VOL. 03 NO. 9,
FEBRUARY, 2024
E-ISSN 3026-958X
P-ISSN 3027-1169

African Scholar Publications & Research International
www.africanscholarpub.com

Journal of Science Innovation & Technology Research (JSITR)

FITTING MULTIPLE LINEAR REGRESSION MODEL TO FRUIT JUICE AND YOGURT DEMAND DATA: A CASE STUDY OF NIYYA FOODS AND DRINKS COMPANY, KADUNA

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Abstract

This research work was carried out using data obtained from Niyya Foods and Drinks Company Nigeria limited. The data is a monthly data series for the period of one year, being from May 2021 to May 2022. The analysis carried out include multiple linear regression, correlation analysis and multi-collinearity analysis, From the result on this study, it was found out that, all the parameters of the fitted model were found to be significant, Equally the regression is significant and the fitted model of prediction is $Y= 61.546+ 1.007x_1 + 0.997x_2 + 0.990x_3 + 0.996x_4 + 0.977x_2$,the correlation analysis result reveal that there is present of weak positive correlation among the variables and the multi-collinearity test reveals that there is no present of collinearity in the data. This study was concluded by recommending among others that the government should allocate more resources to the agricultural sector, so that more machinery that will acquire to assist in increases of foods and fruit drinks production as well as aid in the preservation of fruit to meet demand.

Keywords: Regression, Demand, Fruit Juice, Yogurt, Multi-Collinearity.

INTRODUCTION

Juice is defined in the most general sense as "the extractable fluid contents of cells or tissues" (Full Definition of juice, 2016). Botanically, fruit is a plant organ, the principal biological purpose of which is to protect and eventually nourish the seeds as part of the natural plant propagation (Bates et al., 2001). The

fleshy component, which is normally the edible part of the mature/ripe fruit, contains mainly parenchyma cells, possessing thin cell walls and a vacuole that occupies most of the cell volume. Thus, the cell sap found inside the vacuole represents the major component of the fruit juice. Within a given fruit species there are numerous cultivars (varieties) available, including some that dominate the juice production (e.g., cider apples), while others are preferred for the fresh market. Usually batches of fruits from different cultivars are processed, however, single fruit cultivar juices can also be extracted, e.g., Brettacher apple juice, which has been proposed to be suitable as a natural functional food (Bitsch et al., 2001). The yield from any fruit juice process depends on good solids handling. Removing the solid matter and pulp, and then clarifying the juice can control the colour, taste and overall quality of the end products (Kazembe 2005). About 20 million Nigerians, approximately 15 percent of the country's population of more than 133 million, constitute the target market for juice products. Consumption should increase as households begin to use products at home more frequently. The few large food processing companies have developed or increased production for local consumption and export to neighboring countries. New firms are reported to be investing in Tetra park production lines. Small - scale manufacturers of bottled fruit drinks have also boosted capacity (Fasogbon, 2018).

Yogurt is a fermented milk product by bacterial fermented from milk (oxford English dictionary, 2009). It is also defined as a thick white liquid food mostly made by adding bacterial to milk and often flavored with fruit as explain in (Cambridge English Dictionary, 2021). Yogurt is a health drink for favorite breakfast, lunch or snack food made by the friendly natural bacterial fermentation of milk. It is basically a form of curdled milk but with less fat. Yoghurt is among the most popular fermented foods in the world, and enjoys wide consumer acceptability, due to its taste and health benefits. It can be used as accompanier of the main meal or as a snack during the day. The word yoghurt probably originates from the Turkish term “yogurmak”, which means to thicken, coagulate, or curdle (McGee *et al*, 2010). Current research has been investigating how to improve yogurt both in terms of its potential as a healthy food and as an appetizing product that appeals to the general population. The role of lactic acid bacterial is widely applied in various fluids including agriculture especially in the field of food. (Zourari, *et al*, 2010).

