42.49
12	Side Hill cake	0.006 wedgewire	8.5%	12.0%	74.4%	32.51		3.89				
18	Side Hill cake	0.006 wedgewire	6.7%	11.7%	84.3%	118.74		13.90				
23	Side Hill cake	0.006 wedgewire	5.2%	11.8%	87.1%	107.00		12.64				
28	Side Hill cake	0.006 wedgewire	2.4%	10.3%	89.5%	52.70		5.44				
33	Side Hill cake	0.006 wedgewire	1.2%	8.7%	91.6%	22.68		1.97				
14	Screw Press liquor	0.006 wedgewire	8.5%	4.7%	68.0%	12.51		0.59		1.50	3.10	0.48
19	Screw Press liquor	0.006 wedgewire	6.7%	3.6%	63.7%	91.74		3.31		11.00	3.73	2.95
24	Screw Press liquor	0.006 wedgewire	5.2%	2.8%	70.5%	82.00		2.27		9.83	4.18	2.35
29	Screw Press liquor	0.006 wedgewire	2.4%	2.0%	71.7%	41.70		0.83		5.00	2.05	2.44
34	Screw Press liquor	0.006 wedgewire	1.2%	1.5%	71.9%	16.68		0.25		2.00	1.27	1.57
15	Screw Press cake	0.006 wedgewire	8.5%	28.7%	86.9%	20.00		5.74				System Flow Rate 6.44
20	Screw Press cake	0.006 wedgewire	6.7%	31.8%	88.3%	27.00		8.60				9.51
25	Screw Press cake	0.006 wedgewire	5.2%	27.7%	90.2%	25.00		6.92				15.29
30	Screw Press cake	0.006 wedgewire	2.4%	23.4%	92.7%	11.00		2.58				28.76
35	Screw Press cake	0.006 wedgewire	1.2%	36.7%	94.0%	6.00		2.20				44.06

Sample Identification #	Screen Size inches	SP			TKP			TKN		
		conc. mg/L	mass g	% removed in PC	conc. mg/L	mass g	% removed in PC	conc. mg/L	mass g	% removed in PC
11 Side Hill in	0.006 wedgewire	583	4936	16.6%	1126	9532	20.9%	3320	28110	22.3%
