

CHAPTER ONE

INTRODUCTION

The ever increasing demand of consumers for chemical and antibiotic free food has paved the path for natural products to be used in extending the shelf life of a big number of fruits. Recently plant extracts and essential oils have received a lot of attention for use in food products due to their antioxidant and antimicrobial activities as well as flavour properties (Dhanze and Mane, 2012).

In the Sudan, Oranges are members of the citrus species (*Citrus sinensis*) of the family Rutaceae. It is also known as sweet oranges.

Citrus sinensis (L) is subjected to a variety of storage problems. Oranges usually can remain stout for 1-2 days at room temperature and up to 2 weeks in the refrigerator. So orange fruits need to prolong the shelf life. we need length the shelf life. Accordingly, we intend to use botanical material to prolong the shelf life of these fruits.

The objectives of this study is to extend the life span of orange fruits by using argel leaves ethanolic extracts. In this work we intend to:

- 1- Obtain ethanolic extract from the argel leaves.
- 2- Prepare three different concentrations from this extract (100%, 50% and 25%).
- 3- Use these concentrations by coating the orange fruits in a randomized complete design using the three concentrations as treatments in three replicates compared to the untreated control.

Recently, the uses of natural products for crop protection were greatly emphasized by scientists in everywhere (Guideword, *et.al*, 1990). Medicinal plants have become the focus of intense study in terms of validation of their traditional uses.

CHAPTER TWO

LITERATURE REVIEW

2.1 Orange Tree

In the Sudan, Oranges are members of the citrus species (*Citrus sinensis*) of the family Rutaceae. It is also known as sweet oranges. Different varieties are cultivated in different parts of the country (Almost in all states with concentration of Khartoum, Nile River, Northern State and western states).

2.1.1 Scientific classification

Kingdom::Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Solanales

Family: Rutaceae

S.N: *Citrus sinensis*

2.3 Argel plant (*Solenostemma argel*)

Argel (*Solenostemma argel*) is a desert plant of traditional medical uses in the Sudan. It grows wild in the area extending from Dongola to Barber, particularly around Abu Hamad, where it is grown under irrigation (Elkamali and Khalid, 1996). Sudan is regarded as the richest source of this plant (Orange, 1982). Phyto-chemicals of medicinal properties from argel shoots had been reported by many workers (Roos et al., 1980; Kamel et al., 2000; Hamed, 2001). Sulieman et al. (2009) reported that the aqueous extracts of argel have antifungal and antibacterial properties. The farmers in Kassala State put argel shoots in porous jute sacks in the irrigation canals to be leached by water. The water was effective in

controlling aphids and white flies in summer tomatoes and Egyptian bull worm in okra respectively (Unpublished observation). In a pilot field experiment on *Brassica nigra*, some peripheral plots were severely infested by aphids. The infestation caused stunting of shoots and delayed flowering compared to non-infected plots. However, upon treatment with argel as a soil additive, or a spray of shoot water extract or a combination of soil additive and spray, the vegetative growth was restored in all plots after pest disappearance and the plants flowered within 10-15 days after treatments. The inflorescence was abnormally thick and profusely branched in plants that received the combined treatment suggesting a growth-regulator-like effect and indicating the efficiency of argel as a pesticide (Abdelwahab, 2002).

2.3.1. Scientific classification

King dome : Planta

Unranked : Angiospterns

Unraked : Eudicots

Order : Gentianales

Family : Apocynaceae

Sup family : Asclebiadoideae

Genus : Solenostemma

Species : S.argel

2.3.2 Plant distribution

Argel distributes in Arabian Peninsula and North Africa.

The shelf life of oranges, like most other fresh fruit variable because most have no sell by date 'use by date' or best before date since there is no printed

data. It is difficult to tell how long the fruit has been on the grocery shelf prior to purchase 'the only date you can go by is the purchased date or date picked. Two main varieties of orange navel that are best for eating and Valencia that are best for juice.

Practicing proper hygiene and food safety techniques will help prevent food borne illness.

Although not perfect test your senses are usually the most reliable instruments to tell if you orange have gone bad beyond the shelf life.

Some common traits of bad orange are a soft texture and some discolored. The soft spot is moist and develops mold' usually white in color at first.

There is of course certain health risks associated with spoiled food so always remember to practice food safety and enjoy your food before their shelf life has expired.

