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Proximate Composition and Physicochemical Properties of Different Released and Improved Onion (Allium cepa L.) Bulbs Varieties

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Abstract
Since its significant an ingredient in various dishes, medicinal property, nutritional worth and energy value, red onions (Allium cepa L.) impart numerous health benefits to users. The purpose of this research was to determine proximate composition and selected physicochemical properties of different red onion (Allium cepa L.) varieties grown at same field management condition in Ethiopia as well as comparative study among varieties and between study varieties and standard reference. All field and laboratory data was analyzed one way ANOVA SAS statically soft ware and the result of agronomy data was indicated that there were a significant difference in marketable and unmarketable yield in terms of number and weight of bulbs among the onion varieties ($P<0.05$) while no significant different in data of stand count at 1 1/2 and harvested time, bulb skin thickness, color, shape of full grown bulb and weight of bulb. The result of physical parameters showed that significant difference among the varieties in JV, JW and TSS content but no significant difference in Juice color, MC and pungency at ($P< 0.05$).Statically comparative study was conducted to investigate the proximate composition between studied varieties and standard reference and the result showed that Ethiopian onion cultivars were high in ash (4.14±0.12- 8.3±0.14%), protein (8.6±0.03 –10.84±1.23%) and fiber (3.82± - 5.15±0.12%) content than standard (0.35, 3.1,1.7% respectively) but low in vitamin C(2.21±0.11- 4.41±0.12 mg/100g), carbohydrate (16.77±1.1-21.87±0.4 g/100g) and energy value(109.45± 3.3– 137.43±7.1 KJ/100g) than standard(7.4,35.87,166 KJ/100g respectively). The levels of pH value (5.41±0 - 2-5.59±0.1), fat (0.68±0.7-0.85±0.12%) content were almost identical among varieties and standard (5.29, 0.84%) respectively.
Keywords: Onion, Varieties, Proximate analysis, Physical parameters, ANOVA

1. INTRODUCTION

Onions (*Allium cepa* L.) are a natural part of the daily diet for most of the population and are a crop of great economic importance in all over the world [11]. It has been used as an ingredient in various dishes for thousands of years by many cultures around the world. In Ethiopia, onion (red) is the most important crop among the spices and is an integral part of diet. It is also used in almost all food preparation [1]. It is cultivated almost throughout Ethiopia and ranks first in production among the species [13].

Not only does the vegetable lend an excellent taste to dishes, but also is associated with imparting a number of health benefits to its users. As numerous health benefits have been attributed to onions, it has been used traditionally in Ethiopia as well as in different parts of the world as medicine [23]. It can protect against cancer, fight fungi and bacteria, promote cardiovascular health, reduce high blood pressure and insulin resistance, aid in weight loss, possess antioxidant activity, and fight chronic bronchitis, infections and fever [23].

Several studies have shown quercetin to have beneficial effects against many diseases and disorders including cataracts, cardiovascular disease as well as cancer of the breast, colon, ovarian, gastric, lung and bladder. In addition to quercetin, onions contain the phytochemicals known as disulfides, trisulfides, cepaene, and vinyl dithins. These compounds have a variety of health-functional properties, including anticancer and antimicrobial activities. Onions are also 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. Onions are 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. Onions are also cholesterol free, and provide dietary fiber, vitamin C, vitamin B6, potassium, and other key nutrients [24].

Most onions contain vitamin C, vitamin B_6, folic acid and numerous other nutrients in small amounts. They are low in fats and in sodium, and with an energy value of 166 kJ (40 kcal) per 100 g (3.5 oz) serving, they can contribute their flavor to savory dishes without raising caloric content appreciably [24].

Onions contain chemical compounds such as phenolics and flavonoids that basic research shows to have potential anti-inflammatory, anti-cholesterol, anticancer and antioxidant properties [14]. Antinutrients are chemicals which have been evolved by plants for their own defense, among other biological functions and reduce the maximum utilization of nutrients especially proteins, vitamins, and minerals, thus preventing optimal exploitation of the nutrients present in a food and decreasing the nutritive value.

From Ethiopian Institution of Agriculture Research , Melkassa agriculture research center was national

horticulture research and the center was released five onion varieties such as adama red, bonbay red, nasik, nafis and melkum and these varieties were demonstrate the consumer and they are used for house consuming, local and foreign market. But the information on their nutritional profile and quality parameters value in term of flavor, provide health-promoting phytochemicals, anti oxidant as well as nutrients is scanty [5]. The present study was conducted to determine the nutrient profile, physicochemical properties of onion cultivars. This is important to generate base line information and robust quality data base for consumer, marketability, research purpose and breeders on those released and improved onion varieties.