16 Side Hill in	0.006 wedgewire	410	6012	23.7%	764	11189	21.2%	2676	39215	22.7%
21 Side Hill in	0.006 wedgewire	290	7343	4.0%	919	23275	10.0%	1589	40247	22.7%
26 Side Hill in	0.006 wedgewire	148	3374	4.2%	345	7881	9.1%	860	19620	13.4%
31 Side Hill in	0.006 wedgewire	90	1924	8.7%	161	3449	12.3%	263	5633	30.2%
13 Side Hill liquor	0.006 wedgewire	527	3682		782	5465		2225	15556	
17 Side Hill liquor	0.006 wedgewire	331	3062		617	5712		2073	19204	
22 Side Hill liquor	0.006 wedgewire	318	6517		561	11487		1626	33290	
27 Side Hill liquor	0.006 wedgewire	141	2877		215	4389		300	6129	
32 Side Hill liquor	0.006 wedgewire	88	1801		157	3214		425	8690	
12 Side Hill cake	0.006 wedgewire	550	812		934	1379		2841	4194	
18 Side Hill cake	0.006 wedgewire	442	2382		1321	7124		4811	25934	
23 Side Hill cake	0.006 wedgewire	397	1931		1043	5067		2337	11351	
28 Side Hill cake	0.006 wedgewire	393	940		799	1912		2870	6867	
33 Side Hill cake	0.006 wedgewire	268	275		697	718		1900	1956	
14 Screw Press liquor	0.006 wedgewire	573	325		985	560		2447	1390	
19 Screw Press liquor	0.006 wedgewire	137	569		751	3128		3615	15054	
24 Screw Press liquor	0.006 wedgewire	327	1219		573	2133		1775	6606	
29 Screw Press liquor	0.006 wedgewire	136	258		1219	2308		850	1610	
34 Screw Press liquor	0.006 wedgewire	140	106		265	200		268	203	
