

## Evaluation of compositions and Nutritional facts in some varieties of kiwifruit

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**Abstract**—Determination of compositions and Nutritional Fact of fruit is very Important. In this research, Nutritional Facts in varieties of Hayward, Bruno and Abbut Evaluated. Fruits have been casual picked from kiwifruit gardens in mazandaran province, IRAN, In late August, September and October. all selected fruits were the same In term of ripening Degree and then mixed together for determination of compositions. This study showed that Non-reduced sugars in all 3 varieties have no Remarkable Differences, but have Remarkable Differences statistically. This research showed that varieties of Hayward and Bruno have the most and the least eatable parts, respectively ( $p < 0.05$ ). Dry matters of Abbut and Bruno were the same, but less than Hayward variety ( $p < 0.01$ ). Minerals in Hayward and Bruno have no Remarkable difference, but were more than Abbut ( $p < 0.05$ ). Soluble solid materials were different in three varieties that It was the most in Hayward and It was the least in Bruno ( $p < 0.01$ ). PH in all 3 varieties were Different, It was the most in Hayward and the least in Bruno ( $p < 0.01$ ). Acidity was the same in Abbut and Bruno but more than Hayward Remarkably ( $p < 0.05$ ). Protein was the most in Hayward, and the least in Abbut ( $p < 0.05$ ). Fat was the same in Hayward and Bruno, but less than Abbut ( $p < 0.05$ ). Total and Reduced sugar were the same in Hayward and Abbut, but more than Bruno Remarkably ( $p < 0.01$ ). Total fiber were different in all 3 varieties that was The most in Bruno and the least in Abbut ( $p < 0.05$ ). Total Energy was the same and more than Bruno ( $p < 0.05$ )

**Key words**- composition, nutritional facts, kiwifruit

### I. INTRODUCTION

Fruits contain varied compositions, so there is much variations in terms of structure and composition. Each fruit comprises alive tissues those are active metabolically and changed frequently. The rate and range of these changes is related to physiologic role and the phase of ripening and also Nutritional facts of fruit is related to chemical compositions are essential for human body and contain water, proteins, carbohydrates, Facts, minerals and vitamins (6). Kiwifruit is a Dioecious plant. the species of *Actinidia sinensis* is a Deciduous plant contains oval leaves, elliptic Fruit with brown plumose rind and Green flesh (2). Kiwi fruit grows from Java to Himalaya Naturally and Its is from southern china. Seeds of kiwi fruit were taken from china to Newzeland in 1906. The trade culture of kiwifruit in Newzeland started in 1930 and Now a days is the first in terms of production and exportation (5).

The harvesting time is related to Tree place, water and soil quality and Date. It is also possible to Decision about picking and storing by on time tests and Adequate conditions. it should be noticed fruit length, width and weight, rind color, membrane firmness, soluble solid content Acidity, respiratory rate, Ethylen in the time of picking and Ethylen products. Many last Experiences suggest that optimum Date of harvesting is in October and December (3). The best female stocks contain Hayward, Bruno, Abbut, manthy and Alison (5). In this research, Nutrition facts and compositions of varieties of Hayward, Bruno and Abbut has been Evaluated.

### II. MATERIALS AND METHODS:

The samples of varieties of Hayward and Bruno picked from kiwi gardens in mazandaran province in late August, September and October, casually. The selected ripe fruits Evaluated in terms of shape, weight and eatable part percent and then refrigerated in  $-18^{\circ}\text{C}$ . In order to Each test, samples refrigerated in  $4 - 5^{\circ}\text{C}$  from Night to morning and then least five fruits from Each variety mixed together and were Homogenized by Blender with high rate (1200 rpm) for 5 minutes. Each test conducted at least in Three replicates.

#### A. Humidity

Humidity was measured by oven in  $105^{\circ}\text{C}+$  for 3-5 hours to getting Net weight (4).

#### B. Ash

The Ash was measured after burning the sample over flame by oven in  $550^{\circ}\text{C}$  for 5 hours (4).

