

## **Effect of Triggrr Applications on Snap Bean and Squash Fruit Quality**

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### **ABSTRACT :**

Sea weed extracts have been reported to contain cytokinins. In order to study their effects on vegetable growth and fruit quality, Triggrr<sup>™</sup>, a commercial product manufactured from sea weed, was used in this experiment. The product was applied on snap bean *Phaseouls vulgaris* L. and squash *Cucurbita pepo* L. Seeds at the rates of 2,4 and 8g/kg. Data recorded on fruit weight, size, % dry weight and total soluble solids of fruits revealed that Triggrr application using the above concentrations had no significant effect on snap bean and squash fruit quality.

**Key words :** Triggrr<sup>™</sup>, Cytokinins, Fruit quality, Snap beans and squash,

### **INTRODUCTION**

There are many reports cited regarding the effect of foliar application of commercially extracted seaweed to vegetable crops. "Cytex", "Triggrr", "Burst" and "Maxicrop" are some of the commercial products available in the market. The reports include increased nutrient uptake, resistance to fungal diseases, reduced incidence of insect attacks, higher yields, better quality products and increased shelf-life (Hankins and Hockey, 1989).

Cytokinins have a wide range of biological activities, including stimulation of cell division, initiation of shoot meristem formation, retardation of senescence and induction of pigment synthesis (Teutonico et. al. 1990).

Although seaweed extract products are reported to contain

cytokinins, there is no direct evidence for their stimulation of any of the above mentioned processes. Senn and Skelton, (1966) found that seed treatment of several species with sea weed extract, even at low concentrations, accelerated greatly the respiratory activity of the seeds, however, the higher the concentration rate of the extract, the higher was the rate of respiratory activity.

The hypothesis behind the use of cytokinin applied exogenously to plants is that there is an evidence that endogenous cytokinins vary in their concentration in response to stress applied to their root systems such as salinity and extreme temperatures. These factors predominate in arid conditions of the United Arab Emirates. Indoll et al. (1989) found that water deficit generally caused a reduction in concentration of endogenous cytokinins in roots, leaves and xylem exudate.

Seeley, (1990) found that stress during spring and summer due to root growth cessation, nutrient deficiency, drought, high evaporative demand, high root and shoot temperature, high radiation levels, low relative humidity and full leaf canopies resulted in shoot growth cessation due to low levels of phytohormones including cytokinins. In addition, cytokinins tend to induce femaleness in several species and are very likely to be involved in the early stages of fruit development (Thomas and Blakesley, 1987).

The purpose of this experiment was to study the effects of a cytokinins product (Tigrr) on fruit quality of snap beans and summer squash and to determine the optimum concentration of this product for seed treatment in order to increase marketable fruits and to produce more favourable fruits for local markets.

## MATERIALS AND METHODS

Seeds of snap beans and squash were sown at the Faculty of Agricultural Sciences' Farm at Al-Oha, Al-Ain (Latitude 24° 15', Longitude 55° 45' and altitude 306.1m above sea level) during the autumn seasons of 1990/1991. Plants were grown in a sandy soil (type torripasments with 92% sand, 5% clay and 3% silt and a pH of 8.7) under the following cultural practices :

- 1 Seeds of snap beans (*Phaseolus vulgaris* L.) cv. "Eagle" were sown 10 cm apart in beds, 160 cm wide. Total plot area was 28.8 m<sup>2</sup> in the first season but reduced to 14.2 m<sup>2</sup> in the

second season. Each plot contained 4 rows. Data recorded for the two consecutive seasons included; fruit length, number of fruits per kg, fruit size ( $\text{cm}^3$  by immersing fruits in water and measuring volume of the displaced water), fruit dry weight (by drying samples in the oven at  $75^{\circ}\text{C}$  for 50 hr) and total soluble solids (T.S.S.) using a hand refractometer.

2. Seeds of squash (*Cucurbita pepo*) cv. "Clarita" were sown 40 cm apart in beds 240 cm wide. Plot area was  $43.2 \text{ m}^2$  in the first season but reduced to half in the second season in order to obtain favorable fruit size and weight for the local consumer. Squash fruits were harvested every other day for 30 days. A sample of 120 fruits from each treatment was used to measure fruit weight, fruit size and T.S.S. as described for snap beans.

Seeds of both crops were treated with seed Triggrr<sup>tm</sup> (contains 0.004% cytokinin as kinetin based on bioassay) obtained from Westbridge, San Diego, CA. using concentrations of 2,4 and 8 g/kg seeds in addition to the control. A completely randomized block design with four replications was used. Plot area contained 4 rows.