15 Screw Press cake	0.006 wedgewire	903	820		2198	1996		6911	6275	
20 Screw Press cake	0.006 wedgewire	1162	1425		1932	2369		7249	8885	
25 Screw Press cake	0.006 wedgewire	261	297		2052	2329		8061	9149	
30 Screw Press cake	0.006 wedgewire	286	143		1438	718		5258	2626	
35 Screw Press cake	0.006 wedgewire	612	167		1563	426		6245	1701	

Sample Identification #	Screen Size inches	K			NH3		
		conc. mg/L	mass g	% rem in PC	conc. mg/L	mass g	% removed in PC
11 Side Hill in	0.006 wedgewire	2962	25077	10.0%	679	5752	19.3%
16 Side Hill in	0.006 wedgewire	2016	29545	11.1%	1650	24177	7.8%
21 Side Hill in	0.006 wedgewire	1457	36911	6.2%	424	10749	8.8%
26 Side Hill in	0.006 wedgewire	815	18609	0.8%	265	6044	5.0%
31 Side Hill in	0.006 wedgewire	365	7838	3.2%	111	2391	6.7%
13 Side Hill liquor	0.006 wedgewire	3507	24519		929	6492	
17 Side Hill liquor	0.006 wedgewire	1531	14177		596	5517	
22 Side Hill liquor	0.006 wedgewire	2141	43837		573	11741	
27 Side Hill liquor	0.006 wedgewire	865	17663		231	4729	
32 Side Hill liquor	0.006 wedgewire	363	7420		129	2638	
12 Side Hill cake	0.006 wedgewire	2498	3687		1042	1538	
18 Side Hill cake	0.006 wedgewire	2200	11862		942	5079	
23 Side Hill cake	0.006 wedgewire	2040	9912		733	3560	
28 Side Hill cake	0.006 wedgewire	1153	2759		346	827	
33 Side Hill cake	0.006 wedgewire	478	492		517	532	
