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Effect of triacontanol on biochemical attributes and yield of sesame (*Sesamum indicum* L.)

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Abstract

Triacontanol (TRIA: Miraculan a result of D Nosil) a functioning development substance, a part of epicuticular waxes of alfa-alfa (*Medicago spit: Chibnall et al. 1933*). Which at low focuses expanded the development and yield of oil yielding harvest sesame. Miracuian expanded chlorophyll, carotenoid dry weight and grain yield by foliar application during preflowering, blossoming and post blooming stages at various focus levels (2, 4, 6, 8 and 10 ppm). Among all the concentrations applied 2 ppm was seen as successful and development advancing than different focuses and control. TRIA favours Yield due to enhanced availability of organic precursors resulting from increased photosynthetic efficiency.

Keywords: triacontanol, biochemical attributes and *Sesamum indicum* L

1. Introduction

Oil seed crops occupy an important place in agricultural economy of India constituting the main commercial crops and the second agricultural crops to the food grains in acreage, tonnage and value. There are about nine important cultivated oil-seed crops, out of which safflower, sesame and mustard forming important group. Oil seed provide vegetable oil which is not only the essential part of human diet but also serves as an important raw material for various industrial products.

Indian oilseed's yield are around half of the world average and almost one- third that of the leading producers in the world. Besides this oil seeds constitute a significant place in India's national economy contributing about 6% of the national income and their products earn valuable foreign exchange for the country. The cultivation of oil seeds provides employment to about 14.5 Million persons in different activities of marketing and processing.

Oil seeds are the main source of vegetable fat as well as cheap and rich source of protein in predominantly vegetarian diet of people all over the world. Per capita availability of fats and oils has slid down recently. The availability is only 1/5th of the optimum nutritional standard of 16 kg per capita per annum advocated by the food and agriculture organisation of the United Nation. The developed countries viz. U.K. and Germany consume 14.0 and 25.1 kg of vegetable oil per head per annum, respectively.

The vegetable oil not only forms the essential part of human diet but also serve as an important raw material for the agro based industries and the manufacture of various other sophisticated products. Another important product obtained from oil seeds is oil cake which is used for livestock feeding on one hand and used as manure in the farming on the other.

Growth and development of the plants are controlled by two sets of internal factors (other than genetic) namely nutritional and hormonal. Nutritional factors supply the plant with organic substances such as carbohydrates, proteins, lipids and necessary mineral ions etc. which constitute the raw materials for growth. However, utilization of these substances for a balanced and coordinated development of the plant body is controlled by certain 'chemical messengers'. These chemical messengers are referred to as plant growth regulators. Exogenous application of these regulators to the plants is being tried during recent time to exploit the crop production potentials to the maximum. Exogenous application of growth regulators is conventionally being tried via foliar applications, soil dressings and in addition to the seed dressing via presowing soaking treatments.

The effect of triacontanol manifests itself in enhanced uptake of nutrients, elevated photosynthesis and augmented biomass and yield in several agricultural crops.

Sesame (*Sesamum indicum* L.) is a bloom bearing every year developed oil crop under the group of Pedaliaceae.

The world collected about 4.76 million metric huge amounts of sesame seeds in 2013 and the biggest maker was Burma. The world's biggest exporter of sesame seeds was India and Japan was the biggest shipper since they use sesame seed in pastry kitchen industry. The nutritive estimation of sesame is phenomenal because of the most steady vegetable oils, with long timeframe of realistic usability, the elevated level of common cell reinforcements: sesamin, sesamol, and sesamol which hinder the advancement of rancidity in the oil. The flour that remaining parts after oil extraction is called sesame supper which is an incredible high-protein feed for poultry and animals.

As indicated by development and creation it possesses third situation as an oil crop in Bangladesh followed by rapeseed and mustard. By and by, Bangladesh faces an intense deficiency of eatable oil because of inadequate creation of cooked oil in the nation. Our creation just guarantees 4 g of oil for each individual while each man can devour 10 g of oil day⁻¹, demonstrates that additional 6 g included through import from other oil delivering nations. Independently, it has been suggested that a grown-up ought to devour 22 g oil day⁻¹ for better wellbeing. Accordingly we are encountering 70% shortage of eatable oil till to date. To satisfy up the need of consumable oil we are burning through 160 million US dollar consistently.