Equal and optimum quantities of irrigation water by rate of 4 L./hr were applied daily for two hours during the growing season, and a 20:20:20 soluble used fertilizers were applied to the field plots by fertigation. Other agricultural practices such as weed management and pest control were performed as commonly followed in Al-Oha district. Data were analyzed statistically and treatment means were compared using the least significant difference L.S.D. multiple comparison method. Differences were at the  $P > 0.05$  level.

## RESULTS AND DISCUSSION

### Squash

In the first season (1990/1991) the concentration of 8g Triggrr/kg of seeds gave significantly higher values for both fruit weight (148.17 g) and fruit size ( $149.63 \text{ cm}^3$ ), however, there was no significant effect on T.S.S. (Fig. 1). During the second season, 1991/1992 fruit weight, fruit size and T.S.S. were not

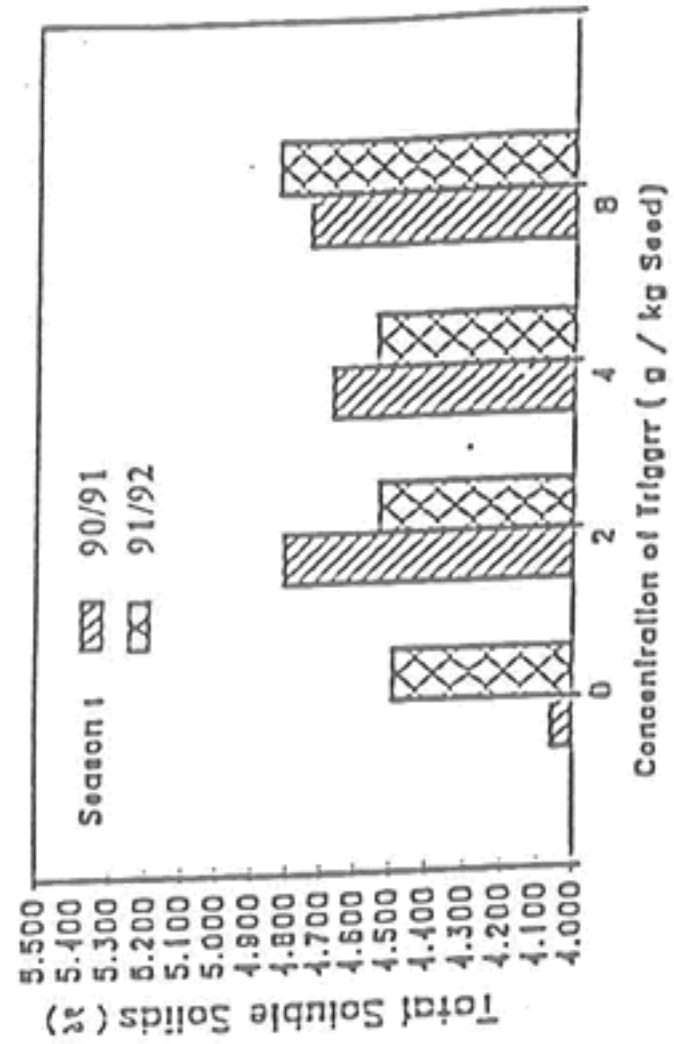
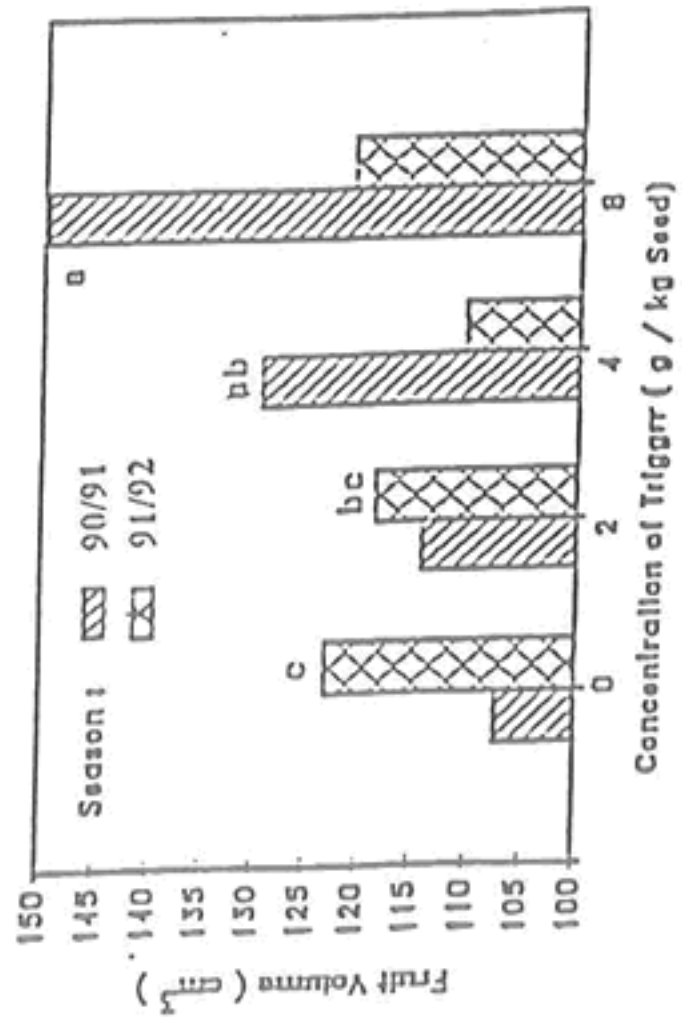
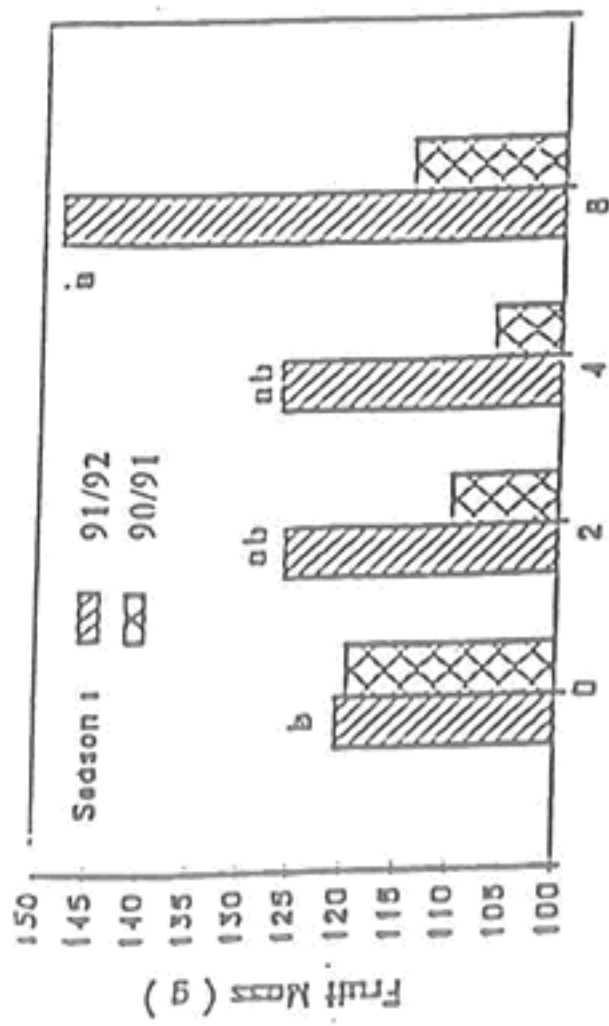