14 Screw Press liquor	0.006 wedgewire	2696	1531		1913	1087	
19 Screw Press liquor	0.006 wedgewire	967	4028		87	361	
24 Screw Press liquor	0.006 wedgewire	1583	5892		142	530	
29 Screw Press liquor	0.006 wedgewire	1001	1896		130	245	
34 Screw Press liquor	0.006 wedgewire	519	393		265	200	
15 Screw Press cake	0.006 wedgewire	2751	2498		1220	1108	
20 Screw Press cake	0.006 wedgewire	2675	3279		1531	1877	
25 Screw Press cake	0.006 wedgewire	2032	2306		836	949	
30 Screw Press cake	0.006 wedgewire	294	147		601	300	
35 Screw Press cake	0.006 wedgewire	927	252		587	160	

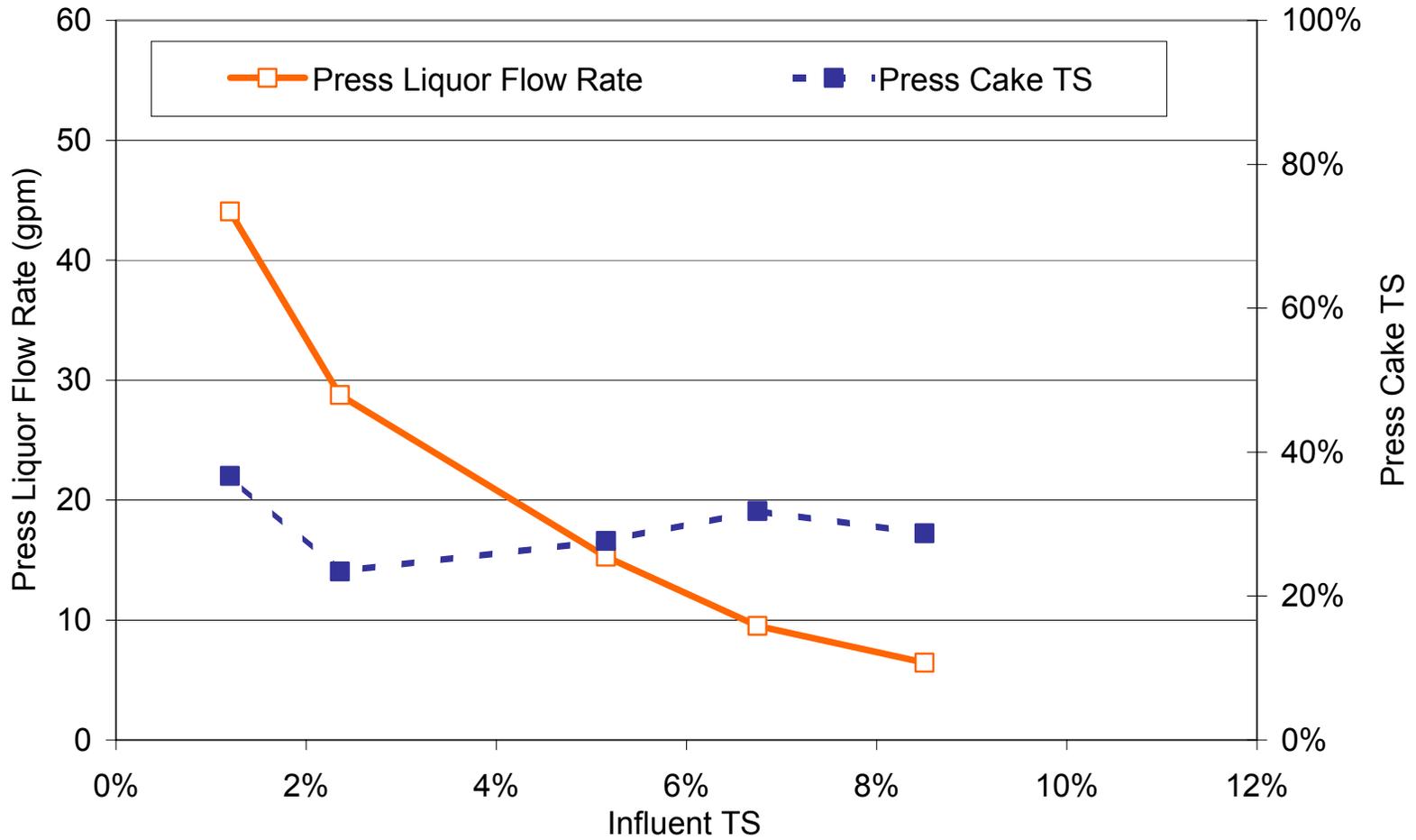
Sample Identification #	Screen Size inches	Initial TS	%TS	%VS	Wet wt. mass in PC		Dry Wt. of Eff. (lb)	dry mass		Vol of eff. (gal)	Run Time (min)	Flow rate (gpm)
					of eff. (lb)	wet basis %		capture eff. %	Vol of eff. (gal)			
36 Side Hill in	0.0125	11.8%	11.8%	76.8%	419.50	23%	49.39			50.30	10.00	5.03
46 Side Hill in	0.0125	11.0%	11.0%	79.0%	828.90	8%	91.37			99.39	6.05	16.43
51 Side Hill in	0.0125	4.8%	4.8%	79.9%	610.12	5%	29.33			73.16	2.37	30.87
56 Side Hill in	0.0125	2.9%	2.9%	83.7%	522.04	1%	15.34			62.59	2.08	30.09
61 Side Hill in	0.0125	1.3%	1.3%	80.7%	489.85	1%	6.25			58.74	1.68	34.96
37 Side Hill liquor	0.0125	11.8%	8.3%	73.5%	115.00		9.57			13.79	10.00	1.38
47 Side Hill liquor	0.0125	11.0%	4.8%	72.4%	468.00		22.52			56.12	6.05	9.28
