Data in Brief 19 (2018) 678–686

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Data on microbial and physicochemical assessment of mixed fruit wine produced from physically damaged fruits

Deborah O. Oba [a], Oluwaseun J. Okunola [a], Solomon U. Oranusi [a], Hilary I. Okagbue [b,*]

[a] Department of Biological Sciences, Covenant University, Ota, Nigeria
[b] Department of Mathematics, Covenant University, Ota, Nigeria

ARTICLE INFO

Article history:
Received 27 April 2018
Received in revised form
16 May 2018
Accepted 18 May 2018
Available online 23 May 2018

Keywords:
Wine
Fermentation
Fruit
Microbial count
Replication
Statistics

ABSTRACT

The data described in this article was obtained in an experiment designed for the production of mixed fruit wine using physically damaged fruits in the process of fermentation. Three fruits (watermelon, pineapple and orange) were used in the wine production process. The fermentation process involved two stages; aerobic and anaerobic fermentation. The paper presents the data on microbial and physicochemical analyses carried out to monitor the fermentation and clarification processes.

* Corresponding author.
E-mail addresses: obadebbie@yahoo.com (D.O. Oba), seunjoyokunola@gmail.com (O.J. Okunola), solomon.oranusi@covenantniversity.edu.ng (S.U. Oranusi), hilary.okagbue@covenantuniversity.edu.ng (H.I. Okagbue).

https://doi.org/10.1016/j.dib.2018.05.104

Specifications Table

Subject area	*Microbiology*
More specific subject area	*Industrial Microbiology*
Type of data	*Tables*
How data was acquired	*Microscope (Olympus, XSZ-107BN), colony counter (Stuart serial R000102178), spectrophotometer, Titration,pH meter (Hanna instruments.PH211 microprocessor) and weighing balance.*
Data format	*Raw, Analyzed.*
Experimental factors	Microbial counts, Physicochemical parameters measurement.
Experimental features	Three types of physically damaged fruits were used in the production of mixed fruit wine. During aerobic and anaerobic fermentations, changes in pH, Titratable Acidity (TTA), reducing sugar, alcohol content, specific gravity and total viable plate counts and total coliform count were monitored.
Data source location	*Ota, Ogun State, Nigeria.*
Data accessibility	*Data available within the article*

Values of the data

- The data presented here shows the microbial and physicochemical assessment of mixed fruit wine produced from physically damaged fruits.
- The data here could serve as a benchmark for other researchers that are willing to work on reducing post-harvest losses using damaged fruits.
- The data presented could give an understanding on how to channel waste to wealth.
- Multivariate statistical analysis can be applied for further exploration of the data.

1. Data

The data presented here represents the total viable plate counts and total coliform counts from the aerobic and anaerobic fermentation process of damaged fruit (watermelon, pineapple and orange)

Table 1
Changes in temperature (°C) during the fermentation process.

Days	Replicate 1	Replicate 2
0	–	33
1	28	29
2	30	29
3	29	29
4	27	28
5	28	29
6	28	28
7	28	28
14	27	29
21	27	28
28	27	28
42	27	27
56	27	27
63	27	27
64	27	27

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine.

Table 2
Changes in pH during the fermentation process.

Days	Replicate 1	Replicate 2
0	5.73	5.72
1	4.93	4.95
2	4.64	4.63
3	4.55	4.55
4	4.59	4.49
5	4.50	4.50
6	4.49	4.49
7	4.39	4.40
14	4.25	4.27
21	4.10	4.12
28	4.05	4.07
42	4.05	4.03
56	3.96	3.95
63	3.93	3.94
64	3.93	3.93

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine.

Table 3
Changes in titratable acidity (%) during the fermentation process.

Days	Replicate 1	Replicate 2
0	0.11	0.10
1	0.32	0.30
2	0.59	0.60
3	0.76	0.75
4	0.81	0.80
5	0.88	0.86
6	0.90	0.91
7	0.93	0.92
14	0.96	0.94
21	1.01	0.98
28	1.01	1.00
42	1.03	1.02
56	1.06	1.07
63	1.08	1.08
64	1.08	1.08

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine.

using pour plate method. Also, the measurements of the different physicochemical properties throughout the fermentation and clarification processes were presented. Fermentation ended on the 21th day of the experiment and clarification of the wine ran through six weeks. Analysis where carried out once every two weeks. During aerobic and anaerobic fermentations, changes in temperature, pH, titratable Acidity (TTA), specific gravity, alcohol content, reducing sugar and total viable plate and coliform counts were monitored and presented in Tables 1, 2, 3, 4, 5, 6, and 7.

