American Journal of Sciences and Engineering Research
E-ISSN -2348 – 703X, Volume 3, Issue 3, 2020

Nutritional Profile and Physicochemical Properties of Peach Varieties in Ethiopia

Kebede Dinkecha[1], Habtam Setu[2]
Ethiopia Institute of Agricultural Research (EIAR), Holetta Agriculture Research Center, P.O.Box 2003 Addis Ababa, Ethiopia.

ABSTRACT: *Nutritional and functional characteristics of fruits are related to their quality and are influenced by genotype and ripening stage, and by environmental conditions and orchard management practices. The purpose of this research was to test nutritional profile and selected physicochemical properties of different improved and adopted peach varieties in Ethiopia and comparative study among varieties and between study varieties and standard reference. The result got show that improved peach varieties greater amount of ash (4.3-5.51%), protein (4.34-6.05%), fat (0.097-1.386%) and fiber (2.87-4.611%) than standard reference (0.263, 1.423, 0.427, and 1.20%, in the aforementioned order) but lower in carbohydrate (84.411-89.90%) than standard of (96.678%). The mineral content higher in K (0.48-1.182%), Ca (0.162-0.565 %), Mg (0.037-0.066%), Fe (16.33-159.2%) and Zn (2.43-8.84%) than standard reference (0.942, 0.051, 0.071, 16.32, 3.213%), respectively except Na, Mg, Cu and Sulfur while the fruit quality was revealed low moisture content which less water and medium vitamin C (3.99-5.55%) and TSS (8.36-14.31%). We observed variation in proximate composition and mineral content among sixteen peach varieties.*

Keywords: *Peach, mineral, nutrient content, physicochemical, proximate, varieties.*

I. INTRODUCTION

Temperate fruits trees, like apple, pear, plum, peach, and almond, are that grow well in temperate climate zones where most commercial varieties fulfill their required chilling temperature. Though, because of the low average temperatures, these crops are grown well in the highlands of Ethiopia.

Fruits have regarded as a valuable food commodity with potential health benefits, due in part to their natural antioxidant components, which can contribute to decreasing the incidence of cardiovascular and other chronic diseases [10,12]. It has been revealed that carotenoids and polyphenols such as phenolics, flavonoids, anthocyanins, and phenylpropanoids present in fruits might act as antioxidants or as agents with other therapeutic properties contributing to cardioprotective action [11].

Nutritional and functional characteristics of fruits are related to their quality and are influenced by genotype and ripening stage, and by environmental conditions and orchard management practices. It is a good source of soluble carbohydrates such as starches, sugars and fiber pectin, which helps to reduce cholesterol levels in humans by lowering the secretion of insulin [4,7].

Peach (Prunus persica L.) fruits have high economic and nutritional value [14, 24]. Carbohydrates, organic acids, minerals, and dietary fiber are among the major constituents of peach fruit, which contribute to the nutritional quality of both fresh fruits and juices [26]. Ripened peach fruits having mostly golden yellowish flesh, are sweeter because they exhibit lower acidity. Fruits with yellow flesh have an acidic flavor together with a sweet taste. Peach is rich in vitamin A and potassium, besides having considerable amounts of other valuable components such as organic acids and natural sugars. These constituents elevate the nutritional status of the peach fruit. Regarding medicinal functions, dietary intake of peach can reduce the generation of ROS (reactive oxygen species) in human blood plasma and provide protection from several chronic diseases [21]. Peach fruits have laxative properties and are appropriate to prevent constipation and to treat duodenum ulcers. Phenolic acids, flavonoids, and anthocyanin compounds serve as a major source of potential antioxidants in peach fruit, which might have been used for these medicinal functions [19]. Many factors influence the phytochemical contents of fruits such as climatic conditions, agronomic practices, and varietal differences [22]. Contents of organic acids, carbohydrates, and phenolics are not distributed within different

 Received- 05-03-2020, Accepted- 25-03-2020

parts of fruits, and they concentrate most of them in the epidermal and sub-epidermal layers of fruit [15,16]. The commercial and domestic uses of a huge amount of fruits, for juice, and/or processed sauces and slice production [6], result in the generation of a large number of seeds and peel as agro-wastes.