52 Side Hill liquor	0.0125	4.8%	3.7%	73.6%	430.00		15.89			51.56	2.37	21.75
57 Side Hill liquor	0.0125	2.9%	2.3%	74.6%	465.00		10.87			55.76	2.08	26.81
62 Side Hill liquor	0.0125	1.3%	1.0%	58.5%	466.00		4.77			55.88	1.68	33.26
38 Side Hill cake	0.0125	11.8%	17.8%	81.1%	304.50		54.05					
48 Side Hill cake	0.0125	11.0%	13.9%	87.5%	360.90		50.07					
53 Side Hill cake	0.0125	4.8%	13.1%	87.2%	180.12		23.60					
58 Side Hill cake	0.0125	2.9%	12.0%	90.2%	57.04		6.85					
63 Side Hill cake	0.0125	1.3%	10.0%	92.5%	23.85		2.38					
39 Screw Press liquor	0.0125	11.8%	6.8%	70.0%	208.50		14.24			25.00	10.00	2.50
49 Screw Press liquor	0.0125	11.0%	4.6%	72.7%	291.90		13.29			35.00	6.05	5.79
54 Screw Press liquor	0.0125	4.8%	3.5%	92.9%	150.12		5.25			18.00	2.37	7.59
59 Screw Press liquor	0.0125	2.9%	2.0%	69.9%	50.04		1.02			6.00	2.08	2.88
64 Screw Press liquor	0.0125	1.3%	2.7%	77.2%	20.85		0.57			2.50	1.68	1.49
40 Screw Press cake	0.0125	11.8%	16.6%	80.5%	96.00		15.93	32%				3.88
50 Screw Press cake	0.0125	11.0%	30.9%	88.2%	69.00		21.31	23%				15.06
55 Screw Press cake	0.0125	4.8%	33.6%	89.7%	30.00		10.09	34%				29.35
60 Screw Press cake	0.0125	2.9%	34.6%	92.2%	7.00		2.43	16%				29.69
65 Screw Press cake	0.0125	1.3%	36.7%	93.6%	3.00		1.10	18%				34.75

Sample Identification #	Screen Size inches	SP			TKP			TKN			