2. MATERIALS AND METHODOLOGY

2.1. Field Experiment and Sample collection

The field experiment was conducted at melkassa agriculture research center station by selecting five released onion varieties and the onion seed samples were cultivated in a total of three rapes and for each variety triplicated on the same field to compare the nutritional quality of varieties which growing in the same condition mean same water requirement, soil fertility and field management. Almost all agronomy/ field data were collected. The onion samples were collected from each field experiment plot and curing in storage areas.

Finally the cured onion bulb were sampled and unnecessary stock, gravels and others verities were removed. Two types of sample preparation depend on parameter analysis.

The sample was ground into fine powder by using automatic gridding machine and dried ready for physicochemical (Ash, Crude protein, Crude fat, and Crude fiber) analysis. The powdered samples were stored into an air tight bottle in freeze (about 4 ^{0}C) until further analysis.

The cleaned sample ground by gridding machine and filtered and the aliquot liquid or juice was ready for physicochemical analysis (TSS, TA, pH, Color, Juice volume, juice weight and Pungency) were immediately analyzed within less than 8hours.

2.2. Field Data Collected

Data of yield and yield attributes was collected from ten plants randomly from each plot. Date of transplanting, depth of planting; plant height and number of leaves per plant, leaf diameters and length, dry biomass, weight of dry bulbs, diameters of dry bulbs were collected. Similarly, data was recorded on plot basis include bolter plants, days to physiological maturity, split bulbs, total and marketable bulbs weight. The actual number of days from seedling transplanting to the field to a day at which more than 80% of the plants in a plot showing yellowing of leaves was recorded to determine the days to physiological maturity. The total fresh bulb yield was computed based on the weight of matured bulbs obtained on per plot and one composite soil sample was collected before planting and five composite soil samples were collected from fifteen plots by treatment.

2.3. Determination of Physical Parameter of Onion Varieties

Total soluble solid was determined by using refractometer Index drop of onion juice while titrable acidity was determined by titrating certain juice volume using NaOH as a titrant and phenolphtein indicator until the pH was come to 8.1, and pH determined by using potentiometric [3]. Onion color was determined by using monsoon color chart after preparation of onion juice. Juice volume and Juice weight were determine by weighing certain mass of onion bulb and preparing the juice and finally weight of 100g per juice volume was measured. Pungency was determined using sensory evaluation by selecting sixteen women literate and expert panelist [3].

2.4. Determination of Proximate composition of Onion varieties

2.4.1. Determination of Total Moisture Content

The moisture content of powdered onion sample was determined in an oven through drying method (at 105 °C) according to the procedure described in AACC (2000). Method No. 44-15A. The moisture content of the sample was determined by weighing 2 g of sample into a pre-weighed china dish and drying it in an air forced draft oven at a temperature of 105 ± 5 °C till the constant weight of dry matter was obtained [2]. The moisture content in the sample was determined as follows-

Moisture (%) = [{(Wt. of original sample – Wt. of dried sample) / Wt. of original sample} × 100]

2.4.2. Determination of Ash Content

Ash is an inorganic residue remaining after the material has been completely burnt at a temperature of 550 °C in a muffle furnace. It is the aggregate of all non-volatile inorganic elements. About 8 g of finely ground dried sample was weighed into a porcelain crucible and incinerated at 55 ^{0}C for 6 hours in an ashing muffle furnace until ash was obtained. The ash was cooled in desiccators and reweighed [3].

The % ash content in the onion sample was calculated as follows:

Ash (%) = (Wt. of ash / Wt. of sample taken) × 100

2.4.3. Determination of Crude Proteins

The powdered onion sample was tested for crude protein content according to the Kjeldahl's method as described in AOAC, which involved protein digestion and distillation.

Protein Digestion: About 2.0 g of the sample was weighed into an ash less filter paper and put into a 250 ml Kjeldahl flask. Then, 1 g of digestion mixture (as catalyst) and 15-20 ml of 98 % conc. Sulfuric acid were added. The whole mixture was subjected to heating in the digestion chamber until transparent residue contents were obtained. Then, it was allowed to cool. After cooling, the digest was transferred into a 100 ml volumetric flask and made up to the mark with distilled water and then distilled using Markham distillation apparatus.