#### C. fat

The fat was measured by the way of Soxhlet and Ether Dopedrol solvent (4).

#### D. protein

The protein was measured by The way of kjeldahl and sample. Digestion by catalysor and Sulphuric Acid (4).

#### E. Fiber (cellulose)

The content of fiber was measured by the way below:

Fiber percent =  $\frac{\text{Dry matter weight} - \text{Ash weight}}{\text{preliminary sample weight}}$

#### F. soluble solid content (ssc)

ssc was measured by Refractometer (4).

### G. PH

PH was measured after peeling and mixing of fruit for turning to Homogeneous tissue of fruit puree by PH – meter (Metrom) (4).

### H. Acidity

For measuring Acidity, Fruit extract was provided by pressing fruit puree into multilayer mesh and then conclusive liquid was centrifuged (1500 rpm) for 5 minutes and was used for Acidity test(4).

### I. pulp percent:

In the beginning, eatable part of fruit was peeled and then was Determined by using of formulation below (4):

Pulp percent = the weight of sample before peeling - The weight of sample after peeling

### J. The content of total sugar, Reduced sugar and non-Reduced sugar

To measure total sugar it was used of Acidic Hydrolysis by Fehling (6).

Reduced sugar was measured by the way of Fehling. The percent of obtained sugar in this test is the total sum of Reduced and non Reduced sugars (6).

### K. Energy

The content of energy per 100g of eatable part of fruit calculated with the production of 4.5 kc, 4.5 kc and 9 kc for carbohydrate, protein and Fat respectively (6).

### L. Statistical Analysis

For preparing the averages was used of MSTSTC software by the way of multiple Duncan range test.

## III. RESULTS AND DISCUSSION:

### A. Results :

This research showed that the contents of total Dry matter, soluble solid content, Ph, Fiber and total sugar and Reduced sugar in the range of 1 % ( $p < 0.01$ ) and the contents of protein, Fat, Acidity, pulp, minerals and Energy in the range of 5% ( $p < 0.01$ ) are remarkably Different in 3 varieties.

But non-Reduced sugar (sucrose) was the same and there was not remarkable Difference.

1) *Pulp (eatable part percent)*: pulp was Different in 3 varieties ( $p < 0.01$ ). The eatable parts of Hayward, Bruno and Abbut were decreased respectively. The content of eatable parts in Hay ward, Bruno and Abbut were 96.3 , 92.6 and 89.3 respectively

2) *Dry matter*: In According to this study, Total Dry matter in Abbut and Bruno was the same, but less than Hayward ( $p < 0.01$ ). high Dry matter increases the efficiency of food production. High percent of pulp and Dry matter in Hayward shows that It has best quality for processing among these varieties .

3) *minerals* : The content of mineral is Different in mentioned varieties ( $p < 0.05$ ). The percent of minerals in Hayward and bruno was the same, But less than Abbut ( $p <$

0.05). It seems that abbut has more minerals than the other varieties due to smaller size (because of high area against volume and high percent of minerals in rind), but results of this study showed that varieties of Hayward Bruno have more potential in storing minerals .

4) *soluble solid content (ssc)* : ssc (Brix) has aDirect relationship to ripening Degree. In total, stability in Bruno pulp shows Its low brix. The results of this study also confirms that soluble solid content in Bruno is less than the others Remarkable ( $p < 0.01$ ).The percent of soluble solid contentswere obtained 16.7, 14.6 and 12.8, Respectively .low percent of soluble solid content increases the stability of Bruno pulp for processing in manufactures and helps to keeping of Its shape in heating process.

5) *PH*: This factor is Important in terms of control of flavor tissue, chemical reactions and microbial spoilage The results of This study showed that PH is the most the in Hayward and the least in Bruno (figure 5).The low PH of Bruno creates sour flavor and decreases Acid consumption for the regulation of Different products.

6) *Acidity*: In spite of remarkable Difference between Abbut and Bruno, they have no remarkable Difference in term of Acidity statistically. Acidity in Hayward was less than the others remarkably ( $p < 0.05$ ). This result states the cause of sweeter Flavor of Hayward in comparison of varieties .