		conc. mg/L	mass g	% removed in PC	conc. mg/L	mass g	% removed in PC	conc. mg/L	mass g	% removed in PC	
36	Side Hill in	0.0125	672	12806	19.4%	1230	23424	24.7%	4056	77254	19.2%
46	Side Hill in	0.0125	590	22209	12.4%	836	31449	20.3%	1861	70022	27.2%
51	Side Hill in	0.0125	298	8249	14.7%	642	17784	26.9%	832	23053	42.8%
56	Side Hill in	0.0125	137	3239	7.5%	250	5925	20.7%	604	14326	16.3%
61	Side Hill in	0.0125	55	1226	9.8%	112	2499	9.4%	248	5504	19.3%
37	Side Hill liquor	0.0125	1699	8872		2313	12074		3626	18931	
47	Side Hill liquor	0.0125	523	11119		680	14459		1604	34081	
52	Side Hill liquor	0.0125	297	5805		561	10959		1556	30376	
57	Side Hill liquor	0.0125	213	4502		332	7017		489	10325	
62	Side Hill liquor	0.0125	62	1304		147	3110		211	4461	
38	Side Hill cake	0.0125	654	9041		1397	19319		4678	64675	
48	Side Hill cake	0.0125	346	5662		1046	17141		3466	56793	
53	Side Hill cake	0.0125	346	2827		806	6592		2629	21499	
58	Side Hill cake	0.0125	315	815		8055	20860		2353	6094	
63	Side Hill cake	0.0125	264	286		520	563		1156	1252	
39	Screw Press liquor	0.0125	828	7838		1152	10906		3355	31758	
49	Screw Press liquor	0.0125	481	6377		855	11334		2578	34158	
54	Screw Press liquor	0.0125	317	2161		465	3171		943	6428	
59	Screw Press liquor	0.0125	227	515		383	869		1058	2402	
64	Screw Press liquor	0.0125	175	166		436	412		794	752	
40	Screw Press cake	0.0125	586	2555		1327	5782		3411	14868	