The citrus fruits belong to the group of fruits that includes oranges, lemon, limes, grape fruits and tangerines. Citrus fruits are the highest value fruit crop in terms of international trade. There are two main markets for citrus fruit via the fresh fruit market and the processed citrus fruits market (mainly orange juice). Most citrus production is accounted for by oranges, but significant quantities of grapefruits, lemons and limes are also grown. Citrus is one of the most widely grown fruit trees in sub-tropical Africa. It is believed to have been introduced into the region by the colonial

administrations and missionaries. Since its introduction in Nigeria, citrus has become fully adapted and it features within the cropping systems of the country especially in regions from latitude 6ºN – 9ºN. The varied ecological and climatic conditions suitable for the production of citrus confer on the Nigeria immense comparative advantage and the potential to lead the world in citrus production and trade. Horticulture sub-sector suffered neglect during the colonial and post-independence era in Nigeria. The horticultural sub-sector started receiving due attention in 1975 when the Federal Government of Nigeria with the assistance of UNDP/FAO, established the National Fruits and Vegetable Research and Demonstration Centers (NFVRDC), which eventually transformed to the National Horticultural Research Institute (NIHORT), with citrus as one of the most important mandate crop (Jolaoso, et al., 2011).

Since most of the existing plantings are in mixed cropping systems with cocoa, kola, coffee, rubber, etc. Only a few large plantations are in existence. Most of the present plantings were done with un-budded seedlings. (NIHORT, 2000) also reported that 45% of citrus currently produced in the country is consumed fresh and 30% are wasted due to post-harvest losses and 25% are processed. Commercial cultivation of fruits, citrus inclusive for large scale processing into various fruit products has not really started in Nigeria (Adeyemi, 2005).

There is little investment in citrus processing in Nigeria, despite the fact that investment in the processing of fruits (citrus) has good economic returns. Citrus can be processed into various value added products. Investment in processing of citrus fruits into juice concentrates and other products will greatly reduce the waste experienced especially during seasons of glut. This paper examines the citrus value chain in Nigeria, efforts towards the development of citrus value chain, challenges and strategies for harnessing the potentials of citrus fruits for economic development of the country. This is done using technical information obtained from national survey conducted by the Raw Materials Research and Development Council (RMRDC) on different commodities under the National Raw Materials Information System (Jolaoso et. al., 2011).

The pineapple tree belongs to the Bromeliaceous family. Its fruit can be processed into several products such as canned pineapple slice, pineapple pulp, dried pineapple, pasteurized pineapple juice, and concentrate. The fresh pineapple juice is a popular product due to its pleasant aroma, flavor, and numerous functional properties. The pineapple juice satisfies the “5 A Day” dietary requirement of fruits and vegetables set by many health agencies. Pineapple juice contains a variety of minerals, especially manganese, as well as amino acids, various sugars, vitamins, and polyphenols. It is considered as a functional drink due to its health-promoting properties and has anti-inflammatory, antiatherosclerotic, antiaging, and many other healing properties, which are briefly described in this chapter. Pineapple juice market has increased four-fold

worldwide since 1984 from 1.3 to 5.6 million tons (fresh fruit equivalent). The United States and EU account for 90% of the global market for pineapple juice and concentrate, while Russia, Japan, and Middle Eastern countries account for 6% of the market share. There are different types of pineapple juice available on the market. Some single-strength juice is obtained from pineapple parts that are squeezed with the help of mills and screw presses. Other types include juice from concentrate, blended juice with other fruits, clear juice, and many others. Approximately, 10%–25% of pineapple juice is obtained from canning industry, which is not suitable for the production of single-strength or concentrate juice, due to its high acidity (Sairi, et, al., 2004).

