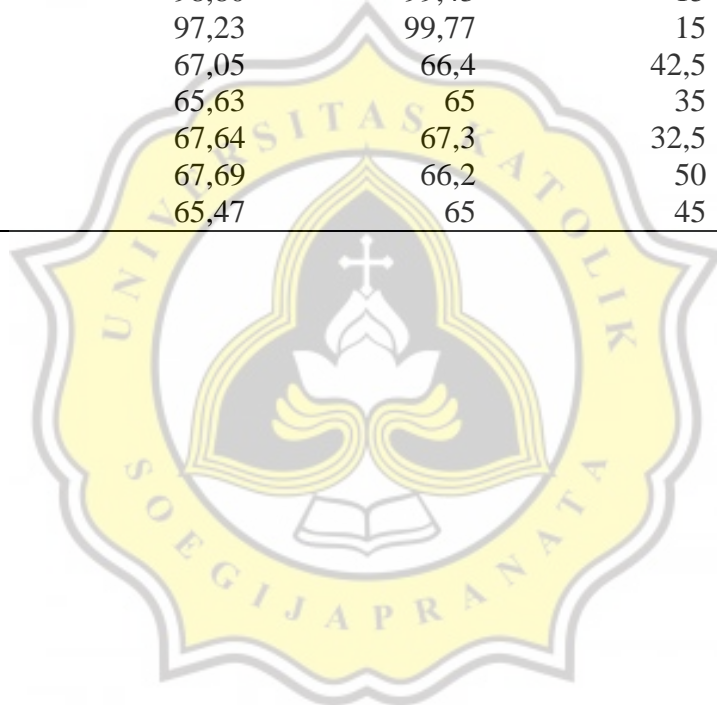


7. LAMPIRAN

Lampiran 1. Rekap Data Analisa Proses *Material Handling* dengan pada *Crystal Sugar Recipe* dan *Liquid Sugar Recipe*.

Tabel 17. Tabel Data Proses Proses *Material Handling*

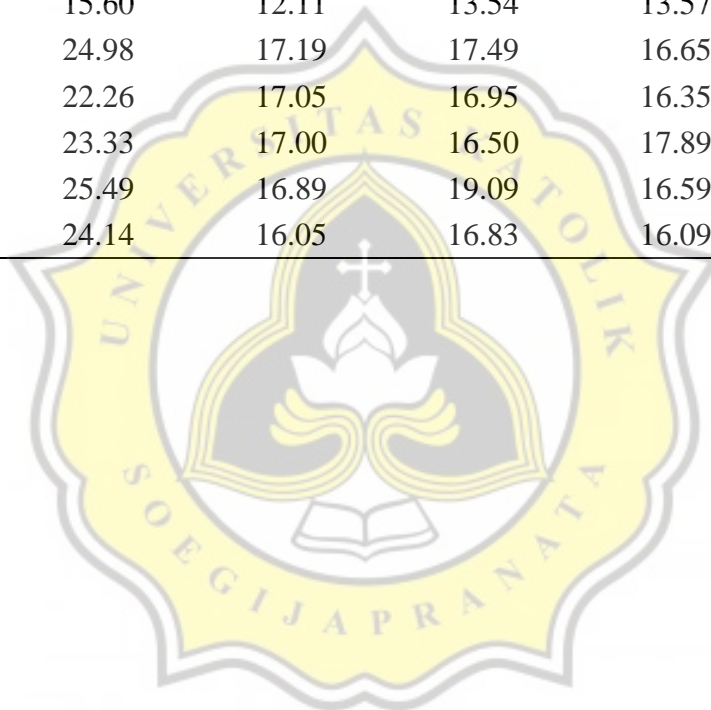
<i>Recipe</i>	Brix (°)	<i>Extract</i> (%)	<i>Colour</i> (EBC)	pH
<i>Crystal Sugar Recipe</i>	99,28	99,68	20	5,65
	97,16	99,78	25	5,86
	98,12	99,48	27,5	5,73
	98,80	99,43	15	5,60
	97,23	99,77	15	5,27
<i>Liquid Sugar Recipe</i>	67,05	66,4	42,5	6,45
	65,63	65	35	6,21
	67,64	67,3	32,5	6,72
	67,69	66,2	50	6,60
	65,47	65	45	6,49