2. Experimental design, materials and methods

Highly acceptable wines can be made from practically all fruits. Wine can be fermented with yeast that occurs naturally in fruits and even damaged fruits. Details on the history of wine making using fruits, fermentation process, must preparation; the effect of yeast in wine production, aging,

Table 4
Changes in specific gravity during the fermentation process.

Days	Replicate 1	Replicate 2
0	1.0420	1.0421
1	1.0400	1.0401
2	1.0390	1.0391
3	1.0331	1.0332
4	1.0285	1.0283
5	1.0225	1.0222
6	1.0155	1.0153
7	1.0070	1.0072
14	1.0020	1.0021
21	0.9950	0.9950
28	0.9925	0.9927
42	0.9922	0.9920
56	0.9920	0.9920
63	0.9900	0.9910
64	0.9900	0.9900

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine

Table 5
Changes in alcohol content (%) during the fermentation process.

Days	Replicate 1	Replicate 2
0	0	0
1	0.26	0.26
2	0.39	0.39
3	1.17	1.17
4	1.77	1.80
5	2.60	2.60
6	3.50	3.50
7	4.40	4.41
14	4.60	4.60
21	6.18	6.18
28	6.50	6.50
42	6.54	6.60
56	6.60	6.60
63	6.80	6.80
64	6.80	6.80

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine.

clarification, packaging/bottling, quality assessment and evaluation of wines of different fruits can be found in [1–13]. Related analysis can be explored, see [14–18] for details.

2.1. Must preparation

Physically damaged fruits were obtained from selected markets in Ota, Ogun State Nigeria. Different treatment measures were carried out on the fruits, which are; rinsing with sterile distilled water, hot water and chemical treatments. The fruits were weighed, washed, peeled, sliced, rewashed, seeds removed for the case of oranges and then reweighed. The fruits were blended with a sterile blender using counter top blender into puree, and then filtered and mixed with sterile distilled water (1:1 w/v).

Table 6
Changes in the sugar reduction (g/l) during the fermentation process.

Days	Replicate 1	Replicate 2
0	24.060	24.072
1	20.084	20.082
2	14.504	14.501
3	8.621	8.620
4	6.431	6.429
5	2.740	2.742
6	1.635	1.634
7	1.600	1.601
14	1.480	1.480
21	1.311	1.312
28	1.310	1.311
42	1.308	1.308
56	1.304	1.303
63	1.301	1.300
64	1.300	1.300

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine.

Table 7
The microbial counts (cfu/ml) during the fermentation process.

Days	TVC	TCC
0	–	–
1	6.0×10^4	0
2	8.5×10^4	0
3	1.6×10^5	0
4	1.95×10^5	0
5	5.5×10^4	0
6	2.5×10^4	0
7	1.6×10^4	0
14	4.0×10^3	0
21	2.0×10^3	0
63	1.0×10^3	0
64	0	0

Remark: Day 28- first week of clarification, Day 42-third week of clarification, Day 56-fifth week of clarification, Day 63-Sixth week of clarification, Day 64- Bottling of wine, TVC- Total viable counts; TCC- Total coliform counts.

2.2. Fermentation

Two fermentors were used in this experiment; the first is a primary fermentor which is for the aerobic fermentation and the secondary fermentation which is for the anaerobic fermentation.

In the primary fermentor, the mixed fruit wine were mixed with known amount of sugar and yeast nutrient, pectinase, potassium metabisulphite and the prepared starter culture were mixed and stirred every 12 hours with daily analysis of temperature, pH, specific gravity, alcohol content and reducing sugar. The primary fermentation lasted for 7 days.

The mixed fruit wine was then transferred to the secondary fermentor aseptically with physio-chemical analysis on a weekly basis of temperature, pH, specific gravity, alcohol content and reducing sugar. The whole fermentation period lasted for 21 days and after which bentonite clay was added to aid clarification of the wine. This process lasted for six weeks. The microbial analysis was by standard microbiological methods, a 6 fold serial dilution was performed. Aliquot of the sample was inoculated

Table 8
Paired sample statistics of changes in temperature (°C).

	Mean	N	Std. Deviation	Std. Error Mean
Replicate 1	25.8000	15	7.19325	1.85729
Replicate 2	28.4000	15	1.50238	0.38791

into a Nutrient agar (NA) for total viable count (TVC) and MacConkey agar for coliform count using the pour plate method. Cultures were allowed to grow for 18–24 hours after which the resulting colonies were enumerated using a colony counter. Colony counts were converted to colony forming units using the formula below;

$$\textbf{\textit{Colony forming unit}} = \frac{No\ of\ Colonies}{volume\ plated} \div dilution\ factor\ cfu/ml$$

The microbial counts presented as the total viable count (TVC) and total coliform counts (TCCl) is shown in Table 7.

