7. LAMPIRAN

Lampiran 1. Syarat Mutu *Fruit Wine*

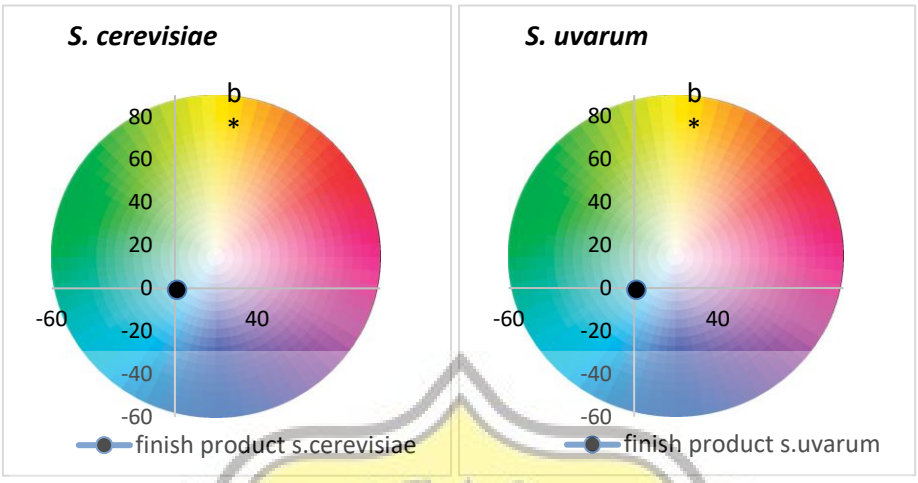
Tabel 9. Syarat Mutu *Fruit Wine* (SNI 1-4019-1996)

No.	Kriteria Uji	Satuan	Persyaratan
1.	Keadaan: Bau dan Rasa		Normal/khas
2.	Etil alkohol	%v/v	5-15
3.	Metil alkohol	%v/v	Maks. 0,1
4.	Asam volatil (dihitung asam asetat)	% v/v Terhadap alkohol absolut	Maks. 0,2 g/100 mL
5.	Bahan Tambahan Makanan		
	a. Zat Warna		Sesuai SNI 01-0222-1987
	b. Pengawet SO_2		
	c. Pemanis Buatan		Negatif
6.	Cemaran Logam	mg/kg	
	a. Timbal (Pb)		Maks. 0,2
	b. Tembaga (Cu)		Maks. 2,0
	c. Seng (Zn)		Maks. 2,0
	d. Raksa (Hg)		Maks. 0,03
	e. Timah (Sn)		Maks. 40,0
7.	Cemaran Arsen	mg/kg	Maks. 0,1
8.	Cemaran Mikroba		
	a. Angka Lempeng Total	Koloni/mL	Maks. 2×10^2
	b. Bakteri *coliform*	APM/mL	Maks. 20
	c. Escherichia coli	APM/mL	< 3
	d. Salmonella sp.		Negatif
	e. Staphylococcus aureus	Koloni/mL	0
	f. Vibrio sp.		Negatif
	g. Clostridium perfringens		Negatif
	h. Kapang	Koloni/mL	Maks. 50
	i. Khamir	Koloni/mL	Maks. 50

Tabel 10. Syarat Mutu *Fruit Wine* (SNI 4019:2013)

