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EVALUATION OF CHEMICAL CHANGES IN FOUR SELECTED VARIETIES OF GRAPES UNDER THE CLIMATIC CONDITION OF BALOCHISTAN PROVINCE

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Abstract:
Present study was carried out in order to evaluate the chemical changes in the grape varieties i.e. Kishmishi, Sandokhani, Sahibi and Haita, which were grown in grape areas of the Balochistan province. The results reveal that best fruit quality on the basis of biochemical analysis was observed in Kishmishi and Sandokhani varieties in Quetta district. While Sahibi and Haita variety were the best varieties in Pishin district. Averaging best quality data were observed in Mastung district, while lowest quality fruits were observed in Kalat district.

Key words: *Biochemical Evaluation, Grapes varieties, Chemical changes*

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INTRODUCTION:

Grapes (*Vitis vinifera*) belong to the family *vitaceae*. Commercially grapes are the world biggest and most widespread deciduous fruit crop [1]. Grapes are widely grown all over the world but Spain, Italy and France are major grapes growing countries [2, 3]. Grapes are Contain Sugar, Vitamins, minerals, and other important food supplements [4, 5].Grapes are almost grown all the temperate regions of Pakistan. In Pakistan grapes are grown on an area of 3500 hectares with annual production of 35500 tones [6, 7].

Balochistan is the main pocket for grape production. The area under grape in Balochistan is about 3400 hectares with the production of about 34300 tones. Most growing areas of grape in Balochistan are Quetta, Kalat, Mastung, Pishin, Zairat, Loralai, Kanak, Khuzdar etc.[8]. Production of grape is increasing day-by-day and replacing apple due to high resistant against drought conditions [3]. Quality of Fruit grapes is different in all areas due to little bit soil and climatically conditions, this may lead new physiogenic races which results variation in quality of fruit. Keeping in view the importance of grapes and change in morphology changes it was decided to carry out a planned work for evaluation bio-chemical changes in grapes varieties grown in different areas.

MATERIALS AND METHODS:

Collection of plant material

Four varieties of grapes (Kishmishi, Sandokhani, Sahibi and Haita) were collected from Quetta, Kalat, Mastung and Pishin field areas.

Evaluation of Chemical changes in grape varieties

Elemental analysis

Five (5) grams dried berry from each variety of all areas were digested in 20-30 ml HNO_3 (Nitric Acid) through gently heating for digestion. After completed digestion each sample was filtered and volume was made to 100 ml by adding distilled water in volumetric Flask. The elemental analysis was done through Atomic Absorption Spectrophotometer with of standard and blank solution Sodium was determined by Flam Photometer wherever required [9-11].

Analysis of dry matter and moisture

100 gm sample was taken from each variety for dry matter and moisture analysis. These samples were kept in Electric oven for two hours at 54 C^o. The dry matter and Moisture were analyzed as [12].

Moisture =Total wt. of sample before oven dry-wt. of sample.

Dry matter = Total weight after over dry [13, 14].

Analysis of fat

The fat% age was estimated by extracting fat from grapes samples in Soxtech system through solvent Diethyl ether as; took 10 grams for every sample in crucible putting it into thimble containing diethyl ether and connected this thimble to the adaptor in a manner that knobs of extraction unit were in the rising position and general knobs were in the boiling position. The temperature was adjusted according to solvent boiling point. The process was done about 2 hours. Finely the solvent diethyl ether was evaporated. The extracted fat percentage was calculated by using formula as.

$$\text{\% of Extract} = \frac{\text{Wt. of extracted X 100}}{\text{Wt. of sample}}$$

[15, 16].

Analysis of sugar

Analysis of Sugar was done through U.V. Spectrophotometer by taking 10 gm. Berry from every sample and added in hot redistilled alcohol to which enough precipitated Calcium Carbonate has also been added for neutralizing acidity. These were allowed for water contents of test portion. Heated up boiling point on steam in water both for about 30 minutes [17,18].

Finally discounted solution into volumetric flask and allowed to cool. Prepared samples were subjected for sugar analysis and through UV Spectrophotometer [19].

RESULTS AND DISCUSSION:

Evaluation of chemical changes in grape varieties

Table 1: Variation of bioactive compounds due to cultivated area in grapes variety "Kishmishi"

BIOACTIVE COMPOUNDS	QUETTA	KALAT	KANAK	MASTUNG	PISHIN
Moisture	78%	76%	80%	79%	82%
Dry matter	20%	21%	19%	18%	19%
Sugar	23%	18%	24%	24%	16%
Fat	1.2%	1.0%	1.6%	1.0%	0.9%
Phosphorus	0.0012%	0.0011%	0.0013%	0.0013%	0.0010%
Potassium	0.0020%	0.0019%	0.0020%	0.0020%	0.0012%
Sodium	0.0040%	0.0033%	0.0037%	0.0036%	0.0020%
Iron	0.0080%	0.0078%	0.0087%	0.0082%	0.0058%
Zinc	0.0012%	0.0011%	0.0012%	0.0012%	0.004%

The data in table-1 regarding bioactive compounds shows that the moisture remained to increase at 82-80-79% in Pishin, Kanak and Mastung field areas. However, with the term of sugar, remained perpetual at 23-24% and were observed at Kanak, Mastung and Quetta field areas respectively. Hence, relevantresults further, showed that best fruit quality on the basis of biochemical analysis was observed in Kishmishi varieties which were grown in Quetta field areas.