Peaches are a source of vitamin C, potassium, dietary fiber, and folic acid. They also contain calcium, iron and have a high protein quality, ratio of mg amino acid/gram protein, low in sodium and contain no fat. They are low in calories with only 30 calories per serving, yet add abundant flavor to a wide variety of foods. Peach is also cholesterol-free and provides dietary fiber, vitamin C, vitamin B6, potassium, and other key nutrients.

So far about 16 peach varieties were improved and adopted through research from Ethiopian Institution of Agricultural Research, Holetta Agriculture Research Center. These varieties were shown to consumers and used them for house consumption and local markets. However, the information on their nutritional profile and quality parameters value during adaptation because of environmental factors, agronomy management, soil type, and nutrient application variation in terms of flavor, provide health-promoting phytochemicals, antioxidant proximate composition, and mineral content, is scanty. We conducted the present study to determine the nutritional profile, physicochemical properties of improved and adopted sixteen peach varieties in Ethiopia.

II. MATERIAL AND METHODS

2.1. Field Experiment and Sample Collection

We conducted the experiment at Holetta Agriculture Research Center (HARC) in 2018 off-season (January-May) using irrigation. The center is found in the Ethiopian highlands, 34 km away from Addis Ababa in the West direction at 904'N and 38030'E and an altitude of 2391 m above sea level. The mean maximum and minimum temperatures are 22 OC and 6 OC, respectively. The center receives a mean total annual rainfall of 1144 mm with erratic distribution, having a high coefficient of variation in amount. The soil is nitosol and vertisol and the soil texture class is clay to clay loam with a pH of 3.8 - 6.2 [25].

2.2. Sample Collection

The peach samples were collected from each variety of trees and unnecessary plant impurities were removed from the experimental plot. Depend upon parameter analysis; we followed two types of sample preparations. In the first sample preparation, the samples were ground into fine powder by using automatic gridding machine and sunlight dried ready for physicochemical (ash, crude protein, crude fat, and crude fiber) analysis. We stored the powdered samples in an airtight bottle at room temperature until further analysis. In the second sample preparation, the cleaned sample ground by gridding machine and filtered and the aliquot liquid or juice was ready for physicochemical analysis (TSS, TA, pH, color, and juice volume and juice weight) and analyzed within less than 8 hours [13].

2.3. Instruments and Chemicals

The instruments and apparatus used in this study were Atomic Absorption Spectrophotometer (Agilent, 200 Series AAS) for Mineral elements, Spectrophotometer (Janway 6300) for phosphorous and sulfur determination, pH meter (HI 9017 microprocessor HANNA), Digital soxhlet and fiber take FOSS 8000TM. All reagent chemicals used were analytical grades; we used distilled water for dilution and preparation of reagents. Traceable to NIST stock solutions, 1000 ppm, was used to prepare a serious of macro and micro mineral elements working standards.

2.4. Determination of Physical Parameters

Total soluble solid was determined by using the refractometer Index drop of peach juice while titrable acidity was determined by titrating certain juice volume using NaOH as a titrant and phenolphthalein indicator until the pH came to 8.2, and pH determined by using potentiometric [3]. Juice volume and Juice weight was determined by weighing the certain mass of peach fruit and preparing the juice and then, the weight of 100 g per juice volume was measured [3].

2.5. Determination of Proximate Composition of Peach Varieties

2.5.1. Determination of total moisture content

The moisture content of the powdered peach sample was determined in an oven through the drying method (at 105 °C) according to the procedure described in AACC (2000). The moisture content in the sample was determined as follows

Moisture Content (%)=(Weight of original sample-Weight of dried sample)/(Weight of original sample) x 100

2.5.2. Determination of ash content

Ash is an inorganic residue remaining after we have burnt the material at a temperature of 550 °C in a muffle furnace. It is the aggregate of all non-volatile inorganic elements. About 3 g of the finely grounded dried sample was weighed into a porcelain crucible and incinerated at 550 ^{o}C for 6 hours in ashing muffle furnace until we got ash. It cooled the ash in desiccators and reweighed [3]. We calculated ash content in the apple sample as:

Ash (%)=(Weight of ash)/(Weight of original sample) x 100

2.5.3. Determination of Crude Proteins

We tested the powdered peach sample for crude protein content according to Kjeldahl's method as described in AOAC [3], which involved protein digestion and distillation and titration. The % nitrogen was calculated using the formula:

Nitrogen (%)=((Vs-Vb) x M_acid x 0.01401)/(Weight of original sample) x 100

Where, Vs - Volume (ml) of acid required titrating sample, VB - Volume (ml) of acid required titrating the blank, M acid - Molarity of acid, and W - Weight of sample. Then, the percentage of crude protein in the sample was calculated from:

% Nitrogen as % crude protein=% Nitrogen x F

Whereas, F (the conversion factor) is equivalent to 6.25 [3].

2.5.4. Determination of Crude Fat

Crude fat was determined using digital SoxtecTM 8000 through the steps of boiling, rinsing, recovery, and auto-shutdown and finally using the gravimetric method [8]. We calculated the fat content in the sample using the formula:

Fat (%)=(Weight of fat)/(Weight of original sample) x 100

2.5.5. Determination of Crude Fiber

About 2 g fat-free sample of powdered peach was taken into a fiber flask and 100 ml of 0.255 N H2SO4 was added. Then the mixture was heated under reflux with heating mantle for one hour. We filtered the hot mixture through a fiber sieve cloth. They threw the difference off and then returned the residue to the flask to which 100 ml of 0.313 M NaOH was added and heated under reflux for another one hour. We filtered the mixture through a fiber sieve cloth and we added 10 ml of acetone to dissolve any organic constituent. The residue was washed with 50 ml of hot water twice on the sieve cloth before and finally, it was transferred in the pre-weighed crucible. The crucible with residue was oven-dried at 105 °C overnight to drive off moisture. The oven-dried crucible containing the residue was cooled in a desiccator and latter weighted (W1) for ashing at 550 °C for 4 hours. The crucible containing white and grey ash (free of carbonaceous material) was cooled in a desiccator and weighted to get W2 [8].

Fiber (%)=(W1-W2)/(Weight of sample) x 100

2.5.6. Determination of Total Carbohydrate

Using the difference method, we determined the total percentage of the carbohydrate content in the peach sample. This method involved adding the total percentage values of crude protein, lipid, crude fiber, moisture and ash constituents of the sample and subtracting it from 100. The value got is the percentage of carbohydrate constituent of the sample [3], as follow:

Carbohydrate (%)=100-[Moisture + Crude fiber + Protein + Lipid + Ash]

2.5.7. Determination of Energy Value

The energy value of the samples was determined by multiplying the protein content by 4, carbohydrate content by 4 and fat content by 9 [3].

Energy Value =(Crude protein x 4) + (Total carbohydrate x 4) + (Crude fat x 9)

2.5.8. Determination of Vitamin C

Vitamin C was determined by redox titration using Iodine solution of juice sample and finally determine the titrate required for standard [18].

2.6. Determination of Mineral content of peach samples

About 1 g of finely grounded powder sample was weighed into a porcelain crucible and incinerated at 550 ^{o}C for 3 hours in an ashing muffle furnace until we got ash. The ash was cooled in desiccators and soaked by 2 ml of 37% HCl and 3 drops of distilled water. We extracted the soaked sample in a 50 ml volumetric flask and from the aliquot macro and micro minerals determined using AAS [2]. We calculated macronutrient:

Macronutrient content (%)=((R-B)*Tv*Df)/(Weight of sample x10,000)x100

Micronutrient content (ppm)=((R-B)*Tv*Df)/(Weight of sample)

Whereas, R - Reading, B - blank, Tv - total volume, and Df - dilution factor.

2.7. Statistical Analysis

Statistical analysis of the data was carried out by using Statistix 10.0 (AS, 2017). The analysis of variance (ANOVA) for comparing nutrient among the treatment and the nutrient content in different peach varieties while the associative test for correlation (Pearson)[20].