No	Kriteria uji	Satuan	Persyaratan
1.	Keadaan:		
1.1	Bau	-	normal/khas
1.2	Rasa	-	normal/khas
2.	Etanol	% v/v	5,1 - 20,0
3.	Metanol	% v/v	maks. 0,01
4.	Keasaman titrasi (dihitung sebagai asam sitrat)	%	maks. 1
5.	Cemaran logam		
5.1	Timbal (Pb)	mg/kg	maks. 0,2
5.2	Merkuri (Hg)	mg/kg	maks. 0,03
5.3	Timah (Sn)	mg/kg	maks. 40,0 (250,0 *)
5.4	Kadmium (Cd)	mg/kg	maks. 0,2
6.	Cemaran arsen (As)	mg/kg	maks. 0,2
7.	Cemaran mikroba :		
7.1	Angka Lempeng Total (ALT)	koloni/mL	maks. 2×10^2
7.2	*Coliform*	APM/mL	maks. 20
7.3	*Escherichia coli*	APM/mL	< 3
7.4	*Salmonella sp.*	-	negatif / 25 mL
7.5	*Staphylococcus aureus*	-	negatif / mL
7.6	Kapang dan Khamir	koloni/mL	maks. 1×10^2
CATATAN : * untuk yang dikemas dalam kaleng			

Lampiran 2. Gambar Pembacaan Warna Chromameter pada sampel akhir *fruit wine* bengkuang dengan *S. cerevisiae* dan *S. uvarum*



Gambar 11. Pembacaan Warna Chromameter *Fruit Wine* bengkuang dengan *S. cerevisiae* dan *S. uvarum*

Lampiran 3. *Scoresheet* Sensori

PAIRED PREFERENCE TEST
Fruit Wine Bengkuang + ekstrak bunga telang

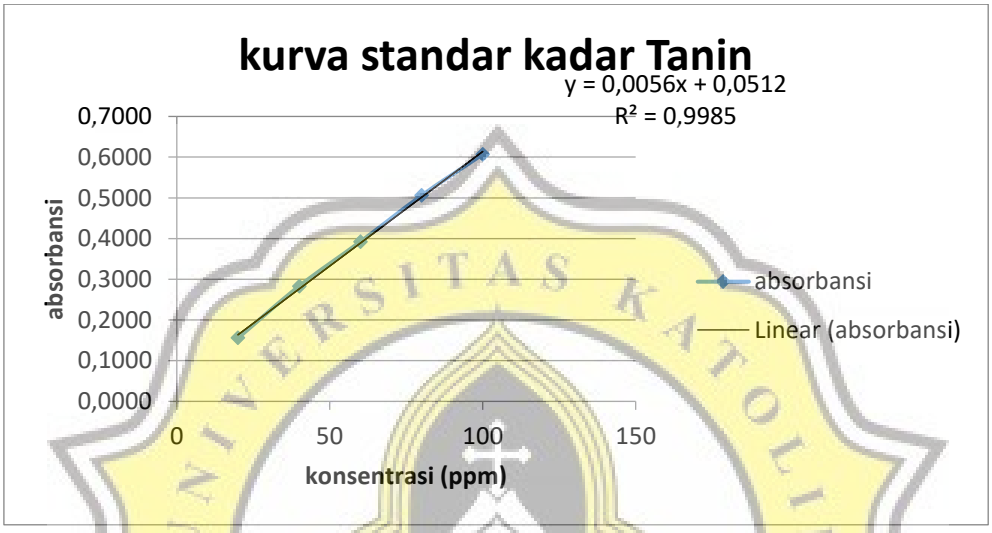
Nama : Hari, tanggal :
Kontak telepon : Fakultas :

Instruksi:
Dalam uji kesukaan ini terdapat 2 jenis *wine* yaitu *wine* bengkuang yang sama namun berbeda jenis *yeast* yang digunakan, Anda diminta untuk menilai parameter **warna, aroma, rasa *sweetness, aftertaste* dan *overall*** dari produk dengan cara mengamati dan mencicipinya secara langsung. Cicipilah produk dari kiri ke kanan dan tuliskan kode produk tersebut pada lembar di bawah ini secara berurutan. Berkumur dan minumlah terlebih dahulu sebelum dan setelah mencicipi produk hingga kondisi mulut kembali netral. Anda dapat mengulang sesering mungkin dalam mencicipi sampel. Kemudian bandingkan antara kedua sampel mana yang lebih Anda sukai. Berikan tanda centang pada kode sampel yang Anda suka. Pemberian tanda centang hanya dapat dilakukan pada **satu sampel pada setiap parameter.**