Sesame is one of the most significant oil crops in Yield of Sesame with 1-Napthalene Acetic Acid (NAA) Bangladesh and developed in all areas. In the time of 1999-2000, the yield secured a territory of 96000 sections of land in Bangladesh with creation of 25000 M tons. Late BBS (2013) [7] announced that 84310 sections of land of land developed for sesame and creation was 30972 metric tons. Along these lines, these information recommend that in spite of the fact that the place that is known for development of sesame is diminishing while the creation is expanding pattern from 1999 to 2013. Be that as it may, in a perspective on populace

development, the prerequisite of consumable oil is expanding with high popular than the creation. It is in this manner, profoundly expected that the creation of consumable oil ought to be expanded impressively to satisfy the expanding request.

Material and Method

The oil seed crops occupy an important place in agricultural economy in India, contributing about 6% of the national income and their products earn valuable foreign exchange for the country. There are about nine important cultivated oil seed crops commonly grown in India viz., groundnut, mustard, safflower, sesame, sunflower, castor, niger, linseed and cotton. Oil seeds are the main source of vegetable fats as well as cheap and rich source of protein in predominantly vegetarian diet of people all over the world. The vegetable oil (drying and semidrying oil) not only form the essential part of human diet but also serves as an important raw material for industries and in manufacturing of various other products.

By virtue of their unique chemical composition made from glycerol and fatty acids, they offer a great scope in meeting the nutritional requirements of the population. Due to their potential and utility in human diet, a study was carried out to check their responses against application of Triacontanol (Natural PGR) on different morphophysiological and biochemical parameters.

Oil content in seeds was measured according to Soxhlet's extraction method. In which 5 gm. seeds were crushed with a pinch of CaCO₃ and this mixture was placed in Soxhlet's apparatus and was digested. In the digestion chamber of Soxhlet's apparatus, sufficient amount of petroleum ether was placed in lower flask temperature was adjusted according to the boiling point of petroleum-ether. The apparatus was connected with a condenser. The oil was extracted at least for two or three hours then the flask was taken out. The material was dried in a heating chamber and amount of the oil was expressed as mg/g dry weight of tissue/seeds.

Table: Effect of Triacontanol on Oil seed crop Sesame (All the data are average of three replicates)

Conc. (ppm)	Yield/Plant (g)	Weight of 100 Seeds (g)	Number of Fruits/Plant	Number of Seed/Siliquae
Con.	14.86 ± 0.05	0.31 ± 0.35	81.67 ± 0.33	58.88 ± 0.52
2	22.25 ± 0.32	0.53 ± 0.69	90.33 ± 0.24	67.07 ± 0.34
4	21.77 ± 0.24	0.42 ± 0.35	88.66 ± 0.26	64.13 ± 0.42
6	19.47 ± 0.24	0.40 ± 0.45	86.33 ± 0.13	62.08 ± 0.35
8	17.73 ± 0.35	0.35 ± 0.35	84.15 ± 0.23	60.67 ± 0.42
10	16.08 ± 0.12*	0.33* ± 0.32	83.33* ± 1.22	59.20* ± 0.32
CD at 5% Level	1.26	0.22	0.87	0.33

Conc.: Concentration, *: Non-Significant, Con.: Control

All the data collected on growth, productivity and biochemical attributes were subjected to statistical analysis of variance subjected to randomised block design as described by Panse and Sukhatme (1985) [8].

Results & Discussion

The outcome got from the perception taken during the investigation of Sesame on development, profitability and biochemical boundaries in oil seed crop (Sesame).

TRIA is a constituent of plant wax and regulates the metabolic pathway. The effect of TRIA enhanced the uptake of nutrients, increased photosynthesis and yield in many agricultural crops. From the findings of this experiment, it is clear that oil seed crops responded to the treatment of miraculan as foliar spray. As it is clear from the observations

that exogenously applied miraculan significantly improved the biochemical attributes and yield parameters. In present studies, the Chlorophyll and Carotenoids contents significantly increased with lower concentrations and 2 ppm was the most effective concentration. It also improve fertilization process leading to increased number of seed per fruit.

Conclusion

Triacontanol or TRIA was first identified in early 1933 as a natural component of plants by Chibnall, *et al.* in alfa-alfa meal. Were first to isolate a crystalline colourless substance from the active fraction of alfa-alfa meal. The Oil-seed crops involve a significant spot in agricultural economy of India comprising the primary business crops and the second rural

harvests to the food grains. There are around nine significant developed oil-seed crop, out of which sesame are significant ones. Oil seeds are the primary wellspring of vegetable fat. The vegetable oil isn't just structure the fundamental piece of human weight control plans yet additionally fill in as a significant crude material for the agro based businesses and the producer of different other modern items. Another significant item from oil-seeds is oil cake, is utilized for animals taking care of and as compost in the cultivating. The above study show, Miraculan with lower concentrations is beneficial to photosynthates to growing fruits and seeds and in turn better Yield.

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