Guava is one of the most cultivated fruit crop in many tropical and subtropical countries. It is rich in **ascorbic acid** (**vitamin C**), **vitamin A**, dietary fiber, pectin, sugars, folic acid, potassium, manganese, copper and certain dietary minerals. Guava is also consumed for medicine purposes in pharmacological activities. These are also processed and preserved in the form of jam, pulp, puree, squash, nectar and juice. Guava juice contains as much as four times higher Vitamin C than orange juice and with its unique flavor and aroma, is able to compete in the market, in any form guava juice or guava wine. (Anderson, 2005; Reddy et al., 2006).

Mango juices are produced from mango fruits. Fruit generally has been defined as the ripened ovary of the flower, with or without other associated parts. It can be classified broadly into two, namely, juicy and pulpy fruits, juice fruits include; orange, lemon, lime, tangerine, tangelo, pumelo, and so no while pulpy fruits include pineapple, mango, pawpaw, banana, cashew, guava, breadfruits, avocado, pear and so on. Mango are grown abundantly in many parts of Nigeria but most of these fruits are lost after harvesting. To reduce post-harvest losses of mango, the federal institute of industrial research Oshodi has developed and perfected process technology for production of juice from Nigeria fruits with the overall objective of conserving foreign exchange, stimulating industrial development, creating employment and reducing poverty. Standard organization of Nigeria (SON) defines fruit juice as the unfermented but fermentable natural juice intended for direct consumption obtained by a mechanical process from sound matured fruits preserved by physical or chemical means. The juice may be turbid to clear (as in the case of clarified juice).

According to (Medical, news, fruits diet 2019) fruits juices are beverages used in everyday life that are found in the retails market and are mostly derived from citrus fruits. Many fertilizers are used in field as a result of atmosphere, underground and surface water pollution, our foods and beverages are contaminated with heavy

metals. Fruits juices which are produced in farm Pride Company are Mango juice, orange juice, guava juice, pineapple juice and mix fruits juice. Fruit juice comes from the flesh of the fruit or from the whole fruit itself. Eating difference fruit provides various health benefits people who eat more fruits and vegetables as part of an overall healthy diet are likely to have a reduced risk of some chronic diseases but some of the fruit juices risk also associated with drinking large amounts of certain fruit. Fruits provide nutrients vital for health and maintenance of your body. (Why is it important to eat fruit? 2020). Some fruits have higher levels of fructic acid than others, with citrus fruits like oranges and grapefruits sitting at the top of the list, alongside grapes, figs, mangoes and cherries. The lowest sugar fruits tend to include berries, such as blueberries, strawberries and raspberries, Apples and pears contain moderate amounts. (Fruit can it harm your teeth, 2018). The method of making fruit juice varies depending on the fruit, but many manufacturers make juice by crushing or "pressing" the fruit to squeeze out the juice inside, then pasteurizing or adding preservatives before packaging the final product. Though many fruit juices have health benefits, consuming too much fruit juice can cause health complications for people, such as weight gain or changes to blood sugar levels. (Amy Richter and Adam Rowden, 2021).

Nigeria is blessed with a lot of fruits, orange are found and produced in north central, cherry are found in the south west, mangoes are found in the north-west while avocado pears are found in the south-east. The challenge the nation has is how to preserve these products and then turn them to economic benefit for the nation. This is what has necessitated a project of this nature.

The aim of this study is to investigate the effect of demand of yogurt and fruit juice in the Nigeria market by fitting a regression model to the data and test for multicollinearity.

LITERATURE REVIEW

Fruit juice comes in different packs and sizes. It can be made from orange, mango, guava, pineapple and other fruit types. The raw material and research development council (RMRCD) estimate Nigeria's annual demand for fruit juice at 550 million litres, while supply by local firms is just 135 million litres, representing 24.5percent. The country produces 930,000 tonnes of citrus fruits annually from three million hectares of land, according to RMRCD. (OdinakaAnudu, 2022).