You can help orange stay fresh longer by storing them in your refrigerator drawer once orange are prepared they should be stored in a tightly closed container to keep out moisture and other environment by avoiding waste. Oranges shelf life information on eat by date is generally reliable.

Please remember that individual cases will vary and that our advice should only be taken as an opinion and not a replacement for your health care professional please eat responsibly.

CHAPTER THREE

MATERIAL AND METHODS

This study which conducted under laboratory condition of Plant Pathology, College of Agricultural Studies, Sudan University of science and Technology during the period July 2017 to investigate the effect of ethanolic extracts of argel leaves on the shelf life of orange fruits.

The argel leaves were collected from bahri Market and then the fruits were treated under the laboratory condition where temperature around 25c. material toad and equipment used in the study orang fruits-glaves –camera-

All material except argel extracts were cleaned by drop water and sterilized by ethanol.

3.1 The experiment

We brought the orange fruits from Khartoum market. The fruits are free of any infection. The fruits were then treated by ethanolic extract of argel leaves by three different concentration 100% -50%-25% with three replicates compared to untreated fruits. Then the results were statistically analyzed using the randomized complete design.

3.1. Isolation and Identification of the causal pathogen

Fungal isolate was isolated from naturally diseased tomato leaves showing blight symptoms and Identification of the causal pathogen. Pathogenicity tests of *Alternaria* sp. Isolate was conducted under laboratory conditions at the Plant pathology lab.

3.2. Plant Material

Dried argel leaves were crushed and ground with mortar and pestle..

3.4. Preparation of extracts

Extracts from leaves of argel , were obtained and tested for their efficacy in prolonging the shelf life of orange fruits.

Powdered plant materials were sequentially extracted with different solvents in a Soxhelt apparatus for 8h according to the method described by (Pandey, 2007). The solvents used for extraction included petroleum ether (PE), ethanol (ET). The respective extracts were filtered and dried under reduced pressure using rotary evaporator to yield solid/semisolid residues. The residues were lyophilized to get dry solid mass.

3.6. Test procedure:

The different concentrations were then rubbed on the peel of the fruits coating them with material.

owth.

3.7. Experimental design:

The experiment was arranged in a Complete Randomized Design.

3.8. Statistical analyses:

The obtained data was statistically analyzed according to analysis of variance (ANOVA) Duncan's Multiple Range Test (DMRT) was used for means separation using Mstat-C statistical package..

CHAPTER FOUR

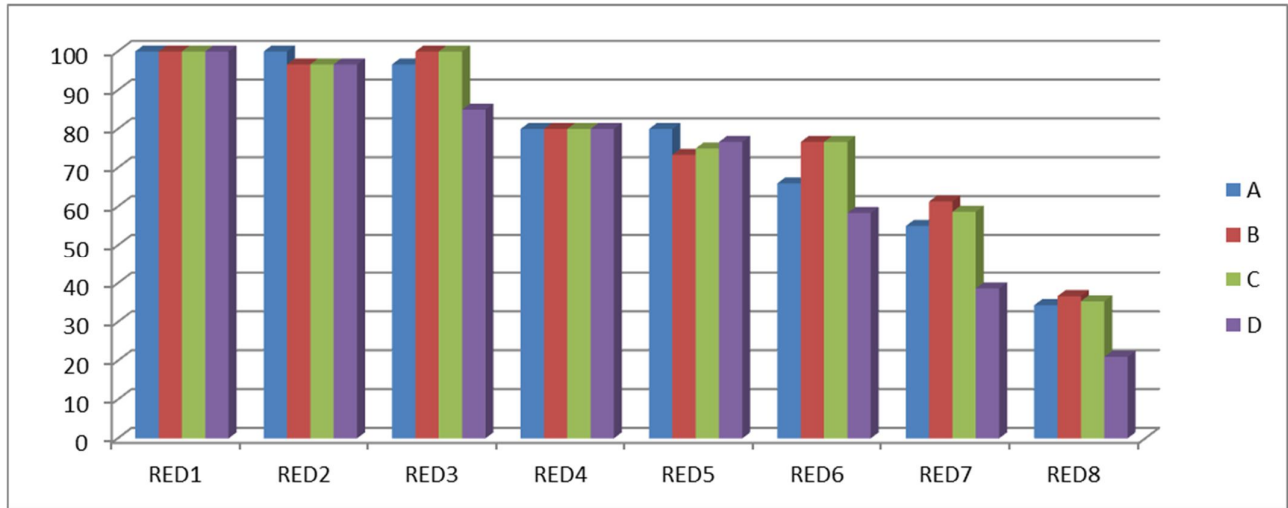
RESULTS AND DISCUSSION

Results:

This study was conducted in the laboratory of plant pathology department of plant protection collage of agricultural studies Sudan university of science and technology July 2017. The study revealed the extension of shelf life of orange fruits

Table (1).....

TREM	RED1	RED2	RED3	RED4	RED5	RED6	RED7	RED8
A	100 ^A	100 ^A	96.66 ^A	80 ^A	80 ^A	66 ^A	55 ^B	34.33 ^A
B	100 ^A	100 ^A	96 ^A	80 ^A	73.3 ^A	76.6 ^A	61.33 ^A	36.667 ^A
C	100 ^A	100 ^A	96.70 ^A	80 ^A	78 ^A	76.6 ^A	58.66 ^{AB}	35.33 ^A
D	100 ^A	96.667 ^A	85 ^B	78 ^A	76.66 ^A	58.3 ^A	38.66 ^C	21 ^B
LSD	0	9.4142	5.4353	0	26.488	18.899	5.4081	7.9882
SE	0	2.8868	1.6667	0	8.1223	5.7951	1.6583	2.4495
CV	0	5.13	3.03	0	18.45	14.46	5.38	13.33



1. THE first reading after three days did not notice any change in the three concentration and the same as the control .

2. The effect after four days in second reading after four days not change in the three concentration but not in the control .

3. The effect after five days third reading was a slight damage in the three concentration but the damage in the control was more .

4. The effect after 6 days the three concentrations are damaged with increase in the control .

5. The effect after seven days concentration 100% maintained the level of damage. The damage in the concentrations 50%-25% is decreased.

6. The effect after 8 days was observed that the level of damage was higher in the concentration 100% compared with the rest of the concentrations which recorded a lower gradient in the level of damage, however, the control was completely damaged.

7. The effect after 9 days more damage was observed on the concentration 100%, when compared with the concentrations 50%-25% which recorded less damage. The control was completely lost.

8. On the 10th day the fruits of all concentrations were lost and badly damaged.

Conclusions

By studying and discussion the result of the experiment it is clear to us that the ethanolic extract of ethanolic argel leaves prolonged the shelf life of orange fruits. On the other hand it is obvious to us that the optimum concentration of the extracts 50%-25% were much more effective.