III. RESULT AND DISCUSSION

3.1. Comparison of physicochemical properties among peach varieties

The moisture content (MC), titratable acidity (TA), and total soluble solids (TSS) in fresh juice of peach varieties were studied and the result was in agreement with Getaneh et al. (2019). When comparing the varieties in MC, the result shows that no significant difference among Tropic beauty and Florida prince, Floridastar and Tranvalia, 9A-35Cand Florids lande and 90-19C. There were no significant differences among Early grand, 88-18W and 88-22C; however, a significant difference in MC was observed among Florida down, Tropic sweet, McRed and Bony gold at $P<0.05$ (Table 1).

The result of pH in fresh peach juice showed that there was no significant difference between Early grand and 9A-35C, Spring crust and Bony gold and Transivalia, McRed, 90-19C, 88-22C, and Florida prince. But we observed the significant difference between Tropic beauty and Florida down in juice pH (Table 1).

The result of TSS Brix (%) in peach varieties juice show no significant difference among Florida grand, Early grand and 9A-35C and Tropic beauty, McRed, Tropic sweet and 88-22C but Florida down significant difference from all others varieties at $P<0.05$ (Table 1).

The result of juice weight in the peach sample shows no significant difference among 88-22C, 88-18W and Tropic sweet, Early grand and bony gold, between McRed and Florida prince, and Tropic beauty and 9A-35C at $P<0.05$. The result of juice volume in this studied showed that there was no significant difference among Florida down, 88-18W and Florida prince and also among Florida grande, Tropic beauty, spring crust, early grand, Bony gold, McRed, and 9A-35C, but the significant difference among the remaining varieties at $P<0.05$ (Table 1).

Table 1. Physicochemical properties (%) of peach varieties at Holetta, central Ethiopia

Varieties	Moisture content in fresh	Juice weight	Juice volume	pH	Titrable acidity	Total soluble solids	Vitamin C
Florida down	49.650^{bc}	26.997^{h}	36.000^{d}	3.487^{cdef}	0.837^{j}	8.363^{d}	4.703^{g}
Transvalia	46.300^{def}	48.363^{b}	54.000^{a}	3.393^{f}	0.930^{h}	13.097^{b}	3.990^{i}
Florida grande	43.90^{ghi}	36.433^{c}	30.00^{g}	3.533^{bcde}	1.223^{e}	14.07^{a}	4.863^{ef}
Tropic beauty	48.200^{cd}	33.157^{e}	30.00^{g}	3.687^{abc}	0.253^{n}	12.027^{c}	5.353^{cd}
Spring crust	45.133^{fgh}	24.190^{i}	30.00^{g}	3.673^{abcd}	1.570^{b}	13.15^{b}	5.230^{d}
Early grand	51.16^{ab}	29.000^{g}	30.00^{g}	3.737^{ab}	0.353^{m}	14.01^{a}	4.480^{h}
Bony gold	47.270^{de}	29.807^{g}	30.00^{g}	3.663^{abcd}	1.170^{f}	12.97^{b}	4.910^{e}
McRed	42.980^{i}	31.100^{f}	30.00^{g}	3.437^{f}	1.680^{a}	12.033^{c}	4.457^{h}
Tropical sweet	43.157^{hi}	34.977^{d}	32.667^{f}	3.457^{def}	0.780^{k}	11.967^{c}	5.383^{bc}
9A-35C	45.63^{efg}	33.163^{e}	30.000^{g}	3.7667^{a}	0.887^{i}	13.98^{a}	4.857^{ef}
90-19H	44.130^{ghi}	37.063^{c}	33.667^{ef}	3.437^{f}	1.263^{d}	13.03^{b}	5.527^{ab}
88-18W	52.380^{a}	34.103d^{e}	35.000^{de}	3.367^{f}	0.580^{l}	12.69^{b}	4.683^{g}
88-22C	50.957^{ab}	35.093^{d}	40.000^{c}	3.410^{f}	1.320^{c}	12.12^{c}	4.980^{e}
Florida prince	48.277^{cd}	31.113^{f}	35.00^{de}	3.440^{f}	1.130^{g}	13.08^{b}	5.660^{a}
Florida star	46.830^{def}	52.460^{a}	50.200^{b}	3.490^{cdef}	0.830^{j}	13.02^{b}	5.377^{cd}
Mean	46.980	34.142	34.783	3.5269	1.003	12.605	4.949
CV (%)	2.70	2.00	2.71	3.70	2.06	2.61	1.81
LSD (5%)	2.1076	1.1357	1.5661	0.2173	0.034	0.5467	0.1488