Kode Sampel	**Parameter**					
	Warna	**Aroma**	**Rasa**	***Sweetness***	***Aftertaste***	***Overall***

Lampiran 4. Kurva Standar Pengujian Kadar Tanin

Konsentrasi larutan asam borat dengan seri pengenceran 20, 40, 60, 80 dan 100 ppm disiapkan dalam pembuatan kurva standar untuk analisis kadar tanin



Gambar 12. Kurva Standar untuk Pengujian Kadar Tanin

Lampiran 5. Daftar Nama Panelis Sensori *Fruit Wine* Bengkuang

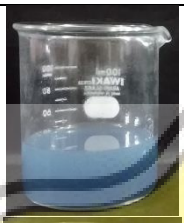
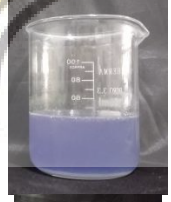
Tabel 11. Daftar Nama Panelis Sensori *Fruit Wine* Bengkuang

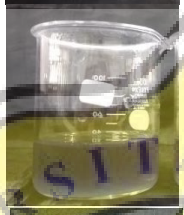
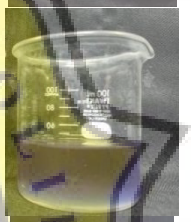
No	Nama	warna	aroma	rasa	*sweetness*	*aftertaste*	*overall*
1	Katarina Ayu	2	1	2	2	2	2
2	Caesilia Indah	2	2	1	2	1	1
3	Edward Calvin	2	2	2	1	1	2
4	Cindy Shania	2	2	1	1	1	1
5	Brigitta Eka	2	1	2	2	2	2
6	Albertus Arsa	2	2	2	1	2	2
7	Yohanes Ian	2	1	2	2	2	2
8	Michael Benhur	1	1	2	1	1	1
9	Margareth C. L.	2	2	2	1	2	2
10	Tan Enrico	2	1	1	1	1	1
11	Helena Beti	1	1	2	1	2	1
12	Theresia Yekti	1	2	1	2	1	2
13	Marchellania	1	1	2	2	1	1
14	Sia, Antonio	1	2	1	2	2	2
15	Agapitus Muel	1	2	1	1	2	2
16	Maria Sandra	2	2	2	1	2	2
17	Albertin L.	2	1	2	2	1	2
18	Brian Mukti	1	1	1	1	1	1
19	Valentinus K. L.	2	1	2	1	1	2
20	Ignaz Dhiyan	2	2	2	1	2	2
21	Andreas Yoga	1	1	2	1	1	2
22	Ivo Ruth	1	1	2	1	1	2
23	Lili Heren	2	1	1	1	1	1
24	Catharina Santi	2	2	2	2	1	2
25	Christopher H.	2	1	1	1	1	1
26	Felicia E.	2	1	2	1	2	2
27	Gregorius Nico	2	2	1	2	2	2
28	Steven Caprileo	2	1	1	2	1	2
29	Tan, Alan	2	2	2	1	2	2
30	Viona Elora	2	2	2	2	2	2
31	Fang, Andreas L	2	2	1	1	1	2

Keterangan:
1= Sampel *Fruit Wine* bengkuang dengan *starter Saccharomyces cerevisiae*
2= Sampel *Fruit Wine* bengkuang dengan *starter Saccharomyces uvarum*

Lampiran 6. Tabel Perubahan *Fruit Wine* Bengkuang Selama Fermentasi hingga Akhir Masa *Aging*

Tabel 12. Foto Perubahan *Fruit Wine* Bengkuang Selama Fermentasi hingga Akhir Masa *Aging*