The global demand for tropical fruit juices has been increasing for the past few years. Sweet aromatic taste of mango is the major factor driving the growth of mango fruit juice market. Rising health concerns and amount of nutrition in fruit juices successfully influenced the growth of mango juice market. Europe is the major consumer of fruit juices which comprises more than 20% consumption of mango juice in Europe of which more than 50% consumed in United Kingdom. Countries in Asia,

South America and Africa are the major producer of mango and major exporters to North America and Europe. Major producers are responsible for more than 90% domestic consumption. Mango beverages are one of the fastest growing fruit juice categories, which are outpacing the carbonated drinks in terms of volume growth. Mango Fruit juices are majorly known for its taste and acquire largest market in Asian countries such as China, India and Indonesia.

According to Goldstein report on global mango juice market outlook, the global demand for tropical fruit juices has been increasing for the past few years. Sweet aromatic taste of mango is the major factor driving the growth of mango fruit juice market. Rising health concerns and amount of nutrition in fruit juices successfully influenced the growth of mango juice market. Europe is the major consumer of fruit juices which comprises more than 20% consumption of mango juice in Europe of which more than 50% consumed in United Kingdom. Countries in Asia, South America and Africa are the major producer of mango and major exporters to North America and Europe. Major producers are responsible for more than 90% domestic consumption. Mango beverages are one of the fastest growing fruit juice categories, which are outpacing the carbonated drinks in terms of volume growth. Mango Fruit juices are majorly known for its taste and acquire largest market in Asian countries such as China, India and Indonesia. Market players such as coca cola and Pepsi Company are continuously expending huge amount on advertisements and product line of mango juices in Asia. In 2016, carbonated drink market in Asia has grown by 27% in volume sales, but juice segment that have up to 25% fresh juice content has grown by 63% over the same period.

In Nigeria, about 3,900,000 tones of citrus fruits were produced from an estimated hectare of 800000 hectares of land in 2012 (FAO, 2012). Citrus is grown in the rainforest and guinea savannahs, most of these farmlands are in the remote part of the country. There are two main markets for citrus fruit in Nigeria: the fresh fruit market and the processed citrus fruits market (mainly orange juice). Most citrus production is accounted for by oranges, but significant quantities of grape fruits, lemons and limes are also grown. Total production and consumption of citrus has grown strongly since the 1980's. The rise in citrus production is mainly due to the increase in cultivation areas, improvements in transportation and packaging, rising incomes and consumer preference for healthy foods (Álvarez*,et al* 2013). Demand and Supply Status of Citrus in Nigeria Demand for citrus in Nigeria has grown rapidly over the past decade and this growth is expected to continue to rise. Compared to an estimated 15 million consumers of citrus fruit and juice in 2002, market size more than tripled to an estimated 55 million (approximately 37% of population) in 2007. Nigeria's demand for consumer pack fruit juice was estimated at more than 200 million litres (over 90% of which was imported) prior to the ban on consumer pack fruit juice in 2002 by the

Federal Government of Nigeria. Since the ban, consumption of fresh and processed citrus has further increased by approximately 10% per year. Fruit juice consumption has grown from 200 million litres in 2002 to 320 million litres in 2007. The market for fruit concentrate, Pre-mix and Syrup (concentrates) has thus risen from 1.5 million kg in 2002 to about 30 million kg in 2007 (UNCTAD, 2007). This coupled with the increased knowledge on the health benefits of fruits and the demand by processors for fresh fruits is an indication of the weight of promise citrus offers Nigeria if its value chain is sufficiently developed. According to Entrepreneur Correspondent (2017) on how to start orange juice production in Nigeria or Africa. Complete guide, 2021. The consumption of orange juice has increased by approximately 10% per year. It rose from 200 million litres in 2002 to 320 million litres in 2007. The number rose to about 550 million litres in 2017. The national demand for fruit juices annually is presently an estimated of about 550 million litres, while the current supply is estimated at 135 million litres.