7) *protein*: The content in the varieties of this research was Different ( $p < 0.05$ ). The percent of protein in Hayward, Bruno and Abbut were 1.17,1.06 and 0.95 , respectively.

8) *Fat*: In According to the results of this research, the content of fat in the varieties was Different ( $p < 0.05$  ).The content of fat in Hayward and Bruno was the same , but remarkably less than Abbut ( figure 8 ) The content of Fat in Abbut was Higher than the others (Approximately 1.5 times) higher fat in Abbut creates higher Energy for fruit consumer than the other varieties ( figure8 ) .

9) *Total fiber ( cellulose )*: cellulose is the most Important Fiber in kiwi fruit (4).The content of fiber is Different in the varieties of this study ( $p < 0.01$  ). the content of it in Bruno is the most, and is the least in Abbut ( figure9 ) . The content of total fiber in this study was calculated 2.5, 3.3 and for Hayward, Bruno and Abbut respectively. High content of fiber in Bruno IncreasesIts tissue stability and resistance against Different factors During processing. this is cause of higher potential of Bruno in turning to products like cans ( 1,4 ) .

10) *Total sugar*: The content of total sugar in these varieties is Different ( $p < 0.01$ ). the content was the same in Hayward and Abbut, but more than Bruno (figure 10) .low soluble solid content and low content of sugar in comparison of the varieties confirms the results.

11) *Reduced and non-Reduced sugars* :

The main part sugars in kiwi fruit is from the type of Reduced sugar and Its content in kiwi fruit is similar to total sugar (4,6).

The result showed that Reduced sugar in Abbut and Hayward are the same, but more than Bruno (figure 11) , The percent of Non-Reduced sugar (sucrose) is the same in 3 mentioned varieties and have no remarkable Difference ( = 0.05 ) .The Difference among 3 mentioned varieties was from 0.197 to 0.217.

12) Energy : The obtained energy from consumption of fruit in Abbut and Hay ward is the same m but more than Bruno remarkably (  $p < 0.05$  ).

**B. Discussion :**

In according to the results of this research, The percents of Different compositions in mentioned varieties were Different and also Different from other last results about kiwi fruit composition in the word (8).This result was predictable due to variety effect and Geographical region. Notable Issue is that the type of variations in every part of fruit is not similar. Variety of Bruno has Industrial usage due to remarkable fiber and Dry matter, but has less Energy than the others. The result of this study could be used for offering to kiwifruit consumers, helping to gardeners for planting and Developing of production of high quality varieties in order to

Industrial usages or fresh predicts, giving Information to owners of food Industries.

To select and predict the best preliminary material based on ultimate quality, and helping to fruit Exporter for giving Information to customers about product characters and to select the best condition for storing and handling (7,9 ).The results also could help to Nutrition Experts for presentation of Nutritional offers

**REFERENCES**

[1] Arthey, D.,And Dennis C. 1996 . Vegetable Processing. Chapman and Hall. New York.  
 [2] Manolopoulou, H And Papadopoulou P.1997. A Study Of Respiratory And Physico-Chemical Changes OF Four Kiwi Fruit Cultivars During Cool Storage. Food Chemistry. 63(4). 529-534.  
 [3] Schmidt ,R.H.,And Rodrick G.E.2003.Food Safety Handbook.John Wiley and Sons Publications.New jersey.  
 [4] Smit, G.2000.Dairy Processing, Improving Quality.CRC Press,Newyork.  
 [5] Watson , M.and K.S.Gould . 1985 .The development of fruit Shape in kiwi fruit growth characteristics and positional different. J . Hor .sci .68 : 185-194  
 [6] Watson, M. and K.S.Gould.1994. The development of flat and shaped fruit in Actindia chinensis var. Chinensis and Actindia deliciosa Annals of botany.14:59-68  
 [7] zhixue,C.H. Hangwen and x.xingguo.2002. Actindia in china. China Agricultural science and Technology press. 296p