Lampiran 2. Rekap Data Analisa Parameter pada Proses *Colour Formation* pada *Crystal Sugar Recipe* dan *Liquid Sugar Recipe*

Tabel 18. Tabel Data Proses *Colour Formation*

<i>Recipe</i>	<i>Before Adding Sugar</i>	<i>Start Boiling</i>	<i>End Boiling</i>	<i>Whirlpool Rest</i>	<i>Cold Wort</i>
<i>Crystal Sugar Recipe</i>	17.93	12.76	12.23	12.62	14.12
	18.36	12.23	13.25	15.12	16.07
	26.96	14.39	14.55	15.63	14.66
	18.83	12.71	13.48	14.36	13.88
	15.60	12.11	13.54	13.57	12.59
<i>Liquid Sugar Recipe</i>	24.98	17.19	17.49	16.65	16.70
	22.26	17.05	16.95	16.35	16.73
	23.33	17.00	16.50	17.89	16.92
	25.49	16.89	19.09	16.59	16.17
	24.14	16.05	16.83	16.09	15.77



Lampiran 3. Rekap Data Analisa Parameter pada Proses Wort Cooling pada Crystal Sugar Recipe dan Liquid Sugar Recipe.

Tabel 19. Tabel Data Proses Wort Cooling

Nomor Brew	OG (%wt)	Volume (hl)	Colour (EBC)	AEFA (%wt)	pH	FAN (ppm)	Bitterness (IBU)	Extract Losses (%)
<i>Crystal Sugar Recipe</i>								
Brew 1	16.70	206.00	17.33	2.71	5.32	187.00	28.90	2,71
Brew 2	16.73	203.00	16.60	2.67	5.31	175.00	30.20	4,91
Brew 3	16.92	209.00	16.55	2.90	5.31	187.00	28.80	8,03
Brew 4	16.17	210.00	16.07	2.87	5.32	175.00	27.60	2,96
Brew 5	15.77	206.00	16.96	2.65	5.32	139.00	29.00	3,38
<i>Liquid Sugar Recipe</i>								
Brew 1	15.06	212.00	14.14	2.60	5.39	156.00	30.20	,31
Brew 2	15.34	206.00	16.07	2.72	5.38	175.00	30.60	,19
Brew 3	16.29	204.00	14.66	2.69	5.39	178.00	30.40	,15
Brew 4	15.40	212.00	13.88	2.69	5.48	168.00	28.20	,50
Brew 5	15.63	213.00	12.59	2.57	5.43	170.00	30.00	,71

Lampiran 4. Rekap Data Analisa Parameter pada Proses Fermentasi per hari pada *Crystal Sugar Recipe* dan *Liquid Sugar Recipe*.

Tabel 20. Tabel Data Proses Fermentasi Per Hari

Parameter	Hari ke-															
	<i>Main Fermentation</i>					<i>Wait For RUH</i>				<i>RUH</i>		<i>Deep Cooling</i>		<i>Storage</i>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	<i>Crystal Sugar Recipe</i>															
Suhu (°C)	10.6	10.6	10.5	10.5	10.4	10.3	11.3	11.5	12.8	13.6	14.2	14.8	15.2	1.5	1.3	1.3
AE (°P)	15.84	14.96	13.57	10.9	8.88	7.44	6.44	5.77	4.49	3.61	3.18	3.15	2.9	2.99	2.83	2.8
pH	4.93	4.73	4.6	4.53	4.32	4.33	4.34	4.35	4.35	4.39	4.37	4.39	4.42	4.41	4.4	4.38
Colour (EBC)	16.27	14.85	14.38	14.04	13.96	13.94	14.02	13.72	13.63	13.69	13.75	13.56	13.16	13.26	13	12.52
	<i>Liquid Sugar Recipe</i>															
Suhu (°C)	10,5	10,5	10,5	10,5	10,5	10,5	11,2	11,8	13	13,5	13,8	14	9,7	1,7	1	1,6
AE (°P)	13,48	12,57	11,8	8,92	7,83	6,36	5,49	4,52	3,6	3,28	3,08	3,07	3,02	3,02	3,02	2,51
pH	4,89	4,65	4,46	4,35	4,33	4,3	4,32	4,31	4,32	4,31	4,32	4,42	4,41	4,41	4,41	4,55
Colour (EBC)	14,85	14,58	14,35	13,98	13,83	13,64	13,45	13,65	13,64	13,58	13,48	13,42	13,26	12,98	12,61	10,86