In the determination of titratable acidity 6grams of the sample was weighed into 100 ml beaker and 5oml of distilled water was added to the sample. This was titrated with 0.1 M NaOH solution to give a faint pink colour. 1 ml of 1% aqueous alcoholic phenolphthalein indicator solution was added. The calculation of the titratable acidity was done using the formula below;

$$\textbf{Titratable acidity}(\%) = \frac{\text{Mls of NaOH used} * 0.1\text{N NaOH} * \text{multiequivalent factor}(0.064)}{\text{Grams of sample}} \times 100$$

Specific gravity was determined by using a 25 ml specific gravity bottle which was cleaned with distilled water, dried in an oven at 50°C and allowed to cool in dessicator. The weight of the dry bottle was recorded as W_1, The bottle was then filled with distilled water and the weight was recorded as W_2. The bottle was emptied and filled with the wine sample and weight was recorded as W_3. The specific gravity of the sample was calculated thus;

$$\textbf{Specific Gravity} = \frac{W_3 - W_1}{W_2 - W_1}$$

The alcohol content was calculated using the data from the specific gravity;

$$\textbf{Alcohol content by volume}\ (\%) = (\text{Original gravity} - \text{Final gravity}) * 131.25$$

In the estimation of reducing sugar in wine samples, One ml of 3, 5-Dinitrosalicyclic acid (DNS) was added to 1 ml of supernatant of sample, in a test tube and the mixture heated in boiling water for 10 minutes. The test tube was cooled rapidly in tap water and the volume adjusted to 12 ml with distilled water. A blank containing 1 ml of distilled water and 1 ml of DNS was prepared. The optical density of the sample was read against the blank in the spectrophotometer or 540 nm absorbance. The concentration of reducing sugar in the supernatant was estimated from the glucose standard curve.

$$\textbf{Reducing sugar}\ (\boldsymbol{g/L}) = \frac{\text{Absorbance of Test}}{\text{Absorbance of standard}} \times 100$$

Table 9
Paired sample correlation of changes in temperature (°C).

	N	Correlation	Significance
Replicate 1 & Replicate 2	15	−0.798	0.000

Tablee 10
Paired samples test of changes in temperature (°C).

Statistic	Value
mean (paired difference)	–2.600000
Standard deviation (paired difference)	8.441395
t	–1.192902
Degrees of freedom	14
Significance (2 tailed)	0.252733

Table 11
Paired sample statistics of changes in pH.

	Mean	N	Std. Deviation	Std. Error Mean
Replicate 1	4.4060	15	0.47634	0.12299
Replicate 2	4.4027	15	0.47227	0.12194

Table 12
Paired sample correlation of changes in pH.

	N	Correlation	Significance
Replicate 1& Replicate 2	15	0.998	0.000

Table 13
Paired sample test of changes in pH.

Statistic	Value
mean (paired difference)	0.003333
Standard deviation (paired difference)	0.029681
t	0.434959
Degrees of freedom	14
Significance (2 tailed)	0.670222

Table 14
Paired sample statistics of changes in titratable acidity (%).

	Mean	N	Std. Deviation	Std. Error Mean
Replicate 1	0.8353	15	0.28760	0.07426
Replicate 2	0.8273	15	0.28927	0.07469

Table 15
Paired sample correlation of changes in titratable acidity (%).

	N	Correlation	Significance
Replicate 1 & Replicate 2	15	0.999	0.000

Table 16
Paired sample test of changes in titratable acidity (%).

Statistic	Value
mean (paired difference)	0.008000
Standard deviation (paired difference)	0.012071
t	2.566756
Degrees of freedom	14
Significance (2 tailed)	0.022378

Table 17
Paired sample statistics of changes in specific gravity.

	Mean	N	Std. Deviation	Std. Error Mean
Replicate 1	1.0121	15	0.02037	0.00526
Replicate 2	1.0122	15	0.02030	0.00524

Table 18
Paired Sample correlation of changes in specific gravity.

	N	Correlation	Significance
Replicate 1 & Replicate 2	15	0.999	0.000

Table 19
Paired sample test of changes in specific gravity.

Statistic	Value
mean (paired difference)	–0.000067
Standard deviation (paired difference)	0.000302
t	–0.856145
Degrees of freedom	14
Significance (2 tailed)	0.406333

2.3. Statistical tests

Paired sample t- tests are conducted to determine the significant difference in the means of thee replicates. Null hypothesis implies that there is no significant mean difference and the alternative hypothesis implies otherwise. Small sample sizes necessitated the use of t-test. Three distinct tables are obtained for each parameter which is paired sample statistics, paired sample correlations and paired sample test. These are shown in Tables 8–19. Paired sample tests of changes in alcohol content (%) and sugar reduction were not considered because the values of the replicates are almost the same.