Whereas, CV - Coefficient of variance, LSD - Least significant difference, a different letter in a column showed on significant difference while the same letter in the same column showed no significant difference

3.2. Comparison of Proximate Nutritive Value among Peach varieties

We stated the results of proximate composition in the studied peach varieties in Table 2 below. The result was in agreement with Carolina et al. (2012) got and the result revealed that except carbohydrate and energy value the other parameters were higher than standard reference which fit WHO standard [23]. There is no significant difference between Early grand and Florida star and between Transvalia and Bony gold and between McRed and Florida prince and also among 9A-35C, 88-18W and Tropic beauty but other varieties like 90-19C, 88-22C, Florida grand, Tropic sweet, Spring crust and Florida down in ash content at $P<0.05$ (Table 2).

There were significant differences among peach varieties except between Transvalia and Tropic beauty in protein content at $P<0.05$. There were significant differences among all varieties except among Florida grand, Tropic beauty and Bony gold in fat content. There were significant differences among all varieties except among McRed, Tropic Beauty, Early grand and 88-12C in fiber content $P<0.05$ (Table 2).

Table 2. Proximate composition (%) of peach varieties at Holetta, central Ethiopia

Varieties	Moisture content	Ash	Protein	Fat	Fiber	Carbohydrate	Energy value (cal)
Florida down	9.100^{d}	2.760^{j}	4.571^{j}	0.097^{o}	2.870^{n}	89.703^{c}	377.97^{b}
Transvalia	12.000^{c}	4.984^{b}	4.326^{l}	0.116^{n}	3.520^{k}	87.052^{gh}	366.57^{j}
Florida grande	12.733^{b}	4.300^{f}	4.728^{h}	0.190^{m}	3.190^{l}	87.592^{d}	370.99^{f}
Tropic beauty	8.467^{e}	4.397^{e}	4.343^{l}	0.207^{l}	3.840^{i}	87.213^{f}	368.09^{i}
Spring crust	13.500^{a}	3.535^{i}	5.436^{c}	0.283^{k}	4.317^{e}	86.428^{j}	370.01^{g}
Early grand	7.500^{fg}	4.653^{c}	3.629^{m}	0.674^{e}	3.687^{j}	87.356^{e}	370.01^{g}
McRed	9.500^{d}	3.710^{h}	4.784^{g}	0.510^{g}	3.836^{i}	87.160^{fg}	372.37^{e}
Tropical sweet	13.300^{a}	4.049^{g}	5.163^{e}	0.824^{b}	2.989^{m}	86.976^{h}	375.97^{c}
9A-35C	7.433^{fg}	4.343^{ef}	4.821^{f}	0.713^{d}	4.177^{g}	85.945^{k}	369.49^{h}
90-19H	9.500^{d}	5.388^{a}	4.646^{i}	0.746^{c}	4.611^{a}	84.607^{m}	363.73^{m}
88-18W	8.433^{e}	4.391^{ef}	5.743^{b}	0.533^{f}	4.167^{h}	85.166^{l}	368.44^{i}
88-22C	9.300^{d}	4.499^{d}	5.223^{d}	1.386^{a}	3.678^{j}	85.212^{l}	374.22^{d}
Florida prince	7.033^{gh}	3.711^{h}	4.647^{i}	0.493^{h}	4.527^{b}	86.620^{i}	369.51^{h}
Florida star	6.500^{h}	4.716^{c}	6.055^{a}	0.473^{i}	4.343^{d}	84.413^{n}	366.13^{k}
Standard	13.407^{a}	0.263^{l}	1.423^{o}	0.427^{j}	1.200^{o}	96.687^{a}	396.23^{a}
Mean	9.8396	3.934	4.5317	0.4899	3.7439	87.300	371.74
CV (%)	3.41	1.47	0.44	1.88	0.16	0.10	0.06
LSD (5%)	0.5569	0.0963	0.0333	0.0153	0.0097	0.1415	0.3565

Different letters in a column showed on significant difference while the same letter in the same column showed no significant difference.