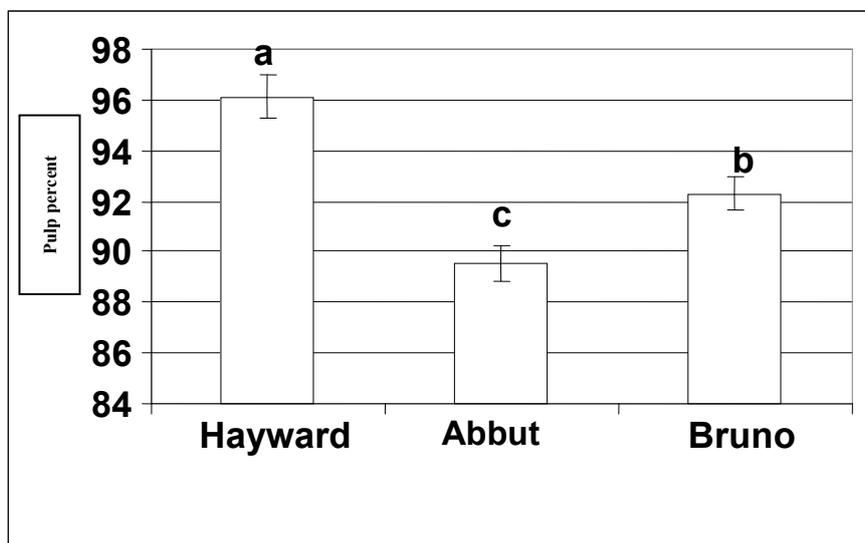


Figure 1-pulp percent in the varieties of kiwifruit

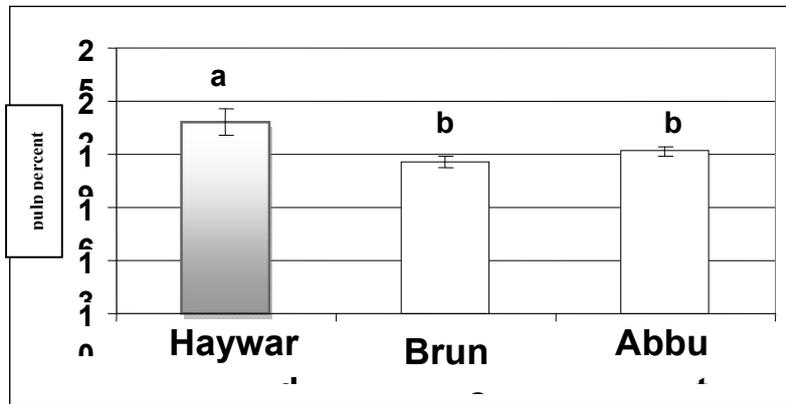


Figure 2- percent of Dry matter in the varieties of kiwifruit

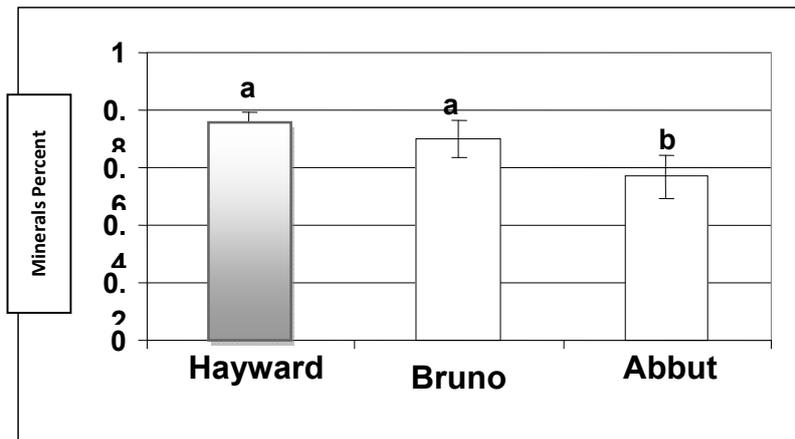