Acknowledgements

The authors sincerely acknowledge Covenant University Center for Research Innovation and Discovery (CUCRID) for sponsoring the research.

Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.05.104.

References

[1] W.F. Duarte, D.R. Dias, J.M. Oliveira, J.A. Teixeira, J.B. Almeida, De, R.F. Schwan, L.W.T. - Food, Science and Technology Characterization of different fruit wines made from cacao, cupuassu, gabiroba, jaboticaba and umbu, LWT - Food Sci. Technol. 43 (10) (2010) 1564–1572.
[2] O. Emmanuel, Studies of wine produced from pineapple (Ananas comosus), Int. J. Biotech. Molec. Biol. Res. 3 (1) (2012) 1–7.
[3] A.O. Eni, I.A. Oluwawemitan, S.U. Oranusi, Microbial quality of fruits and vegetables sold in Sango Ota, Nigeria. Afr, J. Food Sci. 4 (5) (2010) 291–296.
[4] S.U. Oranusi, W. Braide, A study of microbial safety of ready-to-eat foods vended on highways: onitsha-owerri, south east Nigeria, Int. Res. J. Microbiol. 3 (2) (2012) 066–071.
[5] S.U. Oranusi, M. Galadima, V.J. Umoh, P.I. Nwanze, Food safety evaluation in boarding schools in Zaria, Nigeria, using the HACCP system, Sci. Res. Essay 2 (10) (2007) 426–433.
[6] S.U. Oranusi, V.J. Umoh, J.K.P. Kwaga, Hazards and critical control points of kunun-zaki, a non-alcoholic beverage in Northern Nigeria, Food Microbiol. 20 (1) (2003) 127–132.
[7] A.A. Ajayi, C.F. Peter-Albert, M. Akeredolu, A.A. Shokunbi, Clarification of Tomato Juice with Polygalacturonase Obtained from Tomato Fruits Infected by Aspergillus niger, Pak. J. Biol. Sci. 18 (2) (2015) 74–80.
[8] S.U. Oranusi, O.J. Olorunfemi, Microbiological safety evaluation of street vended ready-to-eat fruits sold in Ota, Ogun state, Nigeria, Int. J. Res. Biol. Sci. 1 (3) (2011) 22–26.
[9] W. Braide, I.J. Odiong, S.U. Oranusi, Phytochemical and Antibacterial Properties of the seed of Watermelon (Citrullus lanatus), Prime J. Microbiol. Res. 2 (3) (2012) 99–104.
[10] S.U. Oranusi, W. Braide, H.O. Nezianya, Microbiological and chemical quality assessment of some commercially packed fruit juices sold in Nigeria, Greener J. Biol. Sci. 2 (1) (2012) 001–006.
[11] S.U. Oranusi, W. Braide, Microbiological safety assessment of apple fruits (Malus domestica Borkh) sold in Owerri Imo State Nigeria, Adv. J. Food Sci. Technol. 4 (2) (2012) 97–102.
[12] W. Braide, S.U. Oranusi, C.C. Otali, Microbiological status of processed fruit juice sold in the commercial city of Onitsha, Sch. J. Biol. Sci. 1 (3) (2012) 25–30.
[13] S.U. Oranusi, S.O. Dahunsi, Preliminary study on hazards and critical control points of kokoro, a Nigerian indigenous fermented maize snack, SpringerPlus 4 (1) (2015) 253.
[14] M.A. Ruiz-Bellido, V. Romero-Gil, P. García-García, F. Rodríguez-Gómez, F.N. Arroyo-López, A. Garrido-Fernández, Data on the application of Functional Data Analysis in food fermentations, Data Brief. 9 (2016) 401–412.
[15] P. Nambisan, Data of optimization of laccase production by Marasmiellus palmivorus LA1 under solid state fermentation using one factor at a time method, Data Brief. 17 (2018) 1276–1282.
[16] C. Florencio, F.M. Cunha, A.C. Badino, C.S. Farinas, E. Ximenes, M.R. Ladisch, Secretome data from Trichoderma reesei and Aspergillus niger cultivated in submerged and sequential fermentation methods, Data Brief. 8 (2016) 588–598.
[17] P.J. Boynton, D. Greig, Fungal diversity and ecosystem function data from wine fermentation vats and microcosms, Data Brief. 8 (2016) 225–229.
[18] M. Nakano, Y. Sagane, R. Koizumi, Y. Nakazawa, M. Yamazaki, K. Ikehama, H. Sato, Clustering of commercial fish sauce products based on an e-panel technique, Data Brief. 16 (2018) 515–520.