Guava is commonly consumed in Latin America and around the world, either as fresh fruit or in products such as juices and candies. Aside from its pleasant flavor, the rising demand has been boosted by new lifestyle trends that encourage society to adopt healthy habits. The fruit has low carbohydrate, fat, and protein content and high water content, as well as vitamins A, B, and C. The vitamin C content is between 180 and 300 mg per 100 g of fruit, which is far greater than that found in citrus fruits like oranges and lemons, which is why it is referred to as a “superfruit”. Several studies regarded ripe guava as a nutraceutical due to its compounds with health and disease-prevention properties P Guava L. is a fruit that is known around the world as a food, but it is also used as medicine by several indigenous peoples in Central America and Africa, and it is present in many traditional medicines and degenerative diseases such as cancer. P. guajava L. has been shown in studies to have hepatoprotective, antiallergic, antimicrobial, antigenotoxic, antiplasmodial, cytotoxic, antispasmodic, cardioactive, antidiabetic, anti-inflammatory, and antinociceptiveproperties. The compounds, particularly thoseextracted from the leaves and fruits, have beneficial pharmacological properties. (Pérez*, et al*, 2008).

According to a market research report titled "Africa Dairy Products Market Outlook. The growing trend among people to consume yoghurt as a substitute of dessert owing to its low sugar content is one of the major factor contributing towards growth of the segment. High prevalence of diabetic population in the continent has also increased the demand for yoghurt as dessert in Africa. Additionally, the efforts by the market players to provide yoghurt to customers in diverse flavors and small packing as per their needs in economically sensitive countries of Africa further augment the sales of yoghurt. (Modupe, 2016)

METHODOLOGY

The data for this study was collected from Niyya foods and drinks company in Kaduna between 2021 and 2022. The analyses adopted in this research are multiple linear regression, correlation analysis, and multi-collinearity.

MODEL SPECIFICATION

MULTIPLE LINEAR REGRESSION ANALYSIS

Multiple Regression Analysis refers to a set of techniques for studying the straight-line relationships among two or more variables. Multiple regression estimates the β's in the equation

$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k + \varepsilon$

The X's are the independent variables, Y is the dependent variable. The subscript k represents the observation row number. The β's are the unknown regression coefficients. Their estimates are represented by b's. Each β represents the original unknown (population) parameter, while b is an estimate of this β. The ε is the error residual of observation k. Although the regression problem may be solved by a number of techniques , the most-used method is least squares. In least squares regression analysis, the b's are selected so as to minimize the sum of the squared residuals. This set of b's is not necessarily the set you want, since they may be distorted by outliers--points that are not representative of the data. Robust regression, an alternative to least squares, seeks to reduce the influence of outliers.

Multiple regression analysis studies the relationship between a dependent variable and p independent variables (predictors, regressors, IV's). The sample multiple regression equation is

$y=b_o+b_1x_1+b_2x_2+...+b_k$

If p = 1, the model is called simple linear regression. The intercept, b_o, is the point at which the regression plane intersects the Y axis. The b_i are the slopes of the regression plane in the direction of x_i. These coefficients are called the partial-regression coefficients. Each partial regression coefficient represents the net effect the i_{th} variable has on the dependent variable, holding the remaining X's in the equation constant.Once the β's have been estimated, various indices are studied to determine the reliability of these estimates. One of the most popular of these reliability indices is the correlation coefficient. The correlation coefficient, or simply the correlation, is an index that ranges from -1 to 1. When the value is near zero, there is no linear relationship. As the correlation gets closer to plus or minus one, the relationship is stronger. A value of one (or negative one) indicates a perfect linear relationship between two variables. The regression equation is only capable of measuring linear, or straight-line, relationships. If the data are a random sample from a larger population and the εj are independent and normally distributed, a set of statistical tests may be

applied to the b's and the correlation coefficient. These t-tests and F-tests are valid only if the above assumptions are met in order to make good use of multiple Regression, you must have a basic understanding of the regression model. (Noora, 2020)

REGRESSION ANALYSIS AND ANALYSIS OF VARIANCE (ANOVA)

Regression analysis can also be considered from the point of view of the ANOVA table. Recall that SST=SSR+SSE this decomposes SST in to two components called explained (or regression) sum of squares and error (residual) sum of squares. Association with the sum of square is the degree of freedom, which the number of independent observation in which it is based. SST has (n-1) degree of freedom and SSE has (n-2) degree of freedom.