50	Screw Press cake	0.0125	879	2752		2037	6383		6070	19016	
55	Screw Press cake	0.0125	891	1213		3512	4783		7245	9868	
60	Screw Press cake	0.0125	765	243		3862	1227		7352	2336	
65	Screw Press cake	0.0125	881	120		1720	234		7806	1063	

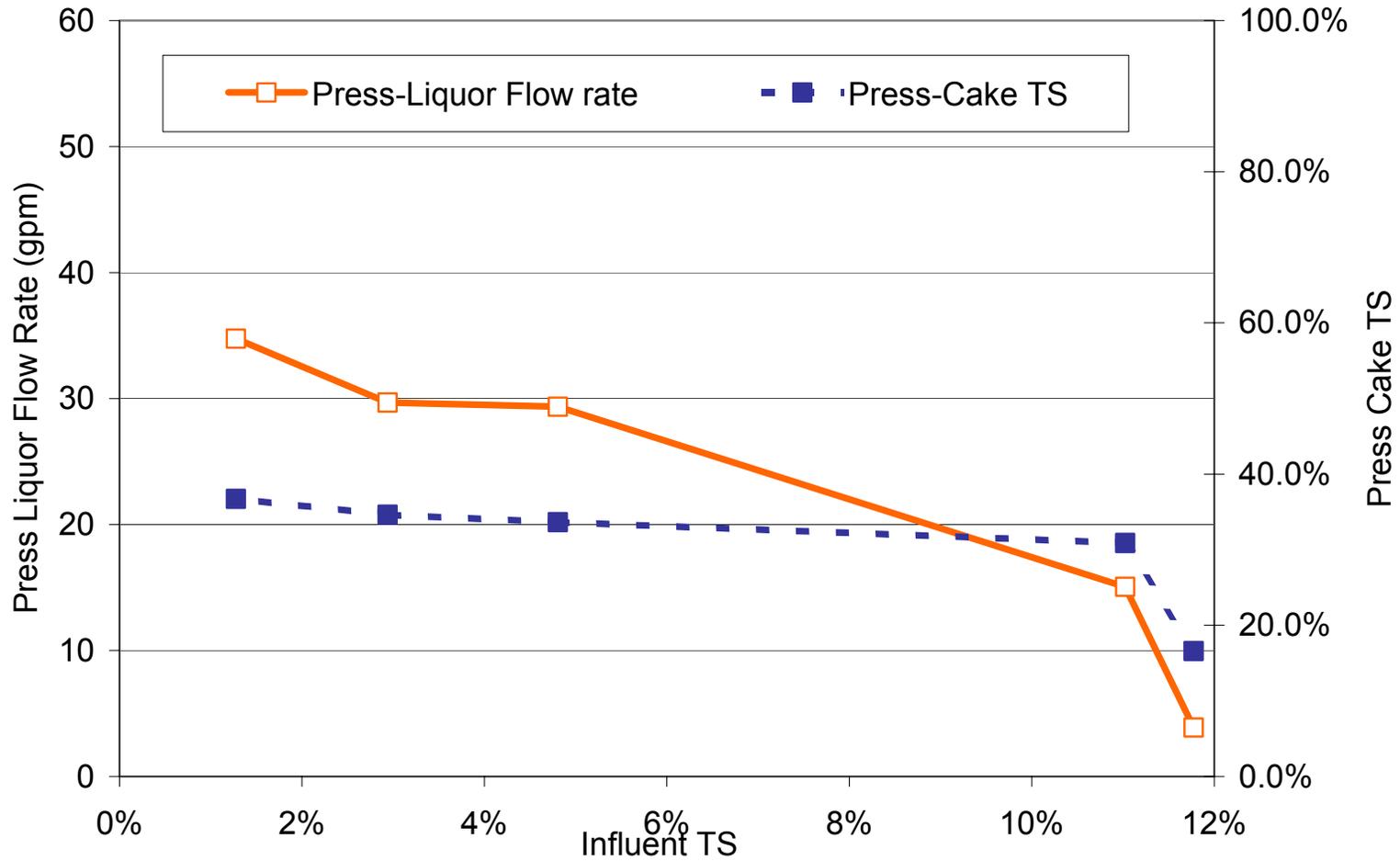
Sample Identification			K			NH3		
			concentration	mass	% removed	concentration	mass	% removed
#		Screen Size	mg/L	g	in PC	mg/L	g	in PC
36	Side Hill in	0.0125	3839	73122	7.5%	1528	29104	5.0%
46	Side Hill in	0.0125	2825	106306	6.1%	1149	43237	7.6%
51	Side Hill in	0.0125	1389	38465	6.2%	108	2996	27.3%
56	Side Hill in	0.0125	70556	167221	0.0%	325	7694	1.9%
61	Side Hill in	0.0125	408	9073	1.5%	51	1133	6.5%
37	Side Hill liquor	0.0125	3839	20045		1528	7978	
47	Side Hill liquor	0.0125	2332	49554		665	14123	
52	Side Hill liquor	0.0125	1624	31707		384	7489	
57	Side Hill liquor	0.0125	5517	116476		89	1868	
62	Side Hill liquor	0.0125	292	6183		117	2467	
38	Side Hill cake	0.0125	3790	52389		2060	28482	
48	Side Hill cake	0.0125	1581	25898		630	10321	
53	Side Hill cake	0.0125	1953	15967		879	7189	
58	Side Hill cake	0.0125	1802	4666		645	1670	
63	Side Hill cake	0.0125	495	536		253	274	
39	Screw Press liquor	0.0125	2566	24291		558	5283	
49	Screw Press liquor	0.0125	2302	30501		115	1521	
54	Screw Press liquor	0.0125	1708	11641		545	3711	
