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## RESEARCH ARTICLE

# ALTERATIONS IN HYDROXYL ION SCAVENGING ACTIVITY IN RAISIN VARIETIES A FUMIGATED WITH SALTS

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**ABSTRACT**

Grape is one of the most commercial horticultural crops of the world. Grapes are very nutritious, rich source of minerals and different vitamins. It revels from the figure, the Thompson seedless raisins treated with Changes in the hydroxyl ion scavenging potential in the Thompson and Sonaka seedless raisins treated with different chemical compounds on the basis of percent inhibition are presented are shown in Figure. It revels from the figure, that the Thompson seedless raisins treated with K2CO3+sulphur has a greater hydroxyl ion scavenging potential than the raisins treated with other compounds, while Sonaka seedless raisins treated with CaCO3 shows higher OH- ions scavenging potential than the raisins treated with other compounds.



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## INTRODUCTION

Grape (*Vitis sp.*) belonging to Family Vitaceae is a commercially important fruit crop of India. Grapes are eaten as raw or they can be used for making wine, raisins, jam, and jelly, which are very nutritious and rich source of minerals like potassium, phosphorus, calcium, magnesium and other micronutrients and different vitamins. The dried grapes, commonly known as raisins, have a great importance in economy of the country and considered as one of the nutritious most popular dry fruits in the world. Raisins are dried fruits of certain varieties of grapevines with a high content of sugar and solid flash (Khair and Shah, 2005). The increased production of table grapes has a great potential to produce raisins with minimum losses of fresh fruits (Telis *et al*., 2004). According to FAO data, grape production all over the world is about 62,348 million tonnes (WHO and FAO, 2003). According to De Candolle (1886), the cultivation of grape goes back to 4000 BC in Egypt and the oldest wine was found in Armenia near the Caspian Sea in Russia. As per the report of Parker *et al.* (2007), the Thompson seedless grapes, were first introduced in 1876, accounted for 95% of the California crop used for golden raisin production. Thapar (1960) indicated that grape was introduced in India in 1300AD by the Persian invaders in North and South India (Daulatabad in Aurangabad districts of Maharashtra). Nizam of Hyderabad has also introduced some grape varieties into Hyderabad from Persia in the early 20th century (Chadha and Shikhamany, 1999). India is a small producer of grapes, with a world share of less than 2 percent (Barrientos and Kritzinger, 2004). The total average cultivation of grape is near about 80,000 hectares in India and 28,000 hectares in Maharashtra.

## MATERIALS AND METHODS

***Hydroxyl radical scavenging activity (OH-):*** The scavenging of the hydroxyl radical was measured according to the method described by Halliwell *et al.* (1987). Methanolic extracts were prepared from raisins. The methods given by Anwar *et al*. (2006) and Sultana *et al*. (2008) described earlier were employed for the preparation of methanolic extracts. The assay mixture contained 0.1 ml of 1 mM EDTA, 0.01 ml of 10 mM $FeCl_3$, 0.1 ml of 10 mM $H_2O_2$, 0.36 ml of 10 mM Dexoy ribose and 1ml of leaf extract (100 µg/ml), 0.33 ml of potassium phosphate buffer (50 mM, pH 7.4) and 0.1 ml of 1 mM ascorbic acid The mixture was incubated at 37 0C for 1 h. One ml of incubated mixture mixed with 1 ml of 10 % TCA and 1 ml of 0.5 % TBA (in 0.025 M NaOH). The intensity of the pink coloured complex developed measured at 532 nm. The ascorbic (100 µg/ml) acid was used as standard. Scavenging % of the hydroxyl radical was calculated by using the formula.

$$\% \text{ Scavenging activity} = \frac{AC - AE}{AS \times AC} \times 100$$

Where,

AC is the Absorbance of Control
AE is the Absorbance of leaf extract
AS is the Absorbance of standard