Citrus senensis (L) osbeck(prosp maxima x reticulate) sweet orange plant
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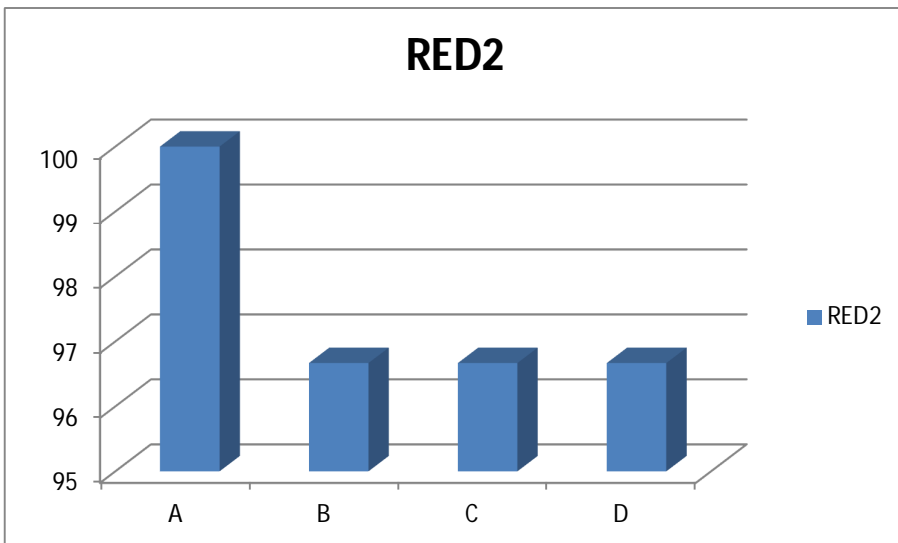
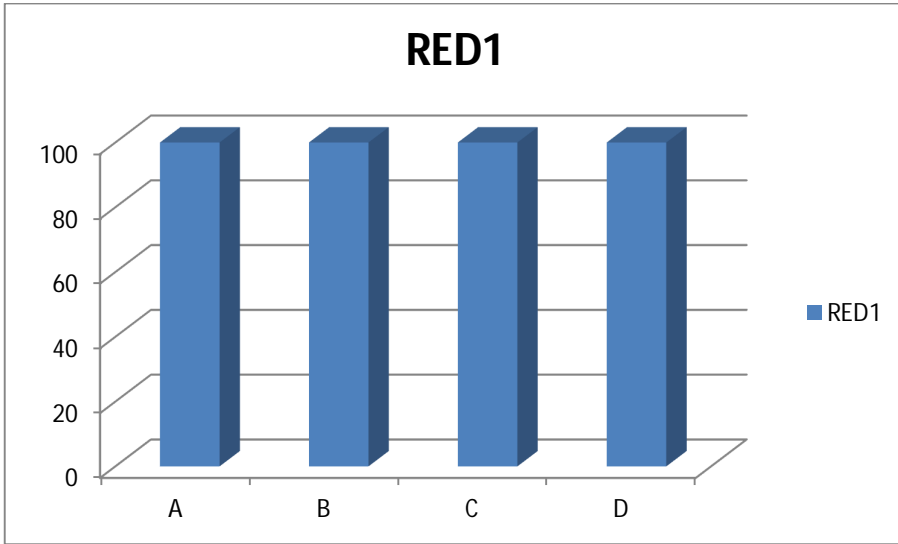
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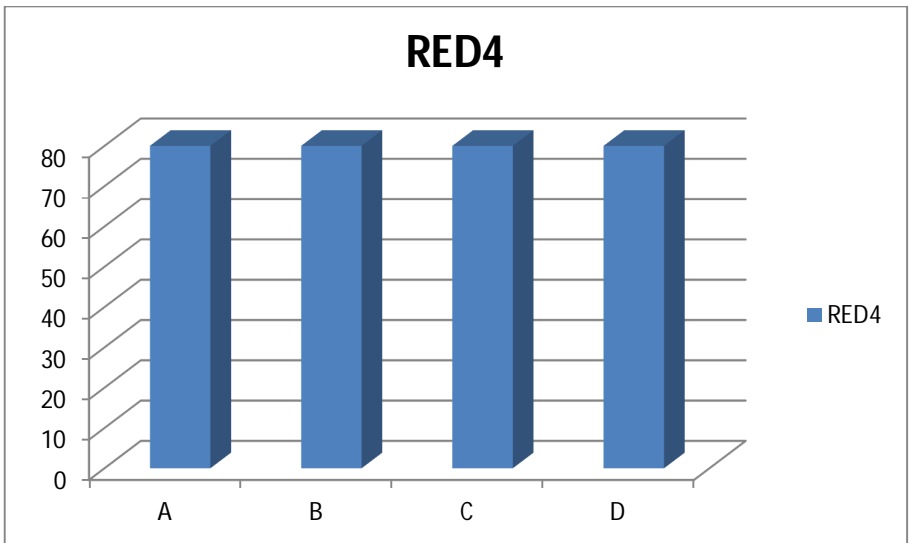
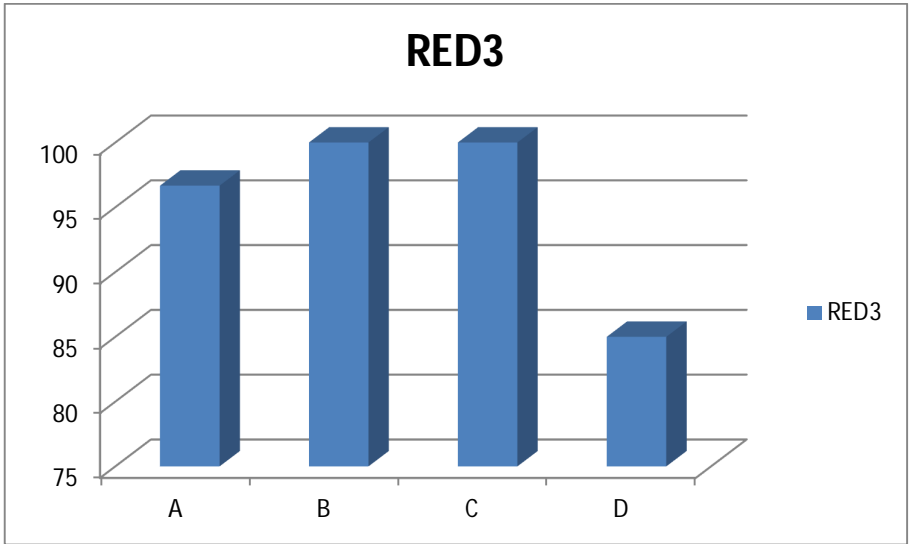
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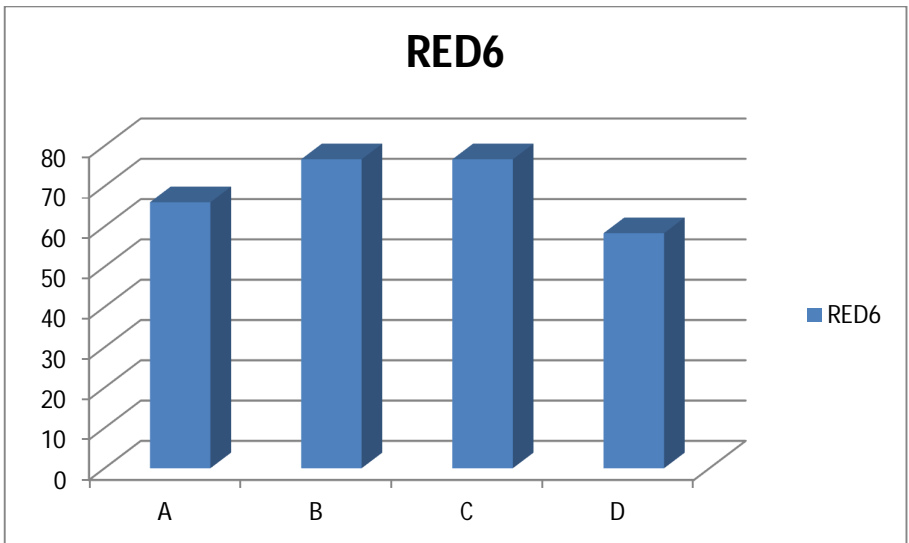