Protein Distillation: Before use, the Markham distillation apparatus was steamed through for 15 min after which a 100 ml conical flask containing 5 ml of 2 % boric acid and 1 or 2 drops of mixed indicator was placed under the condenser such that the condenser tip was under the liquid. About 5.0 ml of the digest was pipetted into the body of the apparatus via a small funnel aperture. The digest was washed down with distilled water followed by addition of 3-4 drops of phenolphthalein and 5 ml of 40 % (W/V) NaOH solution. The digest in the condenser was steamed through until enough ammonium sulfate was collected. The Boric acid plus indicator solution changed color from red to green showing that all the ammonia liberated had been trapped. The solution in the receiving flask was titrated with 0.063 N hydrochloric acid upto a purple end point.

Also, a blank was run through along with the sample. After titration, the % nitrogen was calculated using the formula:

% Nitrogen = (Vs–VB) × M acid × 0.01401 × 100 W

Where, Vs = Volume (ml) of acid required to titrate sample;

VB = Volume (ml) of acid required to titrate the blank; M acid= Molarity of acid; W=Weight of sample

Then, percentage crude protein in the sample was calculated from the % Nitrogen as % crude protein = % N x F, where, F (conversion factor), is equivalent to 6.25 [3].

2.4.4. Determination of Crude Fat

The crude fat in the powdered sample was determined using Soxhlet extraction for 24 hour. Approximately, 3.0 g of samples were weighed accurately into labeled thimbles.

The dried boiling flasks (250 ml) were weighed correspondingly and filled with about 150 ml of petroleum ether (boiling point 40 -60 ^{0}C). The extraction thimbles were plugged tightly with cotton wool. After that, the Soxhlet apparatus was assembled and allowed to reflux for 24 hrs. The thimble was removed with care and petroleum ether collected from the top container and drained into another container for re-use. After that, the boiling flask was heated in a hot air oven until it was almost free of petroleum ether. After drying, it was cooled in a desiccator and weighed [2].

The % fat in the sample was calculated using the formula:

Fat (%) = (Wt. of fat / Wt. of original sample) × 100

2.4.5. Determination of Crude Fiber

About 2 g fat free sample of powdered onion 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. The hot mixture was filtered through a fiber sieve cloth. The difference obtained was thrown off and the residue was returned to the flask to which 100ml of 0.313 M NaOH was added and heated under reflux for another one hour. The mixture was filtered through a fiber sieve cloth and 10 ml of acetone was added to dissolve any organic constituent. The residue was washed with 50 ml of hot water twice on the sieve cloth before it was finally transferred in the pre-weighted crucible. The crucible with residue was oven dried at 105 ^{0}C overnight to drive off moisture. The oven dried crucible containing the residue was cooled in a desiccators and latter weighted (W1) for ashing at 550 ^{0}C for 4 hours [3].

The crucible containing white and grey ash (free of carbonaceous material) was cooled in a desiccator and weighted to obtain W2. The % of crude fiber was calculated as follows-

Fiber (%) = [{(W1 – W2) / Wt. of sample} × 100]

2.4.6. Determination of Total Carbohydrate

The total percentage carbohydrate content in the onion sample was determined by the difference method. This method involved adding the total values of crude protein, lipid, crude fiber, moisture and ash constituents of the sample and subtracting it from 100. The value obtained is the percentage carbohydrate constituent of the sample [13].

Thus: % carbohydrate = 100 – (% moisture + % crude fiber + %protein + % lipid + % ash)

2.4.7. Determination of Energy Value of Onion Samples

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 × 4) + (Total carbohydrate ×4) + (Crude fat × 9)

2.4.8. Determination of Vitamin C of onion samples

Sample preparation and evaluation of ascorbic acid by method spectrophotometer: All samples has been

blended then filtered using Buchner, 10 gm of each sample was transferred into a 100ml volumetric flask homogenized by using 50ml acetic acid solution with shaken, 4-5 drops of bromine water has been added until the solution became colored, Then a few drops of thiourea solution were added to it to remove the excess bromine and thus the clear solution was obtained. Then 2, 4-Dinitrophenyl hydrazine solution was added thoroughly with all standards and also with the oxidized ascorbic acid. Then complete the solution up to the mark with acetic acid. The absorbance for all samples has been measured using UV-visible spectrophotometer to determine the concentration of ascorbic acid in the onion under testing [14].