Lampiran 5. Analisa Data Proses *Material Handling*

a. Uji Normalitas

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pH_CS	.260	5	.200*	.927	5	.576
pH_LS	.209	5	.200*	.971	5	.883
Colour_CS	.233	5	.200*	.884	5	.329
Colour_LS	.198	5	.200*	.951	5	.742
Brix_CS	.228	5	.200*	.908	5	.454
Brix_LS	.240	5	.200*	.896	5	.389
Extract_CS	.225	5	.200*	.855	5	.212
Extract_LS	.239	5	.200*	.828	5	.134

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

b. Uji Homogenitas dan Uji Independent T Test pada Proses *Material Handling*

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
pH	Equal variances assumed	.041	.845	-6.704	8	.000	-.87200	.13008	-1.17196	-.57204
	Equal variances not assumed			-6.704	7.839	.000	-.87200	.13008	-1.17304	-.57096
Colour	Equal variances assumed	.454	.520	-4.990	8	.001	-20.50000	4.10792	-29.97288	-11.02712
	Equal variances not assumed			-4.990	7.599	.001	-20.50000	4.10792	-30.06053	-10.93947
Brix	Equal variances assumed	.026	.876	52.800	8	.000	32.13800	.60867	30.73440	33.54160
	Equal variances not assumed			52.800	7.980	.000	32.13800	.60867	30.73380	33.54220
Extract	Equal variances assumed	22.390	.001	66.743	8	.000	32.84600	.49213	31.71115	33.98085
	Equal variances not assumed			66.743	4.344	.000	32.84600	.49213	31.52123	34.17077

Lampiran 6. Analisa Data Proses *Colour Formation*

a. Uji Normalitas

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Before_Sugar	.211	8	.200*	.904	8	.312
Start_Boiling	.218	8	.200*	.834	8	.065
End_Boiling	.187	8	.200*	.945	8	.656
Whirlpool_Rest	.187	8	.200*	.862	8	.126
Cold_Wort	.215	8	.200*	.882	8	.195

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

b. Uji Homogenitas dan Uji Independent T Test pada Proses *Colour Formation*

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Before_Sugar	Equal variances assumed	2.383	.161	-2.228	8	.056	-4.50400	2.02160	-9.16581	.15781
	Equal variances not assumed			-2.228	4.705	.080	-4.50400	2.02160	-9.80019	.79219
Start_Boiling	Equal variances assumed	1.078	.330	-8.773	8	.000	-3.99600	.45550	-5.04637	-2.94563
	Equal variances not assumed			-8.773	5.854	.000	-3.99600	.45550	-5.11731	-2.87469
End_Boiling	Equal variances assumed	.281	.611	-6.727	8	.000	-3.96200	.58894	-5.32011	-2.60389
	Equal variances not assumed			-6.727	7.661	.000	-3.96200	.58894	-5.33062	-2.59338
Whirlpool_Rest	Equal variances assumed	1.880	.208	-3.951	8	.004	-2.45400	.62115	-3.88637	-1.02163
	Equal variances not assumed			-3.951	6.394	.007	-2.45400	.62115	-3.95150	-.95650
Cold_Wort	Equal variances assumed	1.815	.215	-3.634	8	.007	-2.19400	.60379	-3.58634	-.80166
	Equal variances not assumed			-3.634	5.108	.014	-2.19400	.60379	-3.73629	-.65171