59	Screw Press liquor	0.0125	1391	3161		441	1001	
64	Screw Press liquor	0.0125	507	480		61	58	
40	Screw Press cake	0.0125	1264	5510		333	1453	
50	Screw Press cake	0.0125	2068	6478		1053	3300	
55	Screw Press cake	0.0125	1757	2393		600	817	
60	Screw Press cake	0.0125	1471	467		450	143	
65	Screw Press cake	0.0125	988	134		543	74	

## **APPENDIX B**

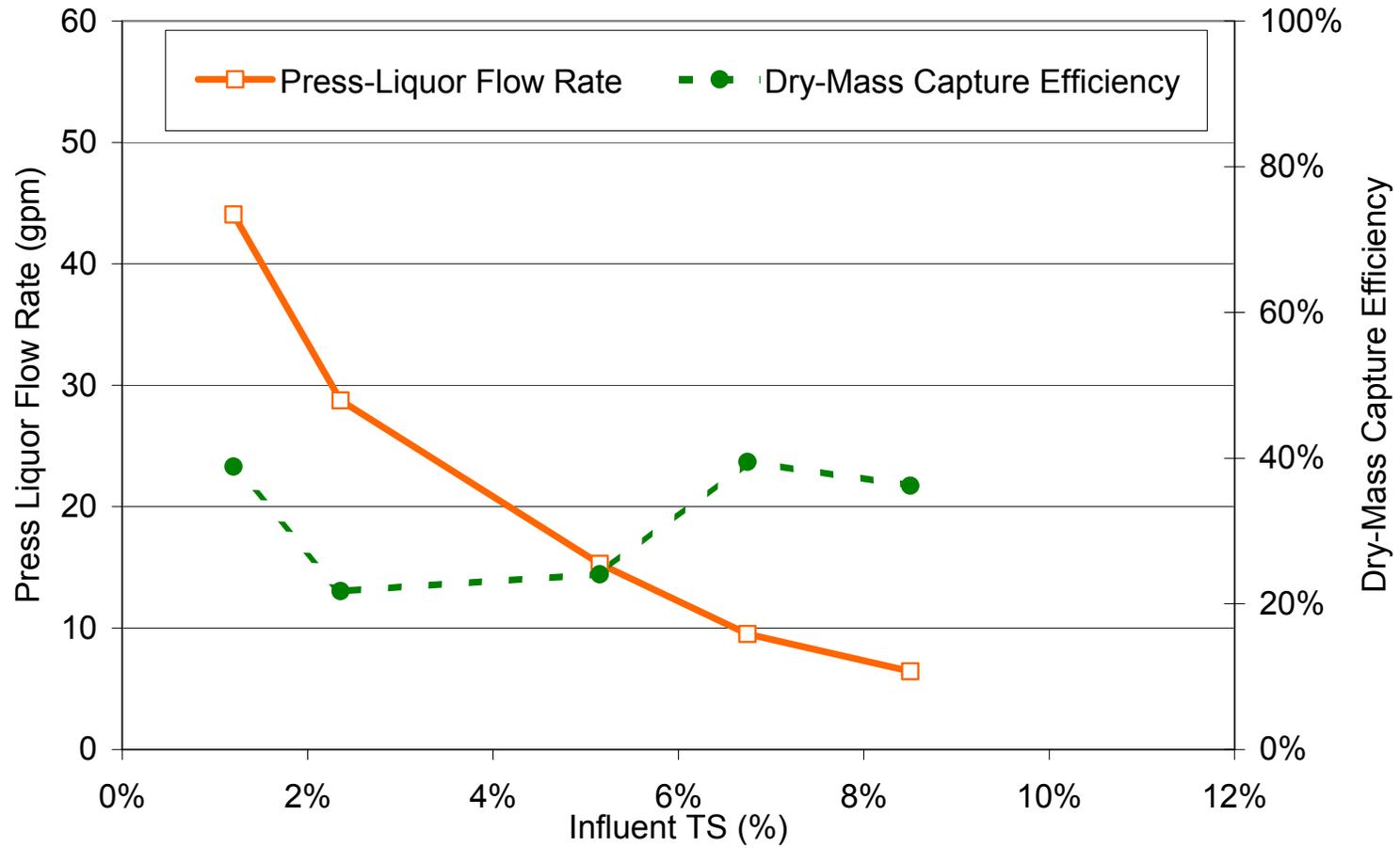
**Percentage of Total Solids (TS) in Press Cake from Bauer Side Hill and Agri-Press (0.006" screen)**



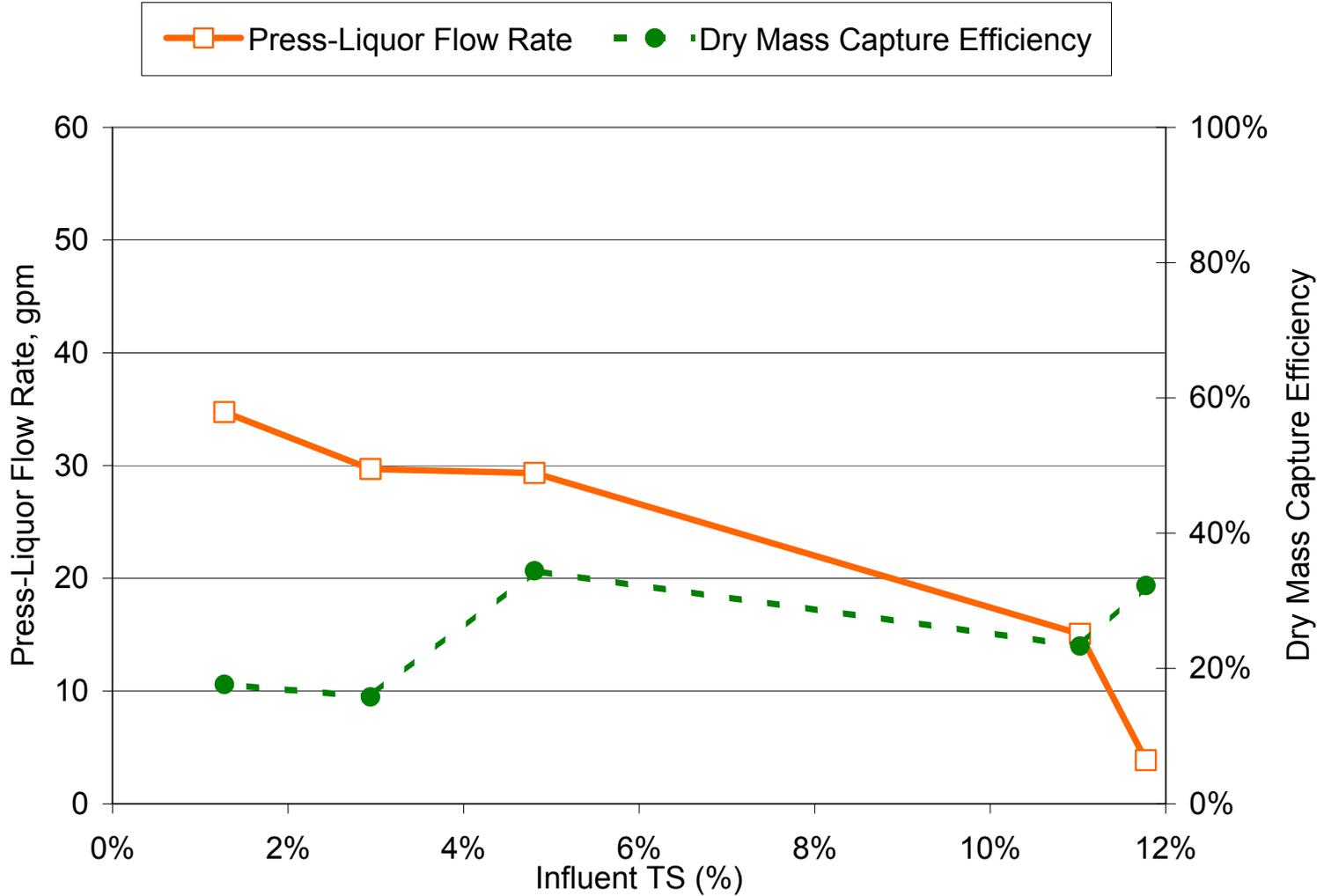
**Percentage of Total Solids (TS) in Press Cake  
from Bauer Side Hill and PressTech AgriPress (0.125" screen)**



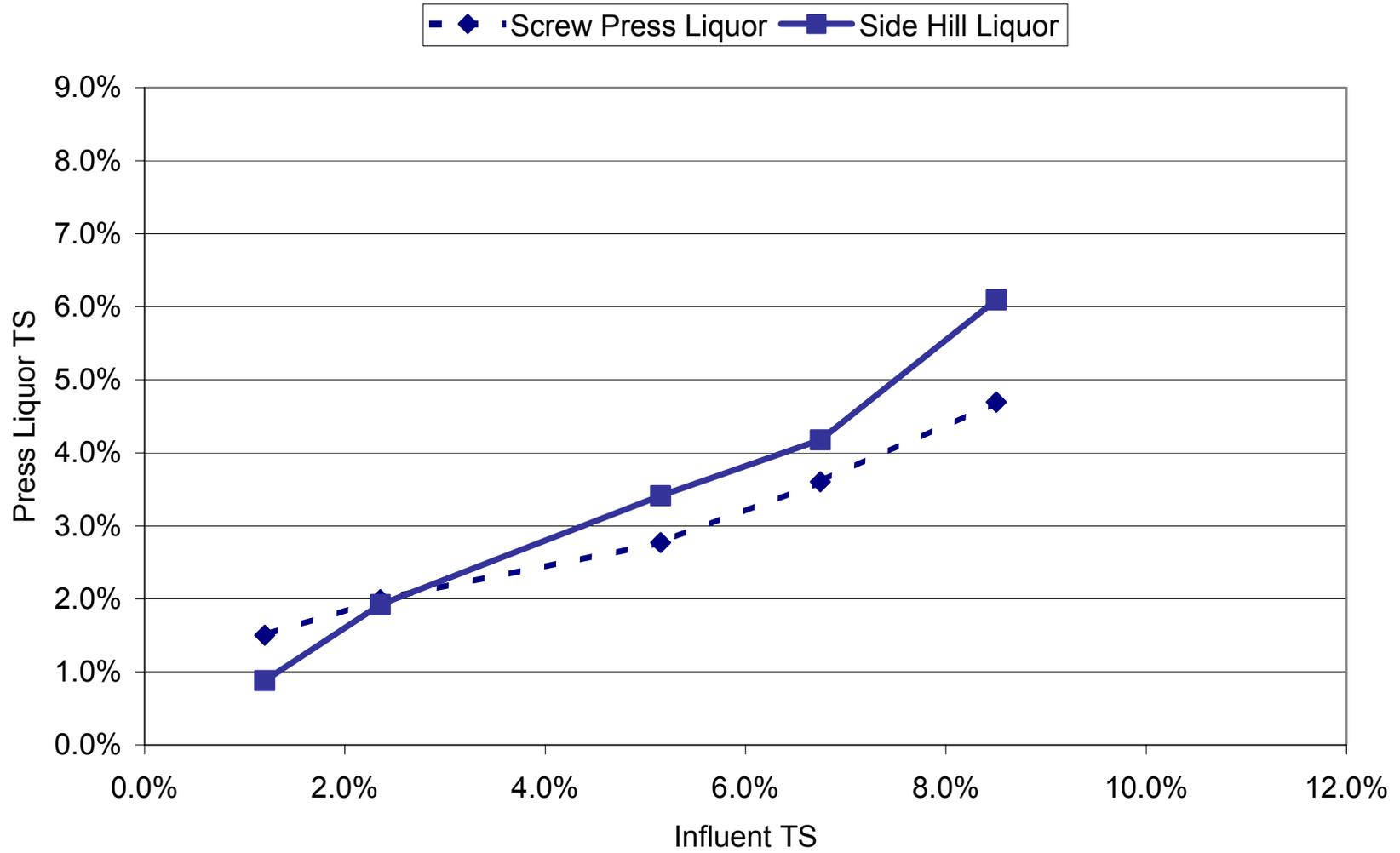
**Dry Mass Capture Efficiency by  
Bauer Side Hill and PressTech Agri-Press (0.006" screen)**



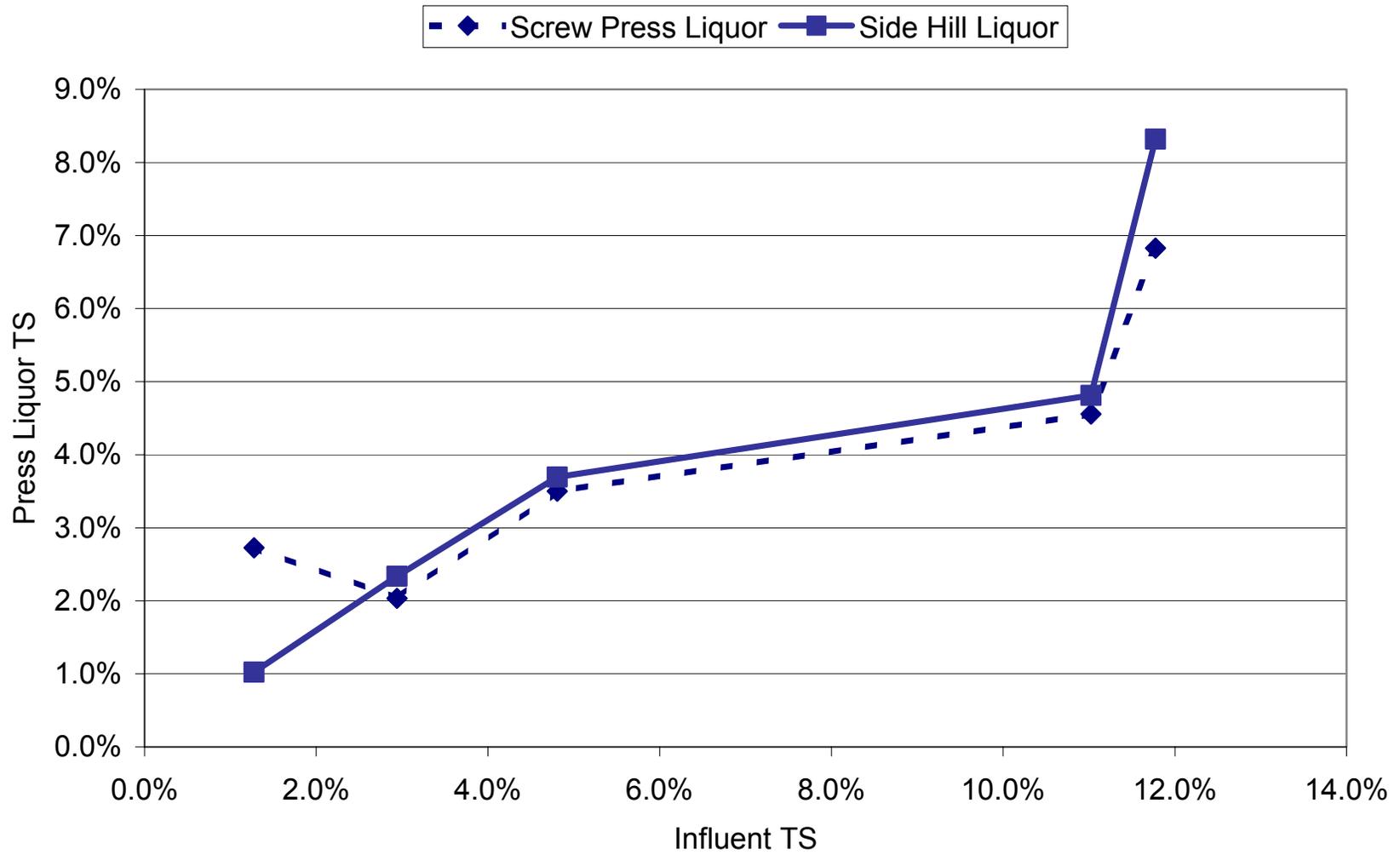
Dry Mass Capture Efficiency from  
Bauer Side Hill and PressTech Agri-Press (0.125" screen)



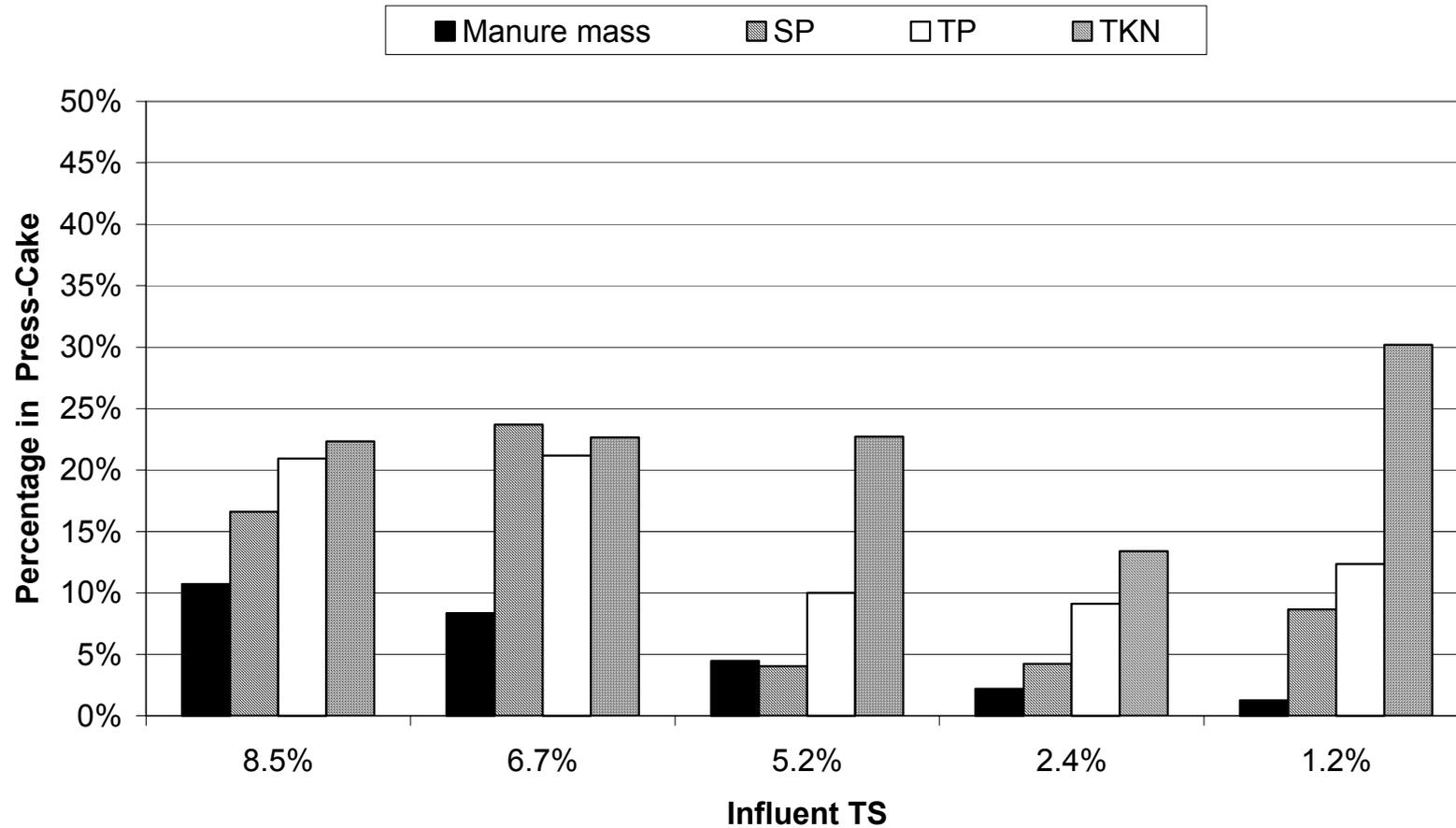
Total Solids (TS) in Press Liquor vs. Influent with use of 0.006" Screen



Total Solids (TS) in Press Liquor vs. Influent with use of 0.125" Screen



## Nutrient Partitioning in Agri-Press Using 0.006" Screen: Percentage of Influent Constituent in the Press-Cake



## Nutrient Partitioning in Agri-Press Using 0.125" Screen: Percentage of Influent Constituent in the Press-Cake