Figure 3- percent of minerals in varieties of kiwifruit

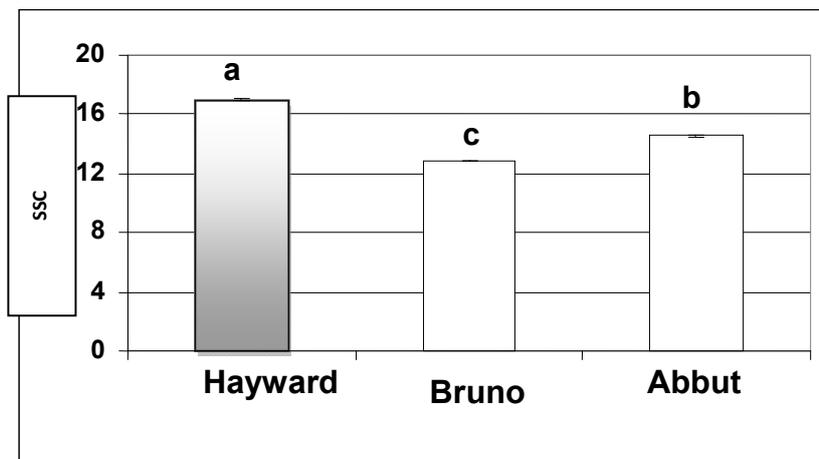


Figure 4 – soluble solid percent

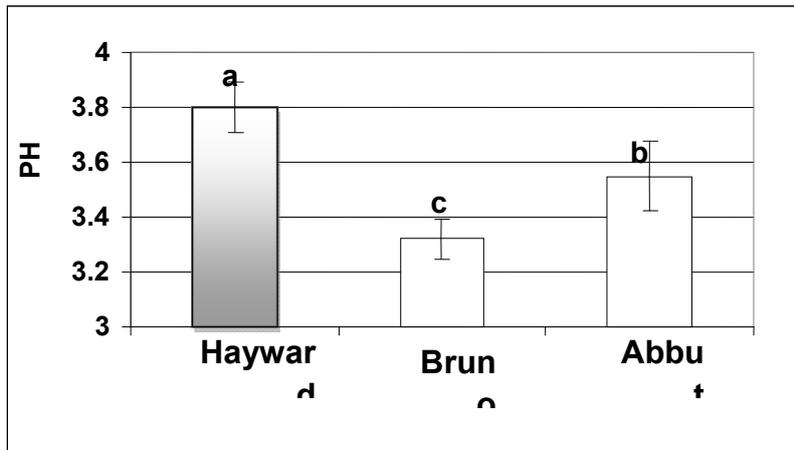


Figure 5 – The comparison of PH in the Different varieties

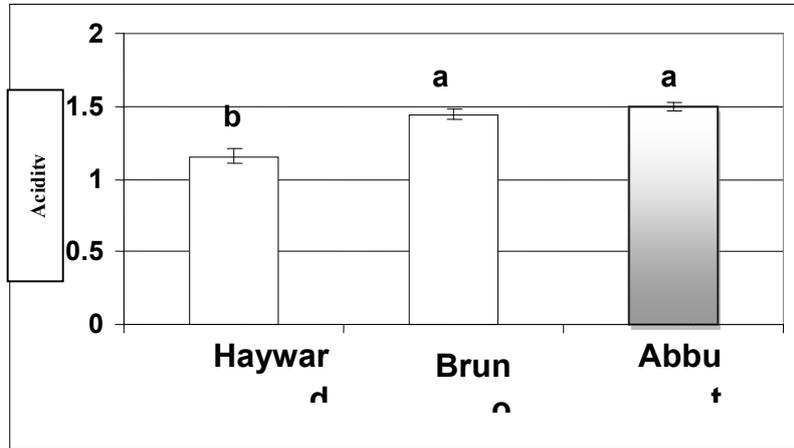