2.5. Statistical analysis

Statics 10.0 software (SAS Institute, Inc., Cary, NC, USA) was used for data analysis. Data were subjected to one-way ANOVA, and the comparative analyses between means were conducted by using the Duncan multiple range test.

3. RESULT AND DISCUSSION

3.1. Agronomy Data

Some important agronomy data of five onion varieties were given in Table 1 and 2. The result reveals that all onion varies were same bulb skin thickness, shape of full grown bulb and bulb flesh color while they are different in bulb skin color and weight of bulbs. Melkum and bonbay red were light red in bulb skin color while the remaining was red. Bonbay and nasik are high in weight while adama red and nafis are low. This was due to size of bulb and moisture content difference.

Table 1. Agronomy data for different onion varieties

Onion Variety	Bulb Skin thickness	Shape of full grown bulbs	Bulb skin color	Bulb flesh color	Weight of 10 bulbs (g)
Adama Red	thin	flat	red	Light brown	432
Melkum	thick	flat	Light red	Light brown	536
Bonbay red	medium	flat	Light red	Light brown	624
Nasik	thin	flat	red	Light brown	640.7
Nafis	thin	flat	red	Light brown	495

Other most relevant agronomy data compared among onion varieties were stand count at two different and marketable and unmarketable yields. The result of stand count at one and half time was showed that no significant difference for adama red, melkum and nafis while significant difference was observed between bonbay and nasik. Stand count at harvest time was revealed that no significant difference for bonbay nasik and nafis but significant different between adama red and melkum ($P<0.05$). The result of marketable yield number was no significant different between adama red and nafis, and bonbay and nasik. There were significant different among varieties in marketable yield weight except adama red and nasik at $p<0.05$. As shown in Table 2 unmarketable yield was indicated the onion bulb those unaccepted on the market due to small bulb size, decay and disease and splinted in to different parts. Melkum was many under size bulb while bonbay and nasik, adama red and nafis were same in number of under size bulb. The wieght of under size bulb was showed significant different among the studied varieties except melkum and nafis $p<0.05$. The number of decay and disease bulb was no showed significant different between melkum and nafis but significant different for others. Anova revealed that the number and weight of splinted bulb were showed significant different among the varieties at $p<0.05$. As showed in Table 2 the number of marketable yield was lower than unmarketable yield while marketable yield weight was greater than unmarketable yield.

Table 2: Comparison of agronomy data among onion varieties **(ANOVA)**

Variety	**Sand Count at 11/2**	**Stand Count at Harvested time**	**Marketable Yield**		**Unmarketable yield**					
					Under size bulb		**Decay and disease bulb**		**Splinted bulb**	
			no	**Wt(g)**	**no**	**wt(g)**	**no**	**wt(g)**	**no**	**wt(g)**
A.Red	399b	265a	174a	9490b	65b	1694b	17a	910a	11d	593d
Melkum	389b	239c	145c	9685c	82a	1890a	10b	547d	4.5e	297e
Bonbay	413a	262ab	159b	8150e	54c	1449d	14a	795b	69a	4505a
Nasik	379d	259b	159b	1024b	54c	1489c	6c	197e	39b	2395b
Nafis	398b	258b	171a	11590a	61b	1890a	10b	605c	17c	1292c

Wt(g)-weight in gram no- number

Major soil data parameter of onion field before planting and after harvested was shown in table 3. The pH and EC result was shows that no significant difference adama red, bonbay nafis and before planting of field plot at $P< 0.05$ while there is a significant difference for melkum and nafis plot. Organic matter also no show

significant difference among the plot except nasik at $p<0.05$. The result of this study area were indicated that were no significant difference in TN among the plot except before planting while a significant difference were observed in AP adama red, melkum and BP field plot. This was due to application of DAP fertilizer and uptake by plant in the form of P_2O_5 according to Weldemariam et al.,(2015) recommendation. But no difference among melkum, nasik and nafis grown field. There was no significant different in S content among the field plot except before planting at $p<0.05$. Exchangeable K was no show significant difference among the plot of different onion varieties grown and before planting.