Fig 1. Effect of Triggrr™ seed treatment on some fruit characteristics in Squash.

cation of Trigr (Fig. 1). However, there were significant differences among treatments for fruit dry weight specially at the concentration of 4 g/kg which gave the highest value (Fig. 3).

### Snap bean

In the first season (1990/1991), no effect was observed for Triggrr seed application on fruit length, fruit volume or T.S.S. content (Fig. 1), however, there were significant differences among treatments for number of fruits/kg by which at concentration of 8 g Triggrr/kg seeds gave the highest value (Fig.2).

In the second season (1991/1992), the effect of Triggrr appeared only on fruit size and length where the concentration of 8 g Triggrr/kg seed gave the largest fruit size; and 4 g/kg seed treatment gave the longest fruits. T.S.S. and number of fruits /kg showed no significant differences among treatments (Fig. 2). Results in Fig 3 show that there was no effect of Triggrr on fruit dry weight in snap bean.

The lack of a trend between the results of the two seasons may be attributed to differences in concentration of cytokinins in different samples of sea weed extract used and may be due to the shift to a new field location in the second season.

Cytokinins increased nutrient uptake (Atken and Senn, 1965), improved resistance to diseases and induced better lateral root development (Blunden and Widgoose, 1977). Morrison and Salk (1990) concluded that the mechanism through which foliar Triggrr influences plant growth and yield include increased rates of leaf initiation, stimulation of cell growth and possibly increased rates of cell division.

It could be concluded that the effect of Triggrr as a Cytokinin seed treatment had no significant effect on fruit quality of squash and snap beans . Thus, searching for new products to improve fruit quality for better marketing ought to be investigated.

