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Influences of Long Chain Alcohols on Fruit-Set and Seed Development in Pea *(Pisum sativum)*

By

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Summary

SETIA, R. C., SETIA, N. & MALIK, Ch. P. 1986. Influences of long chain alcohols on fruit set and seed development in pea *(Pisum sativum).* – Phyton (Austria) 26 (1): 73–75. English with German summary.

A mixture of long chain alcohols applied to pea plants as a foliar spray caused a significant increase in number of pods per plant, number of seeds per pod, fresh weight and dry matter per hundred seeds of pea *(Pisum sativum).* The levels of total soluble sugars, starch and protein were also higher in treated seeds.

Zusammenfassung

SETIA, R. C., SETIA N. & MALIK Ch. P. 1986. Der Einfluß langkettiger Alkohole auf Fruchtansatz und Samenentwicklung bei der Erbse *(Pisum sativum).* – Phyton (Austria) 26 (1): 73–75. – Englisch mit deutscher Zusammenfassung.

Eine Mischung langkettiger Alkohole, als Blattspray Erbsenpflanzen appliziert, bewirkt eine signifikante Erhöhung der Hülsenzahl pro Pflanze, der Zahl der Samen pro Hülse und des Frisch- wie Trockengewichts pro 100 Samen. Auch der Gehalt an löslichen Zuckern, Stärke und Protein war in den Samen behandelter Pflanzen höher.

(Editor transl.)

1. Introduction

Crop productivity is dependent upon some yield criteria such as number of seeds per plant, seed size and weight of reserves in the seed meal. Each of these traits is genetically controlled but influenced by several factors including growth substances. Recently growth promoting effects of fatty

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alcohols, especially triacontanol, have been reported (REISS & al 1978, MENON & SRIVASTAVA 1984). We investigated the effects of a mixture of long chain alcohols – hexacosonal, octacosonal, triacontanol, doctriacontanol, tetracontanol and hexatriacontanol (commercially available as "Paras", obtained from Hindustan Lever Ltd., Bombay, India), on some growth and biochemical parameters of pod and seed development in pea (*Pisum sativum* L. cv. Boneville).

2. Material and Methods

Pea plants, raised on the experimental area of this department in small plots in a randomized block design in three replicates, were foliarly sprayed with "Paras" (1 μg/ml) after 30 days of sowing, followed by two more sprays at ten days interval. At maturity the data on the parameters indicated in Tables 1 and 2, were recorded from twenty plants picked up randomly from each replicate. Seeds were analysed for total soluble sugars, starch and free amino acids (MINAMIKAWA 1979) and protein nitrogen (PIPER 1966).

3. Results and Discussion

Table 1 shows that "Paras" treatment caused increase in the number of pods per plant and number of seeds per pod over the control by 12.7 and 23.4 per cent, respectively. This indicated an improvement in fruit-set. Similar results were obtained with triacontanol in tomato and maize by ERIKSEN & al. (1982). Fresh weight and dry matter per hundred seeds also increased by 17.4 and 6.2 per cent, respectively, with "Paras" treatment (Table 1). In

Table 1

Effects of "Paras" on some growth parameters of Pea

Growth parameters	Control	"Paras" treated
Pod number/plant	13.3 ± 1.4	15.0* ± 1.3
Seed number/pod	7.5 ± 0.8	8.8* ± 0.6
Fresh weight (g)/100 seeds	32.6 ± 1.4	38.3* ± 2.4
Dry matter (g)/100 seeds	11.2 ± 3.1	11.9 ± 0.8

Each value is a mean of twenty individual readings ± standard error.

* Values significant at 1% level.

treated seeds the levels of total soluble sugars, starch and protein were higher than the control (Table 2). However, free amino acid content remained low in the seeds. Earlier studies have indicated that long chain alcohols improve physiological efficiency of plants by modifying balance between photosynthesis and photorespiration (REISS & al. 1977, ERIKSEN &

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Table 2

Effect of "Paras" on changes in contents of reserve subtances in Pea seeds

Reserve substances	Control	"Paras" treated
Total soluble sugars (µg/seed)	495.3 ± 4.1	531.0 ± 2.3
Starch (µg/seed)	6439.3 ± 12.1	7361.6 ± 20.4
Total free amino acids (µg/seed)	105.7 ± 2.6	92.0 ± 1.2
Protein (%)	30.0 ± 0.3	32.1 ± 1.0

Values represent mean of three replicates ± standard error.

al. 1981), thereby increasing the level of sugars and also facilitating their transport (MENON & SRIVASTAVA 1984). Thus, increased levels of reserve substances in pea seeds due to "Paras" treatment may be attributed to the enhanced diversion of nutrients towards the developing pods which act as primary sinks during reproductive phase. It is quite likely that the increased yield of pea, a C_3 plant, is the result of suppression of photorespiration. Further studies on these aspects are in progress.

4. Acknowledgement

Thanks are due to Hindustan Lever Ltd., Bombay for gift sample of "Paras".

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