Waktu Fermentasi (Hari)	A	B
0		
1		
2		
3		
4		
5		
6		

7		
8		
9		
10		
11		
12		
14 (*aging*)		
28 (*aging)*		

Keterangan:
A= Sampel *Fruit Wine* bengkuang dengan *starter Saccharomyces cerevisiae*
B= Sampel *Fruit Wine* bengkuang dengan *starter Saccharomyces uvarum*

Lampiran 7. Analisis Data Penelitian

1. Uji Fisik: Warna

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
chroma_L	.318	48	.000	.754	48	.000
chroma_a	.206	48	.000	.822	48	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
chroma_L	Based on Mean	.010	1	46	.919
	Based on Median	.007	1	46	.935
	Based on Median and with adjusted df	.007	1	45.783	.935
	Based on trimmed mean	.008	1	46	.930
chroma_a	Based on Mean	.027	1	46	.870
	Based on Median	.021	1	46	.886
	Based on Median and with adjusted df	.021	1	45.727	.886
	Based on trimmed mean	.038	1	46	.847

Test Statistics[a]

	chroma_L	chroma_a
Mann-Whitney U	200.000	249.500
Wilcoxon W	500.000	549.500
Z	-1.815	-.794
Asymp. Sig. (2-tailed)	.070	.427

a. Grouping Variable: perlakuan

2. Uji Fisik: Kekeruhan (TDS)

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TDS	.425	48	.000	.606	48	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
TDS1	Based on Mean	.070	1	46	.793
	Based on Median	.007	1	46	.935
	Based on Median and with adjusted df	.007	1	45.914	.935
	Based on trimmed mean	.053	1	46	.818

Test Statistics[a]

	TDS1
Mann-Whitney U	239.000
Wilcoxon W	539.000
Z	-1.011
Asymp. Sig. (2-tailed)	.312

a. Grouping Variable: perlakuan

3. Uji Kimia: pH

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pH	.383	48	.000	.680	48	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
pH	Based on Mean	2.043	1	46	.160
	Based on Median	.252	1	46	.618
	Based on Median and with adjusted df	.252	1	43.466	.618
	Based on trimmed mean	1.545	1	46	.220

Test Statistics[a]

	pH
Mann-Whitney U	144.000
Wilcoxon W	444.000
Z	-2.972
Asymp. Sig. (2-tailed)	.003

a. Grouping Variable: perlakuan

4. Uji Kimia: Kandungan Gula

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
gula	.459	48	.000	.556	48	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
gula	Based on Mean	.009	1	46	.926
	Based on Median	.003	1	46	.959
	Based on Median and with adjusted df	.003	1	45.992	.959
	Based on trimmed mean	.007	1	46	.936

Test Statistics[a]

	gula
Mann-Whitney U	174.000
Wilcoxon W	474.000
Z	-2.382
Asymp. Sig. (2-tailed)	.017

a. Grouping Variable: perlakuan

5. Uji Kimia: Aktivitas Antioksidan

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
antioksidan1	.105	48	.200*	.960	48	.103

a. Lilliefors Significance Correction

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

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
antioksidan1	Based on Mean	7.075	1	46	.011
	Based on Median	7.108	1	46	.011
	Based on Median and with adjusted df	7.108	1	37.406	.011
	Based on trimmed mean	7.153	1	46	.010

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
antioksidan1	Equal variances assumed	7.075	.011	-1.444	46	.156	-.22341	.15475	-.53491	.08810
	Equal variances not assumed			-1.444	36.207	.157	-.22341	.15475	-.53720	.09039

6. Uji Kimia: Kadar SO_2

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SO2	.193	48	.000	.835	48	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
SO2	Based on Mean	1.027	1	46	.316
	Based on Median	.729	1	46	.398
	Based on Median and with adjusted df	.729	1	44.229	.398
	Based on trimmed mean	.946	1	46	.336

Test Statistics[a]