Figure6 – The comparison of Acidity in the Different varieties

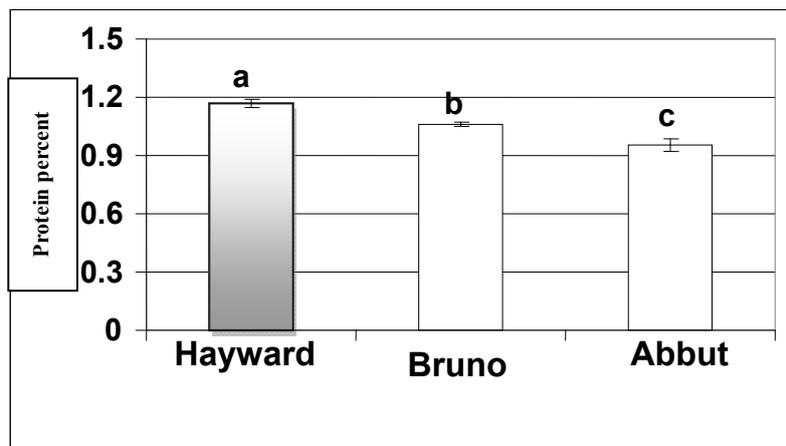


Figure 7 – The comparison of protein percent in the Different varieties

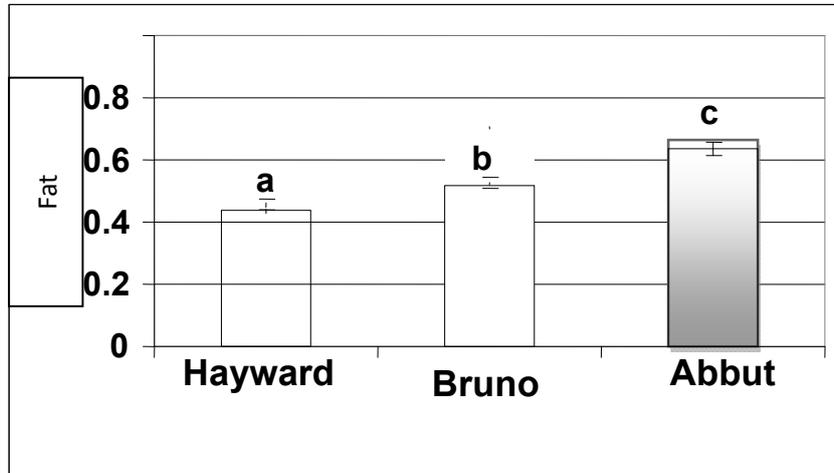


Figure8 – The comparison of fat in the Different varieties.