Table 3: Mean ± SD result of soil analyzed

Plot	PH(1:2.5H_2O)	EC(µS/mol)	%OM	%TN	AP(ppm)	S(ppm)	Exch. K (cmol/kg)
Adama Red	7.4±0.07a	123±2.87b	2.61±0.08a	0.21±0.03ab	13.74±0.15c	17.42±0.27a	1.74±0.27a
Melkum	7.1±0.18b	131±1.98ab	2.74±0.07a	0.189±0.06b	17.13±0.14a	17.5±0.25a	1.54±0.25ab
Bonbay	7.2±0.03ab	127±2.26b	2.49±0.08ab	0.22±0.08ab	14.92±0.13b	17.3±0.14a	1.73±0.14a
Nasik	7.1±0.06b	133±2.79a	2.28±0.09b	0.27±0.06a	18.27±0.21a	16.64±0.19ab	1.64±0.19ab
Nafis	7.3±0.04a	130±3.1ab	2.68±0.11a	0.23±0.07ab	15.67±0.26ab	15.62±0.11bc	1.56±0.11bc
BP	7.4±0.07a	137±3.27a	2.47±0.15ab	0.24±0.04a	14.89±0.17b	23.31±0.13a	1.33±0.13b

EC-electric conductivity OM-organic matter TN- total nitrogen AP-available phosphorous S- sulfur ppm-parts per million BP- before planting

3.2. Comparison of Physical Parameters among Onion varieties

Physical parameters of different onion varieties were shown in Table 4 below. The Juice volume and weight was done by preparing juice from ten gram of onion bulb and the result reveal that there were no significant different in juice volume and juice weight among five onion cultivars at $p<0.05$.The moisture content of fresh onion bulbs were show significant different between melkum and other varieties but, no significant different among bombay red, nasik and nafis. According to USDA standard (2015) onion moisture content was 89% which was higher than this study but, higher than that of *Allium sativum* 66.57, 67.66 and 73.86% [8,9,16] respectively. However, high moisture content in a sample implies its poor storage quality because samples with moisture content more than 15% encourages microbial attacks during storage [21].

Total soluble sugar were shown a significant for adama red, bombay and nasif but, on significant different among melkum, nasik and nafis at $p<0.05$. Bombay, melkum and nafis were same in juice color (white) while adama red and nasik were different. Pungency of onion was shows a puvric acid content and anti biotic sulfur compound and this study result revealed that adama red and bombay red were high pungent while the other varieties were medium in pungency.

Table 4: Comparison of Physical Parameters among Onion varieties

Varieties	JV(ml)	JW(g)	%MC	%TSS	J. Color	Pungency
Adama Red	512.17±71a	608.93±15a	75.18±0.27ab	10.52±0.26b	red	high
Melkum	652.61±1.02b	745.84±1.46c	73.74±0.8a	10.76±0.06bc	white	medium
Bonbay	531.56±2.5a	633.87±2.51b	76.16±0.66bc	9.93±0.28a	white	high
Nasik	649.68±0.45c	712.24±1.74d	77.31±0.63c	10.98±0.23bc	pink	medium
Nafis	601.76±2.22c	681.63±1.2e	77.2±0.06c	11.12±0.24c	white	medium

JV -Juice volume JW-Juice weight MC- moisture content TSS- total soluble sugar

3.3. Comparison of Proximate nutritive value among Onion Varieties

Results of the proximate composition in studied sample materials are given in Table 5. The pH result of this studied were no significant different among the varieties at $p<0.05$ but, different from standard. In this studied the ash contents of onion varieties were revealed that no significant different among the varieties except nafis and standard. From the result all varieties were high in ash content than standard this mean Ethiopian onion were high inorganic compound.

There were no significant different in crude protein and crude fat content among adama red, bonbay, melkum, nasik while significant different for nafis and standard. Anova revealed that all varieties were higher than standard in protein which shows advantage for human since onion was daily consumption with other food but lower than 10.45% [15]. However, food samples with high amount of crude protein contributes as a source of energy and helps in building tissues in animals' body [19].

In this study no significant difference were observed in fiber content between adama red and bonbay red and among melkum, nasik and nafis except for standard. All varieties were higher in fiber (3.8-5.15%) ($p<0.05$) than standard (1.7%) and 0.73% of red (*Allium cepa L)* documented by Odebunmi *et al* (2007). Hence, samples with higher amount of crude fiber improve protection against constipation and it also prevents cardiovascular disease because studies have shown that soluble fiber lowers levels of artery-clogging cholesterol in the blood stream [10].