From thus, it is easy to show that:

$$Fc=\frac{MSR}{MSE}$$

The ANOVA table that can be used to test for the overall regression is given below:

ANOVA TABLE

SOURCE	DF	SS	MSS	F_C
Regression	K-1	SSR	MSR=SSR/K-1	MSR/MSE
Error	N-K	SSE	MSE=SSE/[N-K]	
Total	N-1	SS total		

CORRELATION ANALYSIS

This is the linear relationship between pairs of independent variables. The correlation coefficient is calculated using the formula:

$$r=\frac{n\sum xy-\sum x\sum y}{\sqrt{(n(\sum x^2)-(\sum x)^2(n\sum y^2-(\sum y)^2)}}$$

Where, r = correlation coefficient, n = number of observations, X = first variable in the context, and Y = second variable in the context. If the correlation coefficient value is higher with the pair wise variables, it indicates possibility of Collinearity. In general, if the absolute value of Pearson correlation coefficient is close to 0.8, Collinearity is likely to exist [1,10]. (Noora, 2020).

MULTI-COLLINEARITY

Multi-collinearity is defined as the existence of a perfect or exact, linear relationship among some -or all explanatory variables of a regression model. There is various method of testing multi-collinearity. However, we use the variance inflation factor to test for the data. Variance inflation factor is used to measure how much the variance

of the estimated regression coefficient is inflated if the independent variables are correlated. VIF is calculated as

Variance inflation factor $\text{VIF} = \frac{1}{1-R_J^2}$

Where, the tolerance is simply the inverse of the VIF. The lower the tolerance, the more likely is the Multi-collinearity among the variables. The value of VIF =1 indicates that the independent variables are not correlated to each other. If the value of VIF is 1< VIF < 5, it specifies that the variables are moderately correlated to each other. The challenging value of VIF is between 5-10 as it specifies the highly correlated variables. If VIF ≥ 5 to 10, there will be multi-collinearity among the predictors in the regression model and VIF > 10 indicate the regression coefficients are feebly estimated with the presence of Multi-collinearity (Noora, 2020).

RESULTS AND DISCUSSION

Table 1: Regression of total monthly production on yoghurt, mango, guava, orange and pineapple

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	61.546	21.156		2.909	.027
	Yogurt	1.007	.004	.436	248.173	.000
	Mango juice	.997	.005	.308	214.470	.000
	Guava juice	.990	.006	.178	152.926	.000
	Orange juice	.996	.003	.346	343.386	.000
	Pineapple	.977	.007	.155	132.612	.000

Source: Author's Computation

a. Dependent Variable: Total monthly production

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5$$

Where y=total monthly production, b_0=constant, x_1=yogurt, x_2=mango, x_3=guava, x_4=orange, x_5=pineapple.

The regression equation is

$Y= 61.546+ 1.007x_1 + 0.997x_2 + 0.990x_3 + 0.996x_4 + 0.977x_5$

From table 1, it can be observed that the parameter of the model is given as b_o=0.027, b_1= 0.000, b_2=0.000, b_3=0.000, b_4=0.000 and b_5=0.000, which shows that the parameters are statistically significant at 5% level of significance. It implies that yogurt has a unit increases of 1.007 on the production process in a month whereas, other variables has a decrease unit of 0.99 per month.