The result of carbohydrate show significant difference among all varieties except between Transvalia and Tropic beauty and between 88-18W and 88-22C in fat content at P<0.05. The result of energy value show between Tropic beauty and 88-18W and between Spring crust and Early grand and between 9A-35C and between Tropic sweet and and also between Florida prince at P<0.05 (Table 2).

3.3. Comparison of Mineral Content among Peach Varieties

The mineral contents variation among peach varieties and comparison of improved peach varieties with standard reference were studied and the result show except in Mg all improved peach varieties had higher in Ca and total phosphorous content than standard reference but lower in Na, K, Mg, and TS than standard and Maleeha (2012) result obtained [18,23].

The result of Na content in peach varieties showed no significant difference among Florida grand, Tropic beauty and Tropic sweet, and among McRed, 90-19C, 88-18W and 88-22C but, significant difference among standard, Spring crust, Early grand, Florida down, Florida star, , and Bony gold at P<0.05 (Table 3). The result of K in this studied showed that no significant difference between Florida prince and Florida star, and between standard and 88-18W, and between Florida down and McRed and also among Transvalia, tropic beauty, Spring crust and 88-22C but, the significant difference among other remaining varieties at p<0.05.

The result of Ca content in peach varieties revealed that no significant difference between Transvalia and McRed, and between Florida prince and Florida star and also no significant difference between Tropic sweet and 9A-35C and among Early grand, 88-18W and 88-22C but the significant difference among the remaining varieties in Ca content at P<0.05. There was no significant difference between Florida star and Transvilia and among 90-19C, Tropic sweet and McRed and among Florida down, Florida grand, Tropic beauty, Spring crust, and Florida prince but the significant difference among standard, Bony gold, and 9A-35C in Mg content at P<0.05 (Table 3).

Table 3. Mineral contents (%) of peach varieties at Holetta, central Ethiopia

Varieties	Sodium	Potassium	Calcium	Magnesium	Total Phosphorous	Total Sulfur
Florida down	0.011^{gh}	0.741^{h}	0.169^{hi}	0.049^{f}	0.109^{hi}	0.022^{b}
Transvalia	0.008^{ij}	0.777^{gh}	0.297^{de}	0.036^{i}	0.140^{bcd}	0.005^{b}
Florida grande	0.013^{def}	0.083^{k}	0.565^{a}	0.048^{f}	0.084^{j}	0.003^{b}
Tropic beauty	0.015^{d}	0.779^{gh}	0.233^{g}	0.051^{ef}	0.131^{cde}	0.022^{b}
Spring crust	0.024^{b}	0.781^{gh}	0.322^{c}	0.047^{fg}	0.095^{ij}	0.259^{a}
Early grand	0.018^{c}	0.590^{i}	0.158^{i}	0.044^{gh}	0.097^{ij}	0.031^{b}
Bony gold	0.007^{j}	0.859^{ef}	0.396^{b}	0.066^{b}	0.119^{efgh}	0.063^{b}
McRed	0.012^{fg}	0.748^{h}	0.308^{d}	0.052^{de}	0.119^{efgh}	0.022^{b}
Tropical sweet	0.014^{de}	0.897^{de}	0.167^{hi}	0.054^{de}	0.185^{a}	0.022^{b}
9A-35C	0.013^{defg}	0.994^{b}	0.179^{h}	0.063^{c}	0.143^{bc}	0.033^{b}
90-19H	0.012^{fg}	0.815^{fg}	0.259^{f}	0.055^{d}	0.147^{b}	0.036^{b}
88-18W	0.012^{efg}	0.925^{cd}	0.161^{i}	0.042^{h}	0.135^{bcd}	0.003^{b}
88-22C	0.013^{efg}	0.808^{g}	0.162^{i}	0.043^{h}	0.087^{j}	0.030^{b}
Florida prince	0.018^{c}	1.182^{a}	0.293^{e}	0.047^{fg}	0.127^{defg}	0.022^{b}
Florida star	0.010^{hi}	1.138^{a}	0.286^{e}	0.037^{i}	0.116^{fgh}	0.005^{b}
Standard	0.041^{a}	0.942^{c}	0.051^{j}	0.071^{a}	0.112^{gh}	0.010^{b}
Mean	0.015	0.795	0.245	0.050	0.122	0.036
CV (%)	8.22	3.46	3.41	4.13	7.35	107.0
LSD (5%)	0.002	0.0456	0.0139	0.003	0.0149	0.0641

The result of phosphorous in peach varieties show no significant difference between 9A-35C and 90-19C, and between 88-18W and Transvalia, and between Bony gold and McRed, and between Spring crust and Early grand and also between Florida grand and 88-22C but significant difference between Florida down and Tropic sweet at P<0.05. The result of total sulfur variation among varieties shows no significant difference among all varieties and lower than standard reference at P<0.05 (Table 3).