### **ACKNOWLEDGEMENT**

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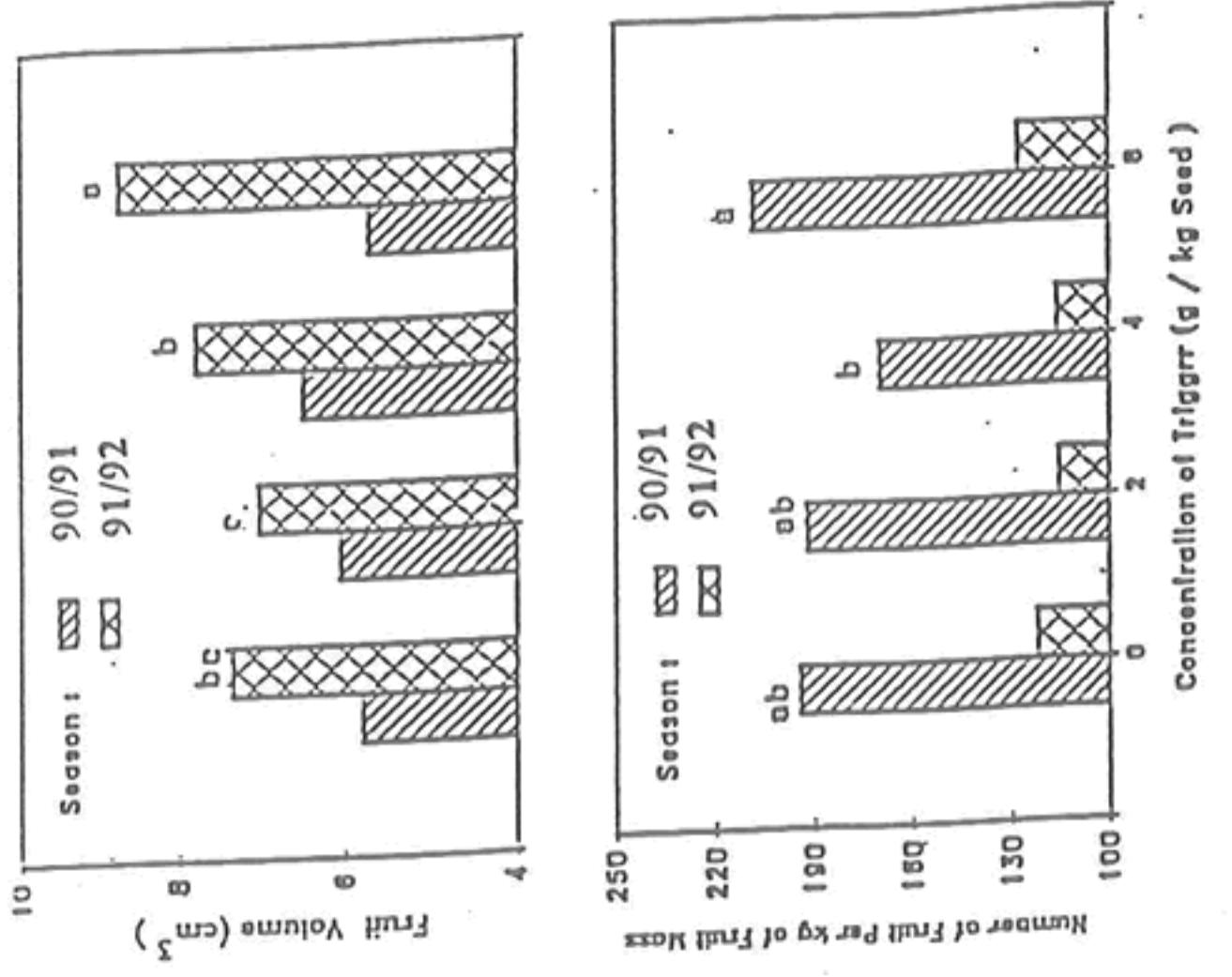


Fig 2. Effect of Triggrr™ seed treatment on some fruit characteristics in Snap Beans