	SO2
Mann-Whitney U	200.500
Wilcoxon W	500.500
Z	-1.821
Asymp. Sig. (2-tailed)	.069

a. Grouping Variable: perlakuan

7. Uji Kimia: Kadar Asam Volatil

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
as_volatil	.177	48	.001	.908	48	.001

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
as_volatil	Based on Mean	1.841	1	46	.181
	Based on Median	1.509	1	46	.226
	Based on Median and with adjusted df	1.509	1	41.597	.226
	Based on trimmed mean	1.822	1	46	.184

Test Statistics[a]

	as_volatil
Mann-Whitney U	193.500
Wilcoxon W	493.500
Z	-1.967
Asymp. Sig. (2-tailed)	.049

a. Grouping Variable: perlakuan

8. Uji Kimia: Kadar Tanin

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
tanin	.161	48	.003	.881	48	.000

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
tanin	Based on Mean	.040	1	46	.842
	Based on Median	.035	1	46	.853
	Based on Median and with adjusted df	.035	1	39.567	.854
	Based on trimmed mean	.040	1	46	.842

Test Statistics[a]

	tanin
Mann-Whitney U	234.000
Wilcoxon W	534.000
Z	-1.114
Asymp. Sig. (2-tailed)	.265

a. Grouping Variable: perlakuan

9. Uji Sensori: Warna

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
warna	Group 1	saccharomyces uvarum	22	.71	.50	.029[a]
	Group 2	saccharomyces cerevisiae	9	.29		
	Total		31	1.00		

a. Based on Z Approximation.

10. Uji Sensori: Aroma

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
aroma	Group 1	saccharomyces cerevisiae	16	.52	.50	1.000[a]
	Group 2	saccharomyces uvarum	15	.48		
	Total		31	1.00		

a. Based on Z Approximation.

11. Uji Sensori: Rasa

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
rasa	Group 1	saccharomyces uvarum	19	.61	.50	.281[a]
	Group 2	saccharomyces cerevisiae	12	.39		
	Total		31	1.00		

a. Based on Z Approximation.

12. Uji Sensori: *Sweetness*

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
sweetness	Group 1	sacchar omyces uvarum	12	.39	.50	.281[a]
	Group 2	sacchar omyces cerevisia e	19	.61		
	Total		31	1.00		

a. Based on Z Approximation.

13. Uji Sensori: *Aftertaste*

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
aftertaste	Group 1	sacchar omyces uvarum	14	.45	.50	.720[a]
	Group 2	sacchar omyces cerevisia e	17	.55		
	Total		31	1.00		

a. Based on Z Approximation.

14. Uji Sensori: *Overall*

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
overall	Group 1	sacchar omyces uvarum	22	.71	.50	.029[a]
	Group 2	sacchar omyces cerevisia e	9	.29		
	Total		31	1.00		

a. Based on Z Approximation.