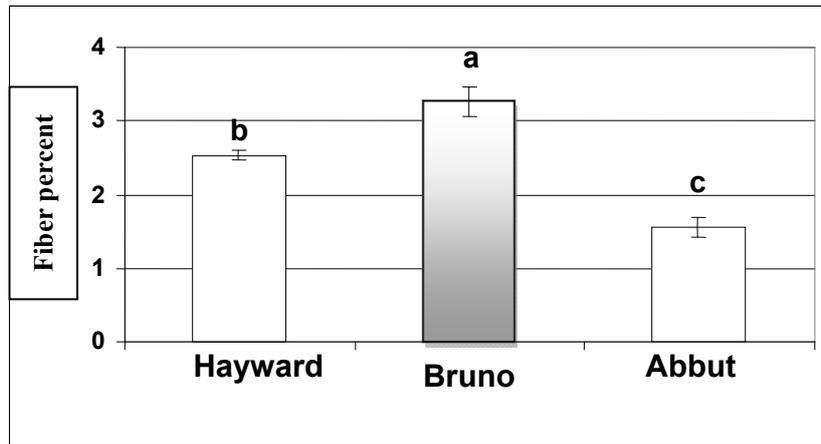


Figure 9 – The comparison of fiber percent in the Different varieties

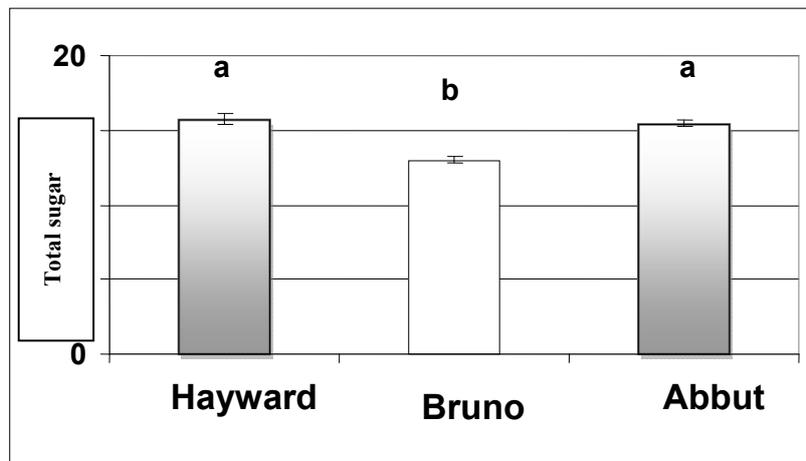


Figure10 – The comparison of total sugar in the Different varieties

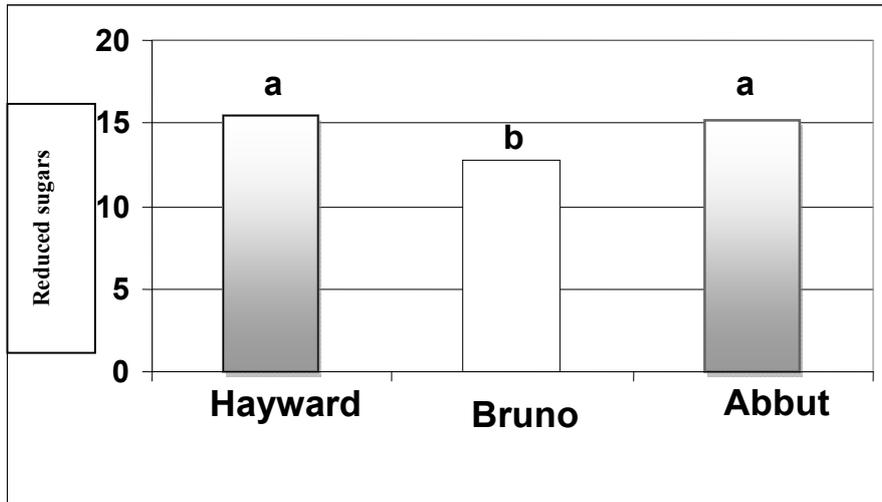


Figure 11-the comparison of reduced sugars in the Different varieties

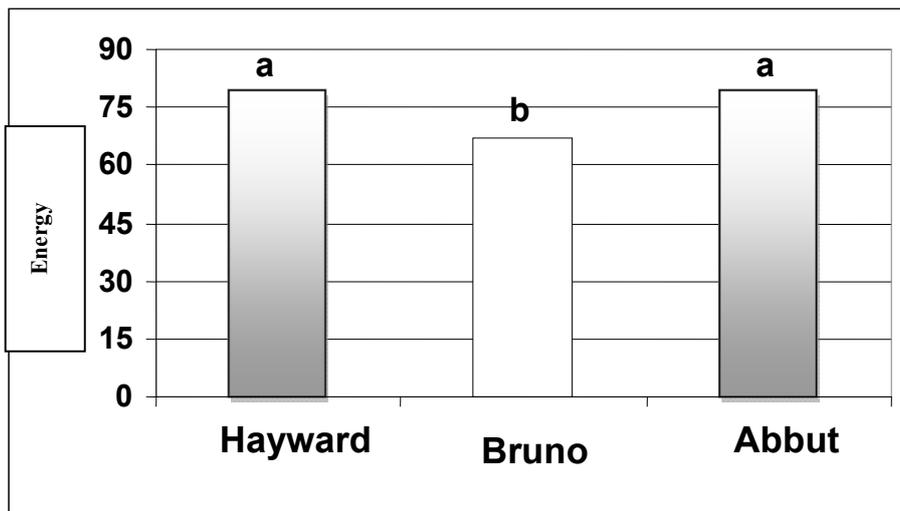


Figure12 – The comparison of production of Energy in the Different varieties