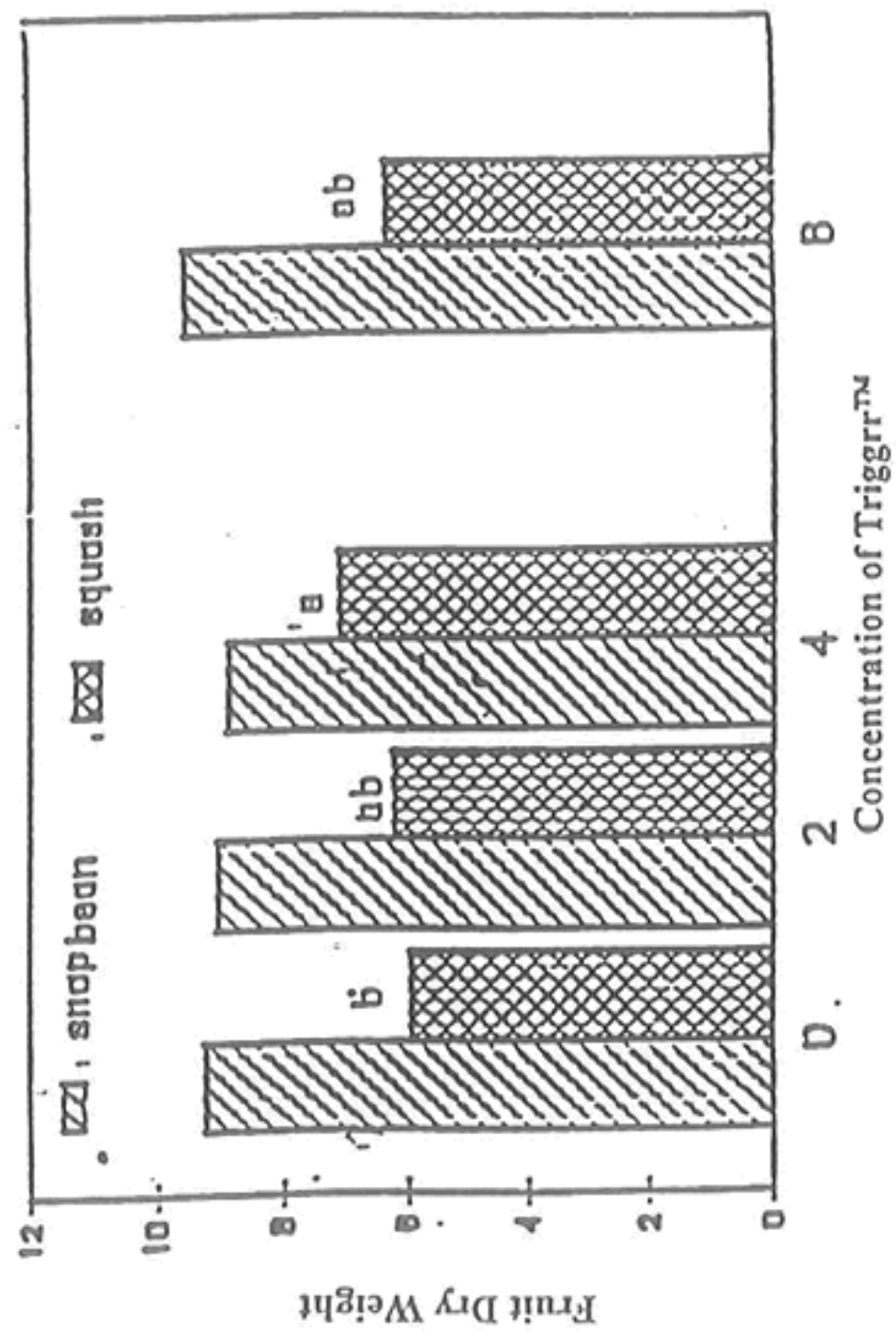


Fig. 3. Effect of Triggrr™ seed treatment on fruit dry weight of Squash and Snap Beans.

Gharib who collected some data for this experiment.

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## إستخدام مادة التريجر وتأثيرها على جودة ثمار الفاصوليا والكوسا

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### ملخص :

أفادت الدراسات أن مستخلص الأعشاب البحرية تحتوي على السيتوكينينات . ولدراسة تأثير هذه المادة على نمو وجودة محصول الفاصوليا والكوسا تم استخدام المادة التجارية ( تريجر ) والمستخلصة من الأعشاب البحرية ( تحتوي على ٤٠ ر . من هرمون السيتوكينين ) في إجراء هذه التجربة تحت ظروف دولة الإمارات العربية المتحدة . حيث تمت معاملة بذور الفاصوليا والكوسا بمعدلات ٢ ، ٤ و ٨ جم/كجم من البذور .

وتمت دراسة وزن الثمار ، حجمها ، نسبة المادة الجافة ومجموع المواد الصلبة الذائبة فيها ، ودلت النتائج أنه لم يكن لهذه المادة تأثيراً معنوياً على الصفات المدروسة .

كلمات مفتاحية : تريجر ، السيتوكينينات ، نوعية الثمرة ، الفاصوليا ، الكوسا.