

## CHANGE IN CHLOROPHYLL CONTENT AND BIOMASS OF SESAME SEEDLING DUE TO STORAGE OF SEEDS

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A significant difference in Chlorophyll (a,b) was found when seedling raised from seed stored at 71.4% and 80.0% RH. Biomass of the seedling raised from the control seeds increased due to increase in RH level from 52.0 to 71.4% and decreased due to storage at 80.0% RH.

**Keywords:** *Aspergillus flavus*, Biomass; Chlorophyll; Sesame seed; Storage.

### Introduction

The seed deterioration by storage fungi has been shown to result in the suppression of seed germination<sup>1,2</sup>. Involvement of microbial toxin in deterioration of pea seeds have been reported<sup>3</sup> but very few authors have reported the adverse effect of seedborne storage fungi on the seedling, that is retardation of the growth of seedlings<sup>2,3</sup>. The present paper deals with the storage of Sesame (*Sesamum indicum* L.) seed with seedborne *Aspergillus flavus* Link ex Faries, observed with high frequency in association with this cultivar of seeds<sup>4</sup>, at varying RH for one and two months. Estimation of Chlorophyll content, the biomass of the seedling raised from the stored seeds has also been done.

### Material and method

Twenty grams Sesame seeds possessing 98% germinability were surface sterilized with 0.1% HgCl<sub>2</sub> for one minute and were washed four times with sterilized and dry blotting folds. The lot was inoculated with one ml spore suspension of the fungus (1 x 10<sup>5</sup> spores approx/ml sterilized distilled water) cultured on Czapek Dox Agar medium for 10 days at 28°C. It was thoroughly shaken for the uniform dispersal of spores on the seed.

Each lot of the inoculated seeds in triplicate besides uninoculated control was stored for two months separately over saturated salt solutions of magnesium nitrate, sodium nitrate, sodium acetate and ammonium sulphate in sterilized sealed desiccators meant to maintain 52.0, 63.3, 71.4 and 80.0% RH respectively at 30°C<sup>5</sup>. After one and two months of the storage, 20 seeds of the above lots were sown nearly 5 mm deep in the garden soil in five replicates and kept in 10 cm earthen pots previously sterilized at 20 psi for two consecutive days for 20 min. Controlled condition (Temp. 25°C, 12 hr light - 6000 lux, 12 hr darkness, 75-80% RH) of the growth was maintained for 10 days.

Seedling raised from the seeds stored for one and two months were randomly taken and chlorophyll a and b were determined<sup>6</sup>. Similarly ten seedlings from each replicate were cautiously taken, washed and dried at 80°C for 24 hrs and desiccated over fused CaCl<sub>2</sub> for next 48 hrs and weighed.

### Result and Discussion

No difference in Chl-a content of the seedlings raised from the control and inoculated seeds stored at 52 and 63.3% RH separately for one

**Table 1.** Biomass and Chlorophyll content of Sesame seedlings raised from the seeds stored with *Aspergillus flavus*.

Period of Storage (Month)	RH (%)	Biomass (Mean $\pm$ SE)		Chlorophyll Content (Mean $\pm$ SE)			
				Chl a		Chl b	
		C	I	C	I	C	I
1	52.0	32.3 $\pm 0.64$	31.0 $\pm 0.42$	0.08 $\pm 0.00$	0.08 $\pm 0.00$	0.57 $\pm 0.00$	0.58 $\pm 0.00$
	63.3	32.0 $\pm 0.40$	26.3 $\pm 0.64$	0.12 $\pm 0.00$	0.11 $\pm 0.00$	0.75 $\pm 0.00$	0.57 $\pm 0.00$
	71.4	48.0 $\pm 0.40$	22.6 $\pm 0.63$	0.12 $\pm 0.00$	0.10 $\pm 0.00$	0.75 $\pm 0.00$	0.52 $\pm 0.00$
	80.0	34.3 $\pm 0.40$	18.0 $\pm 0.82$	0.14 $\pm 0.00$	0.09 $\pm 0.00$	0.79 $\pm 0.00$	0.44 $\pm 0.00$
2.	52.0	42.3 $\pm 0.84$	20.4 $\pm 0.63$	0.08 $\pm 0.00$	0.06 $\pm 0.00$	0.52 $\pm 0.00$	0.52 $\pm 0.00$
	63.3	37.3 $\pm 1.02$	18.3 $\pm 0.62$	0.08 $\pm 0.00$	0.07 $\pm 0.00$	0.40 $\pm 0.00$	0.34 $\pm 0.00$
	71.4	36.0 $\pm 1.08$	16.0 $\pm 0.82$	0.06 $\pm 0.00$	0.04 $\pm 0.00$	0.55 $\pm 0.00$	0.36 $\pm 0.00$
	80.0	26.0 $\pm 0.62$	- *	0.06 $\pm 0.00$	- *	0.26 $\pm 0.00$	- *

C = Control, I = Inoculated. \* = Seeds failed to germinate.

and two months, was observed but significant difference was found when seeds were stored at 71.4 and 80.0% RH. The amount was more in the former condition while less in the latter. Chl-b content increased due to the control seeds stored from 52 to 74.4% RH but decreased at 80% RH (Table 1). The pigment decreased due to inoculation of the seed and also due to increase in the RH level.

The biomass of the seedlings raised from the control seeds increased due to increase in the RH level from 52.0 to 71.4%

while decreased due to storage at 80.0% RH for one month. This decrease was due to inoculation with the increase in RH level and prolongation of the storage period to two months.

The less availability of the biomass due to storage of the inoculated seeds at 80% RH for one month indicates the detrimental effect of this condition which proved more deleterious when the period is extended to two months. Increase in the biomass of the seedlings raised from the control seeds points

out suitable condition of storage of the seeds while its decreases may result probably due to adverse effect on the growth hormone or its precursor resulting in attenuated growth. The decrease in the biomass may also rest on the toxic effect of the storage fungus disturbing the synthesis of Chl, its precursor or both. The characteristics of the seedlings on forementioned storage condition indicates that the fungus, when coupled with high RH, may alter the seed environment and biochemistry in such a way that the seedlings are physiological crippled and rendered weak apprehendingly on account of secretion of toxic metabolite<sup>7,8</sup>.

The suppressed synthesis of the nutrient due to less magnitude of Chl, loss of the content of the seedlings from the root as excudate<sup>9</sup> and its stimulated respiration may result in less gain in photosynthetic product and there by less biomass<sup>10</sup>.

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