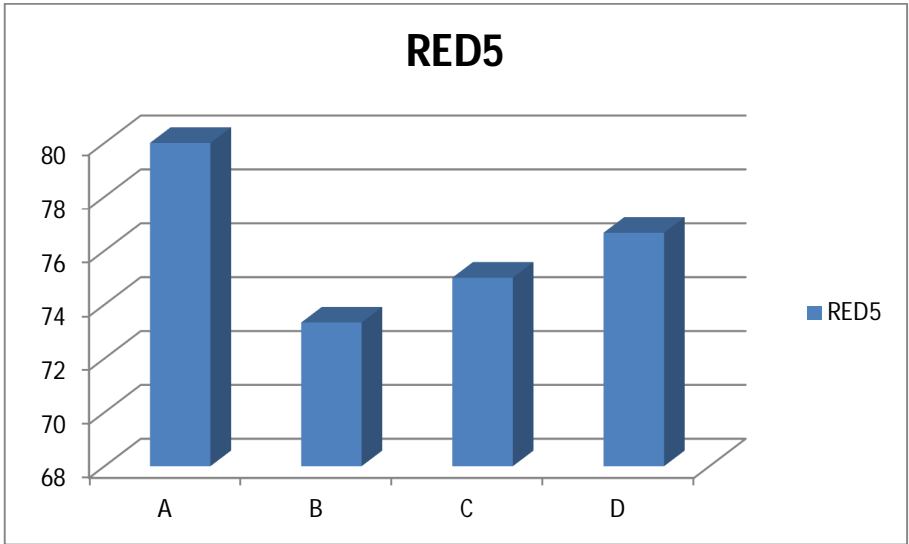
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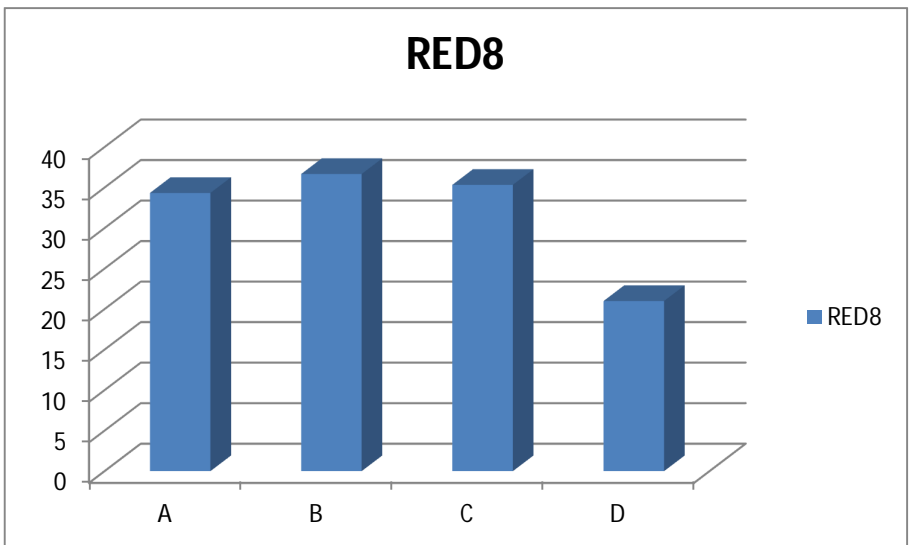
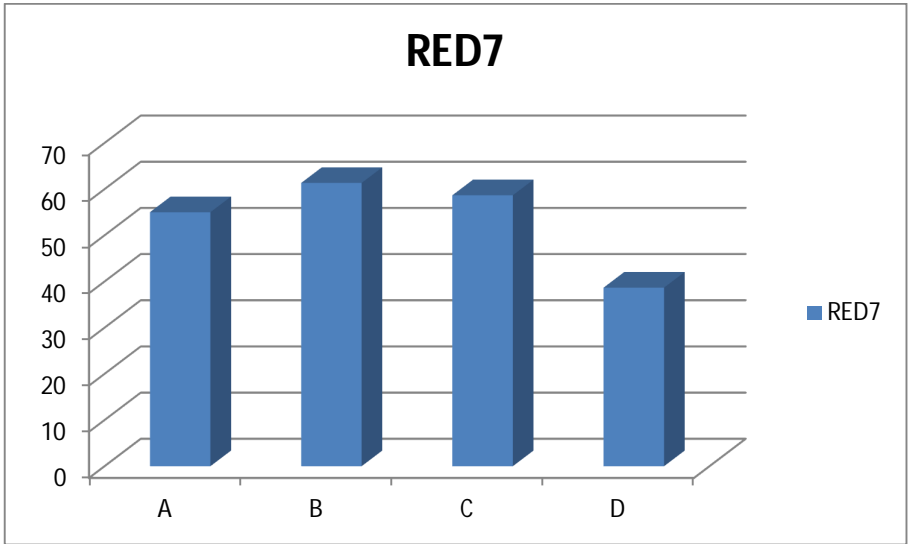
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Appendices

Descriptive Statistics

	RED2	RED3	RED4	RED5	RED6
N		12	12	12	12
Missing		0	0	0	0
Sum		1170	1145	960	915
Mean		97.500	95.417	80.000	76.250
SD		4.5227	6.8948	14.302	69.417
Variance		20.455	47.538	204.55	12.271
SE Mean		1.3056	1.9903	4.1286	11.774
C.V.		4.6386	7.2260	17.877	150.57
Minimum		90.000	85.000	60.000	138.63
Maximum		100.00	100.00	95.000	16.093
					16.961
					60.000
					50.000
					90.000
					90.000
		RED7	RED8	RED1	
		N		12	12
		Missing		0	0
		Sum		641	382
		Mean		53.417	31.833
		SD		9.5199	7.5177
		Variance		90.629	56.515
		SE Mean		2.7482	2.1702
		C.V.		17.822	23.616
		Minimum		38.000	18.000
		Maximum		64.000	100.00
				40.000	100.00
				100.00	