Table 2: Overall Regression Result

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	131063629.670	5	26212725.934	40.819	.000[b]
	Residual	3853036.997	6	642172.833		
	Total	134916666.667	11			

Source: Author's Computation

a. Dependent Variable: Total monthly production

b. Predictors: (Constant), Pineapple, Mango juice, Orange juice, Guava juice, Yogurt

From table 2, the result shows that the overall regression is statistically significant since the p-value of 0.000 is less than the alpha α-value 0.05, we therefore reject H_O and conclude that, significant relationship exists among the variables at 5% level of significance.

Table 3: Goodness of fit test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986[a]	.971	.948	801.357

Source: Author's Computation

a. Predictors: (Constant), Pineapple, Mango juice, Orange juice, Guava juice, Yogurt

From table 3 above, the result shows the model summary, it shows the R^2= 0.971 which is 97.1% of the variation that can be explained by the model and 2.9% is unexplained by the outside model and the adjusted R-square is 94.8%, which implies that they contribute positively to the model and the model is good enough for prediction.

Table 4: Correlation Results

Correlations

		Yogurt	Mango juice	Guava juice	Orange juice	Pineapple
Yogurt	Pearson Correlation	1	0.689*	0.523	0.244	0.466
	Sig. (2-tailed)		0.053	0.081	0.445	0.127
	N	12	12	12	12	12
Mango juice	Pearson Correlation	0.689*	1	0.264	0.144	0.084
	Sig. (2-tailed)	0.013		0.406	0.655	0.794

	N	12	12	12	12	12
Guava juice	Pearson Correlation	0.523	0.264	1	0.284	0.316
	Sig. (2-tailed)	0.081	0.406		0.372	0.316
	N	12	12	12	12	12
Orange juice	Pearson Correlation	0.244	0.144	0.284	1	0.142
	Sig. (2-tailed)	0.445	0.655	0.372		0.660
	N	12	12	12	12	12
Pineapple	Pearson Correlation	0.466	0.084	0.316	0.142	1
	Sig. (2-tailed)	0.127	0.794	0.316	0.660	
	N	12	12	12	12	12

Source: Author's Computation

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

From table 4 above, it shows the correlation result between yogurt and mango juice 0.689, which reveals the present of strong positive correlation between the variables, the correlation between yogurt and guava juice is 0.523, which implies the present of moderately positive correlation between the variables, the correlation between yogurt and orange juice 0.244 reveals the present of weak positive correlation between the variable, the correlation between yogurt and pineapple 0.127 reveals the present of weak positive correlation between the variables. It is observed that the correlation between mango, guava, orange and pineapple have the present of weak positive correlation between the variables.

Table 5: Multicollinearity Test

Coefficients[a]

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**	**Collinearity Statistics**	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	61.546	21.156		2.909	.027		
	Yogurt	1.007	.004	.436	248.173	.000	.299	3.348
	Mango juice	.997	.005	.308	214.470	.000	.446	2.241
	Guava juice	.990	.006	.178	152.926	.000	.683	1.464
	Orange juice	.996	.003	.346	343.386	.000	.907	1.103
	Pineapple	.977	.007	.155	132.612	.000	.675	1.482

Source: Author's Computation

a. Dependent Variable: Total monthly production

From table 5 above is the summary of the collinearity statistics carried out using VIF (variance inflation factor), This shows the various VIF to be less than 10, we therefore

do not reject H_o and concluded that there is no collinearity between the explanatory variable.

CONCLUSION

This study aims at investigating statistical analysis on fitting multiple linear regression model to fruit juice and yogurt demand data. Based on the result of this work, it is therefore concluded that the higher demand of fruits juice and yogurt have significant effect to the fitted model. Based on this conclusion, it is recommended that government should allocate more resources to the agricultural sector in order to provide more machinery that will produce and preserved fruit juice in larger quantity to meet demand. The government should encourage farmers to plants more fruits tree which will help reduce the demand of fruits. Private company should add to their man power in other to meet up with the demand of fruit juice and people should ensure they take fruit juice or yogurt as meal, which serve as benefit to one's health.

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