## RESULTS AND DISCUSSION

***Hydroxyl ion content (OH-):*** Changes in the hydroxyl ion scavenging potential in the Thompson and Sonaka seedless raisins treated with different chemical compounds on the basis of percent inhibition are presented in are shown in Figure 1. It revels from the figure, that the Thompson seedless raisins treated with $K_2CO_3$+sulphur has a greater hydroxyl ion scavenging potential than the raisins treated with other compounds, while Sonaka seedless raisins treated with $CaCO_3$ shows higher OH- ions scavenging potential than the raisins treated with other compounds. The hydroxyl radical is the most reactive of the reactive oxygen species, and it induces severe damage in adjacent biomolecules (Gutteridge, 1984). The hydroxyl radical can cause oxidative damage to DNA, lipids and Proteins (Spencer *et al.,* 1994). Free radicals and other reactive species are constantly generated *in vivo* both by accidents of chemistry and by specific metabolic reaction. The most important reactions of free radicals in aerobic cells involve molecular oxygen and its radical derivates (superoxide anion and hydroxyl radicals), peroxides and transition metals. Reactive species are thought to play an important role in aging and in the pathogenesis of numerous degenerative or chronic diseases, such as cancer, cardiovascular diseases, diabetes and atherosclerosis (Ames *et al.,* 1993). The scavenging abilities of ascorbic acid and black grape seed extracts on hydroxyl radical inhibition were studied by Al-Muwaly *et al.* (2012), they found that ethanolic extract of black grapes shows higher inhibition ability. Balakrishnan and Kokilavan (2011) studied the scavenging activity of *Cucumis trigonus* fruit extract of against hydroxyl radical was found to be 62.53%. Kumar *et al.* (2008) recorded 62.73 % Percentage of $H_2O_2$ scavenging activity of *Citrullus* fruits. It is well known that the grape skins and seeds, waste products generated during wine and grape juice processing, are rich sources of polyphenol (Murthy *et al.*, 2002). In the present investigation also Thompson and Sonaka raisins showed higher scavenging ability of the hydroxyl ions which may be related to its high polyphenol content. This might be benificil to prevent various degenerative diseases induced due to various reactive oxygen species.

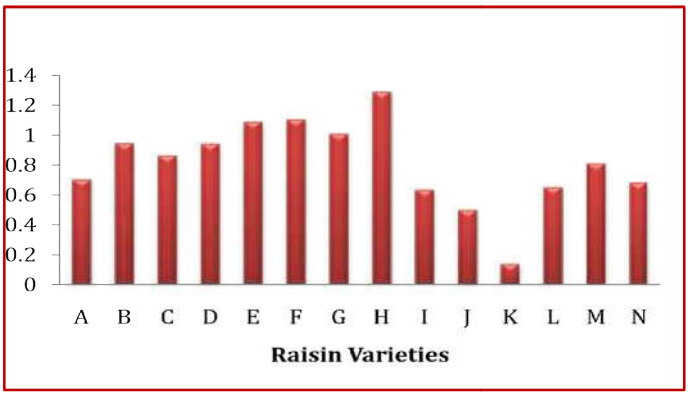


**Fig. 1. Changes in hydroxyl ion scavenging activity of treated raisin varieties**

A = Thompson seedless treated with $MgCO_3$, B= Sonaka seedless treated with $MgCO_3$, C=Thompson seedless treated with $K_2CO_3$, D=Sonaka seedless treated with $K_2CO3$, E=Thompson seedless treated with $CaCO_3$, F=Sonaka seedless treated with $CaCO_3$, G=Thompson seedless treated with $K_2CO_3$+ sulphur, H= Sonaka seedless treated with $K_2CO_3$+ sulphur, I=Thompson seedless treated with $K_2CO_3$+ sulphur + coating, J=Sonaka seedless treated with $K_2CO_3$+ sulphur +coating, K=Thompson seedless treated with $K_2CO_3$+ sulphur + coating + Mango essence, L=Sonaka seedless treated with $K_2CO_3$+ sulphur +coating + Mango essence, M=Thompson seedless treated with $K_2CO_3$+ sulphur + coating +Orange essence, N=Sonaka seedless treated with $K_2CO_3$+ sulphur +coating + Orange essence

### Conclusion

The result of hydroxyl ion scavenging potential assay suggest that the components within the Thompson seedless raisins treated with $K_2CO_3$+ sulphur showed a greater hydroxyl ion scavenging potential than the raisins treated with other compounds, while Sonaka seedless raisins treated with $CaCO_3$ showed higher OH- ions scavenging potential than the raisins treated with other compounds. Thompson and Sonaka raisins showed higher scavenging ability of the hydroxyl ions which may be related to its high polyphenol content. Thus, the raisins of both the varieties exhibited potent antioxidant effect by inhibiting free radicals which can be serving as potent source for the cancer chemo protective effects. This might be beneficial to prevent various degenerative diseases induced due to various reactive oxygen species. The higher antioxidant activity may serve as a new potential source of nutraceuticals and functional foods.

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