3.4. Comparison of Micronutrient among Peach Varieties

The result of micronutrients in this studied show higher than standard reference except for Cu at P<0.05 (Table 4) [23]. The result of Fe in this study shows no significant difference between Florida down and Tropic beauty and between Spring crust and Florida star and also between Florida grand, the 9A-35C but significant difference among the other varieties in Fe content at P<0.05. This studied result showed no significant difference among all peach varieties in Zn content at P<0.05 (Table 4).

The result of Cu show no significant difference between 90-19C and 88-18W, and and Transivalia and among Florida down, Bony gold and 88- 22C but the significant difference among other varieties at p<0.05. The result of Mn in peach varieties show no significant difference between standard and Florida down, and between Tropic beauty and 88-22C, and between Transvalia and 90-19C and also among Bony gold, McRed and Tropic sweet at p<0.05 (Table 4). The result obtained in Fe and Zn content was high which in agreement with Maleeha et al. [18].

Table 4. Micronutrient contents (mg kg^{-1}) of peach varieties at Holetta, central Ethiopia

Varieties	Cu	Fe	Mn	Zn
Florida down	4.137^{c}	116.980^{d}	3.224^{j}	5.062^{c}
Transvalia	2.140^{ij}	46.857^{l}	2.353^{l}	2.828^{o}
Florida grande	2.743^{h}	54.810^{ij}	2.803^{k}	3.287^{l}
Tropic beauty	3.697^{d}	113.900^{de}	5.150^{e}	4.917^{d}
Spring crust	2.903^{g}	93.810^{f}	6.723^{b}	5.633^{b}
Early grand	4.800^{a}	159.360^{a}	5.940^{c}	3.170^{n}
Bony gold	2.747^{h}	82.150^{g}	5.450^{d}	4.605^{e}
McRed	3.387^{e}	121.720^{c}	5.500^{d}	4.475^{f}
Tropical sweet	2.133^{ij}	127.000^{b}	5.450^{d}	4.182^{j}
9A-35C	2.660^{i}	51.667^{jk}	3.713^{i}	4.358^{g}
90-19H	1.873^{l}	50.910^{k}	2.320^{l}	2.425^{p}
88-18W	1.863^{l}	112.610^{e}	4.950^{f}	4.915^{d}
88-22C	2.700^{hi}	70.233^{h}	5.080^{e}	4.280^{h}
Florida prince	1.947^{k}	64.533^{i}	4.393^{g}	3.552^{k}
Florida star	3.167^{f}	66.717^{i}	6.860^{a}	8.840^{a}
Standard	4.613^{b}	16.313^{m}	3.607^{i}	3.213^{m}
Mean	2.9212	84.883	4.5679	4.3515
CV (%)	1.16	2.40	1.48	0.55
LSD (5%)	0.0561	3.3797	0.1122	0.0396

IV. Conclusion

Field management, fertilizer application, genotype, and other environmental factors affect peach productivity and nutritional quality parameters. The result of MC, TA, and the TSS in fresh peach juice quality was revealed low moisture content and makes it is high in quality while high in TA and TSS which vary ranging from 0.253 to 1.680%, and 8.363 to 13.980%, respectively. The studied result showed improved peach varieties had a greater amount of proximate nutrient value and mineral content than standard reference except for carbohydrate, energy value, and calcium content.

The study also showed that the improved peach varieties grown at Holetta were fallen under the WHO standard in the quality of proximate and mineral nutritive value except for carbohydrate and Calcium. Further studies are required for bioactive and antibiotic compounds since its proximate and mineral elements were remarkable.

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