15. Uji Korelasi

Correlations

			chroma_L	chroma_a	chroma_b	kekeruhan	pH	kadar_gula	antioksidan	SO2	as_volatil	tanin
Spearman's rho	chroma_L	Correlation Coefficient	1.000	.471**	-.632**	.557**	-.213	.099	-.392**	-.362*	.107	-.521**
		Sig. (2-tailed)	.	.001	.000	.000	.145	.505	.006	.011	.471	.000
		N	48	48	48	48	48	48	48	48	48	48
	chroma_a	Correlation Coefficient	.471**	1.000	-.845**	.936**	.371**	.591**	-.836**	-.840**	-.317*	-.939**
		Sig. (2-tailed)	.001	.	.000	.000	.009	.000	.000	.000	.028	.000
		N	48	48	48	48	48	48	48	48	48	48
	chroma_b	Correlation Coefficient	-.632**	-.845**	1.000	-.877**	-.365*	-.588**	.769**	.785**	.378**	.858**
		Sig. (2-tailed)	.000	.000	.	.000	.011	.000	.000	.000	.008	.000
		N	48	48	48	48	48	48	48	48	48	48
	kekeruhan	Correlation Coefficient	.557**	.936**	-.877**	1.000	.283	.600**	-.852**	-.846**	-.308*	-.965**
		Sig. (2-tailed)	.000	.000	.000	.	.051	.000	.000	.000	.033	.000
		N	48	48	48	48	48	48	48	48	48	48
	pH	Correlation Coefficient	-.213	.371**	-.365*	.283	1.000	.753**	-.552**	-.597**	-.516**	-.299*
		Sig. (2-tailed)	.145	.009	.011	.051	.	.000	.000	.000	.000	.039
		N	48	48	48	48	48	48	48	48	48	48
	kadar_gula	Correlation Coefficient	.099	.591**	-.588**	.600**	.753**	1.000	-.781**	-.818**	-.360*	-.600**
		Sig. (2-tailed)	.505	.000	.000	.000	.000	.	.000	.000	.012	.000
		N	48	48	48	48	48	48	48	48	48	48
	antioksidan	Correlation Coefficient	-.392**	-.836**	.769**	-.852**	-.552**	-.781**	1.000	.967**	.186	.881**
		Sig. (2-tailed)	.006	.000	.000	.000	.000	.000	.	.000	.207	.000
		N	48	48	48	48	48	48	48	48	48	48
	SO2	Correlation Coefficient	-.362*	-.840**	.785**	-.846**	-.597**	-.818**	.967**	1.000	.185	.853**
		Sig. (2-tailed)	.011	.000	.000	.000	.000	.000	.000	.	.208	.000
		N	48	48	48	48	48	48	48	48	48	48
	as_volatil	Correlation Coefficient	.107	-.317*	.378**	-.308*	-.516**	-.360*	.186	.185	1.000	.305*
		Sig. (2-tailed)	.471	.028	.008	.033	.000	.012	.207	.208	.	.035
		N	48	48	48	48	48	48	48	48	48	48
	tanin	Correlation Coefficient	-.521**	-.939**	.858**	-.965**	-.299*	-.600**	.881**	.853**	.305*	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.039	.000	.000	.000	.035	.
		N	48	48	48	48	48	48	48	48	48	48

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Report #11480782

PENDAHULUAN Latar BelakangBengkuang (Pachyrhizus Erosus) merupakan salah satu jenis umbi-umbian dengan kadar air mencapai 90% yang dapat dikonsumsi secara langsung dan sudah dibudidayakan secara luas di beberapa wilayah Indonesia seperti Jawa, NTT, Bali, Sumatera, Sulawesi dan juga Kalimantan. Bengkuang memiliki kandungan gizi yang baik yaitu vitamin C, vitamin B1, protein, serat kasar yang cukup tinggi serta rendah kalori yaitu 39 kkal/ 100 g karena mengandung oligosakarida (inulin) yang baik dikonsumsi bagi penderita diabetes (Hermianti et al., 2016). Di Indonesia bengkuang hanya dikonsumsi segar atau sebagai makanan tambahan seperti pada rujak, manisan, asinan ataupun sebagai bahan dasar pembuatan kosmetik (Nusifera & Karuniawan, 2009). Oleh karena itu, salah satu olahan bengkuang yang dapat meningkatkan nilai gizi dan nilai ekonominya yaitu diproduksi menjadi fruit wine bengkuang. Wine merupakan salah satu jenis minuman fermentasi yang digemari oleh banyak orang karena aroma yang khas serta mengandung alkohol. 42 45 48 52 Secara umum wine terbuat dari sari buah anggur spesies Vitis vinifera yang difermentasi dengan berbagai macam proses sehingga menghasilkan beberapa macam wine yaitu Red Wine, Rose Wine, White Wine, Fruit Wine, Sparkling Wine, Fortified Wine dan Sweet Wine. Mengonsumsi wine memiliki