Table 2: Variation of Bioactive compounds due to cultivated area in grapes variety "Sahibi"

BIOACTIVE COMPOUNDS	QUETTA	KALAT	KANAK	MASTUNG	PASHIN
Moisture	70%	71%	78%	79%	80%
Dry matter	22%	23%	20%	20%	18%
Sugar	18%	17%	20%	19%	22%
Fat	0.9%	0.7%	1.0%	1.1%	2.9%
Phosphorus	0.0098%	0.0010%	0.0012%	0.0012%	0.0014%
Potassium	0.0019%	0.0018%	0.0019%	0.0019%	0.0024%
Sodium	0.0033%	0.0033%	0.0035%	0.0034%	0.0060%
Iron	0.0040%	0.0039%	0.0066%	0.0066%	0.0108%
Zinc	0.0073%	0.0060%	0.0010%	0.0010%	0.0014%

The information in table-2 about bioactive compounds displays that the moisture remained to increase at 80-79-78% in Pishin, Mastung and Kanak field areas. While, with the term of dry matter, persisted at 23-22% and were observed at Kalat and Quetta field areas respectively. Henceforth, pertinent outcomes are presented that the Sahibi variety was best fruit quality in Pishin field areas.

Table 3: Variation of Bioactive compounds due to cultivated area in grapes Variety "Sandokhani"

BIOACTIVE COMPOUNDS	QUETTA	KALAT	KANAK	MASTUNG	PASHIN
Moisture	76%	76%	79%	81%	82%
Dry matter	18%	17%	19%	18%	16%
Sugar	29%	24%	28%	28%	18%
Fat	2.2%	1.8%	2.0%	2.01%	0.6%
Phosphorus	0.0020%	0.0017%	0.0018%	0.0018%	0.0012%
Potassium	0.0031%	0.0030%	0.0030%	0.0031%	0.0017%
Sodium	0.0056%	0.0050%	0.0046%	0.0045%	0.0022%
Iron	0.0089%	0.0090%	0.0878%	0.0087%	0.0064%
Zinc	0.0022%	0.0018%	0.0017%	0.0017%	0.0014%

Present research was evaluated in order to determine the chemical changes in grape varieties as shown in table-3. The data further, depicted about bioactive compounds displays that the dry matter endured at 82-81-79% in Pishin, Mastung and Kanak field areas respectively. While, with the term of dry matter, keep on at 19-18% and were perceived at Kanak, Mastung and Quetta field areas separately. Henceforward, relevant results, showed that the Sandokhani was the best quality of fruits in Quetta field areas.

Table 4: Variation of Bioactive compounds due to cultivated area in grapes variety "Haita"

BIOACTIVE COMPOUNDS	QUETTA	KALAT	KANAK	MASTUNG	PASHIN
Moisture	77%	73%	75%	75%	76%
Dry matter	21%	23%	18%	19%	18%
Sugar	16%	19%	23%	23%	26%
Fat	1.0%	0.9%	2.00%	2.0%	2.9%
Phosphorus	0.0018%	0.0017%	0.0019%	0.0019%	0.0031%
Potassium	0.0019%	0.0018%	0.0029%	0.0029%	0.0030%
Sodium	0.0047%	0.0043%	0.0052%	0.0052%	0.0060%
Iron	0.0071%	0.0049%	0.0098%	0.0097%	0.0098%
Zinc	0.0013%	0.0012%	0.0018%	0.0018%	0.0034%

Table-3 shows about bioactive compounds displays that the dry matter recorded at 77-76-75% in Quetta, Pishin, Mastung and Kanak field areas separately. Therefore, significant outcomes, were exhibited that fruit quality in Haita was best grown at Pishin field areas.

CONCLUSIONS AND RECOMMENDATIONS:

Averaging best quality fruit in all four varieties were observed in the areas of Kanak and Mastung while, lowest quality fruits in all grapes varieties were observed in Kalat area. Pertinent outcomes, presented that the Sahibi variety was best fruit quality in Pishin field areas. Relevant results further, showed that the Sandokhani best quality was grown in Quetta field areas. Results showed that the Sandokhani was considered as the best quality fruits in Quetta field areas. Based on results fowling recommendation was formulated. Notwithstanding, the potential pocket of the grape fruits at Balochistan province, the grower did not deemed to grown the low delta fruit like grape, in this regard it should be suggested that the promotion and propagation should be at large scale or vast areas in order to increase the farmers socio-economic condition.

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