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# Effect of Foliar Application of Growth Hormones (IAA And $GA_3$) on Oil Percentage of Certain Oil Seed Crops

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## ABSTRACT

Experiment was carried out during December 2013 to March 2014 to study effect of IAA and $GA_3$ on oil percentage of Groundnut (TAG-24), Soyabean (JS-335) and sunflower (SS-56). Sowing of seeds was carried out in plots of 1m x 1m. (One for control and 10ppm to 50ppm concentrations of IAA and $GA_3$). Different concentrations (10ppm to 50ppm) of IAA and $GA_3$ were applied twice 30 and 60 days after sowing. After harvesting oil percentage of the oil seeds was estimated using Soxhlet oil extractor. It was found that application of 40ppm and 50ppm $GA_3$ was able to enhance oil percentage in all the oil seeds. In soyabean application of 20ppm and 30ppm $GA_3$ as well as 40ppm IAA was able to increase oil percentage significantly.

**KEYWORDS**- IAA, $GA_3$, Oil percentage, Soxhlet oil extractor.

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## INTRODUCTION

India is a country where main profession is Agriculture. In India variety of crops are sown, oil seeds contribute about fourteen percent of the total area under cultivation in India. India occupies prominent position both in area under cultivation and in production of oilseeds. India is the fourth largest edible oil economy in the world and contributes about ten percent of the world oil seed production. The growth in the domestic production of oilseeds has not been able to keep pace with the growth in the demand in the country. Groundnut, Soyabean and Sunflower are among the major nine edible oilseeds in India.

Auxins and $GA_3$ are important growth hormones in plants. Besides regulating growth plant hormones affect seed germination, growth, time of flowering, sex of the flowers, senescence of leaves fruits etc. They also affect fruit development, fruit ripening, plant longevity, fruit quality and even plant health [1,2,3] Most of the workers have studied effect of growth regulators on seed germination [4,5,6,7] and morphological or yield parameters [8,9,10] Present work highlights on the effect of two important growth hormones on the oil percentage of three important oil yielding crops Groundnut, Soyabean and Sunflower.

## MATERIALS AND METHODS

A Stock solution of 100 ppm $GA_3$ and IAA was prepared by dissolving 500mg into 500 ml of water (Before preparation of Stock solution $GA_3$ it was dissolved in small quantity of alcohol). It was diluted to prepare 10ppm, 20ppm, 30ppm, 40ppm and 50ppm IAA and $GA_3$.

To study effect of growth hormones on oil percentage plots of 1meter X 1meter (Three rows containing 11 plots each) were prepared. Seeds of Groundnut (TAG-24), Soyabean (JS-335) and sunflower (SS-56) were sowed in three separate rows with recommended spacing on 21 December 2013. Application of growth hormones was carried out twice first 30 days after and second 60 days after date of sowing. Spraying of growth hormones was carried out early in the morning with hand spray. Among eleven plots for a crop one was kept as control, ten plots were applied with gradually increasing (10ppm to 50ppm) concentration of IAA and $GA_3$. All the parameters except application of growth hormones were kept Constant.

Oil percentage was estimated using Soxhlet oil extractor after harvesting the crop.

***Statistical Analysis***- The mean, standard deviation (SD) and coefficient of variation ( CV) has been calculated as described by Mungikar [11] SE was calculated as S.D. / $\sqrt{n}$ ( n = number of

observations), and Critical difference (CD) was calculated as S.E. multiplied with t value for n-1. (C.D.= S.E. x t value for n-1).

## RESULT AND DISCUSSION

When groundnut was applied with different concentrations of $GA_3$ and IAA individually oil percentage was influenced by higher concentration of $GA_3$ (40ppm and 50ppm) and IAA (50ppm). Lower concentration of $GA_3$ and IAA has no significant effect to increase oil percentage of seed. 10ppm IAA and $GA_3$ showed decrease in the oil percentage which was non-significant. Maximum oil percentage was found in seeds of the plant treated with 50ppm $GA_3$ that was 39.1% thus 50 ppm $GA_3$ increased oil content of groundnut seed by 9.8%.

When soyabean was applied with different concentrations of $GA_3$ or IAA oil percentage was increased. $GA_3$ is more effective to increase oil percentage in Soyabean. Except 10ppm $GA_3$ all treatments of $GA_3$ showed increase in the oil percentage which was statistically significant. Maximum oil percentage was found in seeds of the plant treated with 50ppm $GA_3$ that was 15.8% thus 50 ppm $GA_3$ increased oil content of Soyabean seed by 21.5%. Same results were found by Travaglia[12].

When sunflower was applied with $GA_3$ or IAA individually oil percentage was influenced by higher concentration of $GA_3$ (40ppm and 50ppm) and 20ppm IAA. Lower concentration of $GA_3$ has no significant effect to increase oil percentage of sunflower seed. 30ppm IAA showed decrease in the oil percentage which was non-significant. Other treatment showed non-significant increase in the oil percentage. Maximum oil percentage was found in seeds of the plant treated with 50ppm $GA_3$ that was 34.3% thus seeds of Sunflower plants applied with 50 ppm $GA_3$ showed 15.5% increase in the oil content in sunflower than the seeds of control plant. The results are more promising than those recorded previously[13] which showed no significant change in the oil content in Sunflower due to application of plant growth regulators.

**Table 1 - Influence of different concentrations of growth hormones (IAA and GA3) on oil percentage of oil yielding crops**

| Treatment | Oil percentage | | |
|---|---|---|---|
| | Groundnut | Soyabean | Sunflower |
| Control | 35.6 | 13 | 29.7 |
| GA 10ppm | 35.4^ | 13.2^ | 29.7^ |
| GA 20PPM | 35.7^ | 13.6* | 29.9^ |
| GA 30PPM | 36.1^ | 14.2** | 30.5^ |
| GA 40PPM | 37.3** | 14.9** | 31.6** |
| GA 50PPM | 39.1** | 15.8** | 34.3** |
| IAA 10PPM | 35^ | 13.2^ | 29.8^ |
| IAA20PPM | 35.8^ | 13.1^ | 28.7* |
| IAA30PPM | 36.1^ | 13.5^ | 29.3^ |
| IAA40PPM | 36.3^ | 13.6* | 29.6^ |
| IAA50PPM | 36.7** | 13.5^ | 30.2^ |
| Mean | 36.3 | 13.8 | 30.3 |
| S.D. | 1.1 | 0.9 | 1.5 |
| C.V. | 3.1 | 6.3 | 5 |
| S.E. | 0.3 | 0.3 | 0.5 |
| C.D. 5 % | 0.8 | 0.6 | 1 |
| C.D. 1 % | 1.1 | 0.8 | 1.4 |

**(* Significant at p=0.05; ** Significant at p=0.01; ^ Non-significant )**

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