Lampiran 7. Analisa Data Proses Wort Cooling

a. Uji Normalitas

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CW_OG	.157	10	.200*	.937	10	.525
CW_Volume	.222	10	.179	.917	10	.335
CW_Colour	.246	10	.089	.914	10	.306
CW_pH	.278	10	.027	.856	10	.068
CW_FAN	.218	10	.198	.878	10	.123
CW_Bitterness	.223	10	.171	.910	10	.281
CW_AEFA	.251	10	.075	.894	10	.187

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

b. Uji Homogenitas dan Uji Independent T Test pada Proses Wort Cooling

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CW_OG	Equal variances assumed	.148	.710	3.079	8	.015	.91400	.29688	.22938	1.59862
	Equal variances not assumed			3.079	7.996	.015	.91400	.29688	.22932	1.59868
CW_Volume	Equal variances assumed	2.908	.127	-1.175	8	.274	-2.60000	2.21359	-7.70456	2.50456
	Equal variances not assumed			-1.175	7.030	.278	-2.60000	2.21359	-7.82977	2.62977
CW_Colour	Equal variances assumed	1.956	.199	4.035	8	.004	2.43400	.60321	1.04298	3.82502
	Equal variances not assumed			4.035	5.099	.010	2.43400	.60321	.89237	3.97563
CW_pH	Equal variances assumed	10.145	.013	-5.223	8	.001	-.09800	.01876	-.14126	-.05474
	Equal variances not assumed			-5.223	4.139	.006	-.09800	.01876	-.14941	-.04659
CW_FAN	Equal variances assumed	1.480	.258	.333	8	.747	3.20000	9.59792	-18.93284	25.33284
	Equal variances not assumed			.333	5.429	.751	3.20000	9.59792	-20.89764	27.29764
CW_Bitterness	Equal variances assumed	.076	.790	-1.642	8	.139	-.98000	.59699	-2.35667	.39667
	Equal variances not assumed			-1.642	7.983	.139	-.98000	.59699	-2.35717	.39717
CW_AEFA	Equal variances assumed	6.597	.033	1.775	8	.114	.10600	.05972	-.03171	.24371
	Equal variances not assumed			1.775	6.269	.124	.10600	.05972	-.03861	.25061



0.96% PLAGIARISM
APPROXIMATELY

Report #10513190

PENDAHULUAN
LATAR BELAKANG
PT Multi Bintang Indonesia, Tbk.

merupakan salah satu perusahaan multinasional yang berkembang dengan pesat di Indonesia, bergerak di bidang industri minuman beralkohol dan soft drink. Produk bir yang diproduksi bervariasi, dengan salah satu produk yang paling dikenal oleh masyarakat adalah bir Bintang. Di Indonesia, perusahaan yang berada di bawah naungan Heineken's Beer Netherlands ini memiliki dua brewery besar yang berlokasi di Kota Tangerang dan di Sampang Agung, Kabupaten Mojokerto. PT Multi Bintang Indonesia, Tbk. plant Sampang Agung merupakan salah satu brewery terbesar se Asia Tenggara yang memproduksi jenis bir "Bintang Pilsener" dengan 3 ukuran kemasan yang berbeda, yakni dengan ukuran 330 ml (pint), 620 ml (bemer) dan 30 Liter (keg/barrel) dengan kandungan alkohol sekitar 4,67% (v/v). Dalam proses pembuatan bir Bintang secara umum, diperlukan dua jenis bahan baku berdasarkan kegunaannya, yaitu bahan baku utama dan bahan baku tambahan (adjuncts). Bahan baku utama terdiri atas malt (A-malt dan C-malt), barley, yeast dan air. Bahan baku yang ditambahkan terdiri atas hops, gula, roasted malt, CaCl₂, dan ZnCl₂. Gula yang digunakan pada proses produksi adalah gula pasir (sukrosa). Penggunaan gula pasir dalam jangka panjang akan berpengaruh terhadap peningkatan biaya bahan