In this studied anova revealed that standard was highly significant in carbohydrate content than all onion cultivars while on significant different between adama red and bombay and also among melkum, nasik and nafis

varieties. This studied shows standard (35.87g/100g) was higher in carbohydrate content than Ethiopian onion (16.7–21.8g/100g).

In this studied there were a significant different in energy value among onion varieties as well as standard at p< 0.05 and standard(116KJ/mol) was higher in energy than all varieties (109.45–137.43KJ/mol). This result was agreement with both of them appeared to be lower than 357.19 and 367.64 kcal/100g of red *Allium cepa L* and *Allium sativum,* respectively [15].Hence, the report of Sharma *et al.* (2002) demonstrated that samples with higher energy value contribute in providing more energy in animals' body, i.e. the energy value of food is a measure of the heat energy available by the complete combustion of a weighed food sample.

In this studied there was a significant different in vitamin C between onion varieties and standard and also among the three varieties adama red, bonbay, nafis but, no significant different between melkum and nasik varieties. The standard (7.4g/100g) was twice higher than Ethiopian onion cultivars (2.21-4.41g/100g).

Table 5: Comparison of Proximate Analyzed among Onion Varieties

Parameter	Adama red	Bonbay red	Melkum	Nasik	Nafis	Standard
PH	5.42±0.01a	5.52±0.014a	5.57±0.014a	5.59±0.1a	5.41±0.2ab	5.29b
Ash%	4.44±0.1a	8.3±0.14a	4.3±0.2a	4.27±0.14a	4.14±0.12b	0.35c
Protein%	10.84±1.23a	9.06±0.1a	9.04±0.15a	8.7±0.02a	8.6±0.03b	3.1c
Fat%	0.85±0.12a	0.68±0.07ab	0.67±0.07ab	0.83±0.05ab	0.84±0.016b	0.84b
Fiber %	4.78±0.089a	5.15±0.21a	4.99±0.03b	4.04±0.085bc	3.82±0.07c	1.7d
Carb(g/100g)	21.59±0.85b	17.97±0.8b	16.77±1.15c	19.99±0.28c	21.87±0.4c	35.87a
EV(KJ/100g)	137.43±7.1b	114.12±3.5bc	109.45±3.3cd	122.28±1.1de	129.41±1.8e	166a
Vitamin-C (mg/100g)	3.01±0.13b	4.41±0.12c	3.67±0.13d	3.67±0.12d	2.21±0.11e	7.46a

Carb (g/100g) - carbohydrate in gram per 100 g EV (KJ/100g) - energy value in kilo joule per 100gram

The ash, crude protein and crude fiber contents were higher in the study *Allium cepa* L. varieties (4.14-8.3 %, 8.6-10.84% and 3.83-5.15% respectively) compared to the standard (0.35, 3.1, and 1.7%). Whereas, the crude fat, carbohydrate and energy value contents were lower in the studied onion variety (0.67-0.85 %, 16.77-21.87 g/100g and 109.45-137.43 KJ/mol respectively) compared to the standard reference (0.84%, 35.87 g/100g, 166KJ/100g respectively). Moreover, the crude fat contents were comparable and did not indicate any remarkable distinction between the Ethiopian varieties and standard. The vitamin content of onion varieties analysis was expressed in the level of vitamin C were higher in the standard of *Allium cepa* L. compared to the Ethiopian varieties (2.1-4.41mg/100g respectively) (Table 5).

Onion bulbs which are used in our study have high levels of ash, fiber and protein, but comparatively low moisture content, carbohydrate and energy value. The high content of crude protein is important for quality assessment which will be obtained from the seed pulp and high content of ash is important in that it involves higher value of inorganic material.

4. CONCLUSION

Agronomy management practice for onion on the field was high significant effect on onion nutritional quality parameters. Comparative study of different onion varieties' were fit the standard in bioactive and medicinal properties as well as physical parameter. Significant differences of the chemical composition, nutritional value, and antioxidant activities among the onion cultivars were observed, adama red varieties was showed considerable high nutritional value and antioxidant activity which could be developed for functional food that benefits human health. The study was showed Ethiopian onion cultivars were fit WHO standard in the quality of proximate nutritive value for moisture content, ash, protein, fat, fiber but provide less energy value, carbohydrate, and vitamin C. Further studies should be required on *Allium cepa* for bioactive, antibiotic and inorganic mineral composition since its ash and pungency was remarkable.

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