Karnataka J. Agric. Sci.,19 (1): (24-26) 2006

Effect of Delinting, Seed Treatment and Packaging Material on the Change of Composition in Cotton Seed During Storage

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(Received : June, 2004)

Abstract : There was a decrease in oil content and protein content of seed and increase in sugar content with advancement of storage period. The decrease in protein and oil content and increase in EC of seed leachate and reducing sugar was less in the variety Sharada as compared to Laxmi throughout the storage period. Delinted seeds of both the cultivars showed less reduction in protein and oil content and increase in EC of seed leachate and reducing sugar at the beginmng of storage period. The fuzzy seeds were found to be superior at the end of the storage period recording less reduction in the protein and oil content and less increase in the EC of seed leachate and reducing sugar as compared to delinted seeds. Ceresan treated seeds performed better for oil and protein content, EC of seed leachate and reducing sugar as compared to untreated seeds. Further, the seeds treated with ceresan stored in polyethylene bag were found to be superior over seeds stored in cloth bag, with respect to protien and oil content, EC of seed leachale and reducing sugar content.

Introduction

In seed storage, the internal factors such as genetic make up of a variety, carbohydrate, protein, moisture content in seed and external factors such temperature, relative humidity, oxygen pressure, insects and fungi influence the composition of seed. Moisture content of the seed is the most important factor in maintaining the composition of seed. Deterioration of seed in storage is a natural process; but the rate of deterioration in composnion of seed may differ due to genetic factors, cultivar differences, storage environment and period of storage. In the present investigation an attempt was made to study the influence of (delinting, packaging material and seed treatment on chemical composition in two varieties of cotton seeds during storage.

Material and Methods

Seeds of Laxmi and Sharada cotton varieties which were produced at Agricultural Research Station, Hebballi Farm, Dharwad were used as the experimental material. Half the quantity of seeds of Laxmi and Sharada were acid delinted with sulphuric acid (Sp. Gr. 1.84) at the rate of 100ml per kg of seed for one minute, separately. Both fuzzy and delinted seeds were dried to 6.8 to 7.0 per cent moisture content and used for storage studies. The seeds were treated with ceresan (dry dressing @ 2 g/kg of seed). The treated and untreated fuzzy and delinted seeds were packed in cloth bag and polyethylene bag (400 gauge) and stored under ambient conditions from November, 1988 to August, 1989. The experiment was planned in completely randomized design with factorial concept. The quality characters like moisture content, reducing and non-reducing sugars and protein content, oil content, 100 seed weight and EC of seed leachate were assessed bimonthly by adopting the standard procedures in vogue.

Results and Discussion

There was a reduction in the protein content (from 34.38 to 29.73 and 34.40 to 29.88%), oil content (from 20.67 to 18.64 and 20.86 to 18.77%), non-reducing sugar (from 0.087

to 0.043 and 0.094 to 0.046 mg g) and 100 seed weight (from 8.07 to 7.55 g and 8.15 to 7.59 g), respectively in Laxmi and Sharada cotton varieties from November 1988 to July 1989 storage period. This decrease was higher in Laxmi than in Sharada. There was an increase in the content of reducing sugar from 0.290 to 0.554 mg/g in Laxmi and from 0.286 to 0.516 in Sharada variety with advancement in storage period. The reduction in the quality parameters with advancement in storage period may be attributed to the denaturation of protein and enzyme system in the seed, reduction in the oil content, protein content and carbohydrates and increase in the content of free amino and fatty acids (Sankaran, 1976) in the seed.

There was a decrease in the biochemical contents except reducing sugar in seeds as the storage period advanced. This decrease was more pronounced in delinted seeds than in fuzzy seeds. This may be due to increased permeability of seed which might have increased the rate of deterioration of these biochemical contents such as protein content, oil content and non-reducing sugars resulting in increased EC of seed leachate. Increase in the EC of seed leachate and reducing sugar content was also observed as the storage period advanced. Again, this increase was more pronounced in delinted seed than in the fuzzy seed. The change in membrane permeability might have brought deterioration in delinted seed faster resulting in high EC values of seed leachate. High membrane permeability by acid delinting may be the cause for increase in moisture content as compared to fuzzy seed during storage. Such increase in the reducing sugars, EC of seed leachate and free amino acid in the leachate was reported by Surendranath Reddy (1985) who obseIVed that EC, free amino acids and reducing sugars in the leachate increased with storage. Increase in leaching of metabolites due to membrane leakage might have caused decline in the composition of seed (Powell and Mathews, 1978), auto-oxidation of polar lipids of membranes, free radical damage (Basu, 1976), degradation of protiens by activity of hydrolytic enzymes (Ching, 1961). The decrease in seed composition was more in untreated seed as compared to treated seed. In untreated seed, the decrease in oil content was associated with deterioration during storage which probably was due to lipase activity leading to an increase in free fatty acid content (Sharma, 1978). Increase in reducing sugars and EC of seed leachate was more in untreated seed than in treated seed.

During the storage period. the increase in the moisture content of seed stored in cloth bag was found to be higher compared to the seed stored in polyethylene bag. There was an increase in the electrical conductivity of seed leachate and reducing sugars as the storage period advanced. The electrical conductivity values of seed leachate were comparatively less in the seed stored in polyethylene bag as compared to cloth bag. There was a decrease in oil content, protein content, non reducing sugars and 100 seed weight as the storage period advanced in the seed stored in both cloth bag and polyethylene bag. However, decrease was more in cloth bag as compared to polyethylene bag. Similer type of superiority of polyethylene bag over cloth bag was reflected in terms of less decrease in oil content and protein content. These results are in agreement with the reports of Deshpande (1988) in groundnut seed stored for 10 months. From the above discussion, it can be concluded that treated seeds stored in polyethylene bag of 400 gauge thickness had better storability as compared to untreated seeds. The seeds treated with ceresan was able to control storage fungi which usually invade the seed and hasten the process of seed deterioration. Interaction effects between delinting and seed treatment was significant for non-reducing sugars. The results during the early period of storage indicated that delinted seed treated with ceresan gave better quality characters. However, at the end of the storage period fuzzy seed treated with ceresan were found

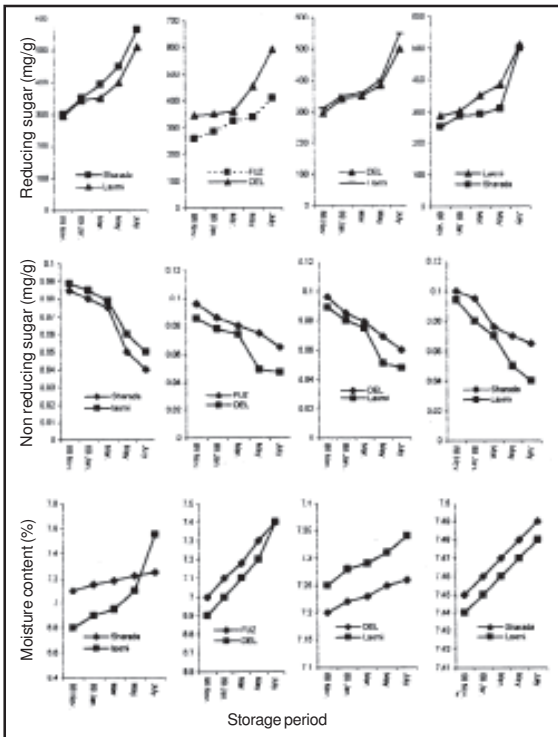

Fig. 1. Change of composition in cotton seeds as influenced by storage period

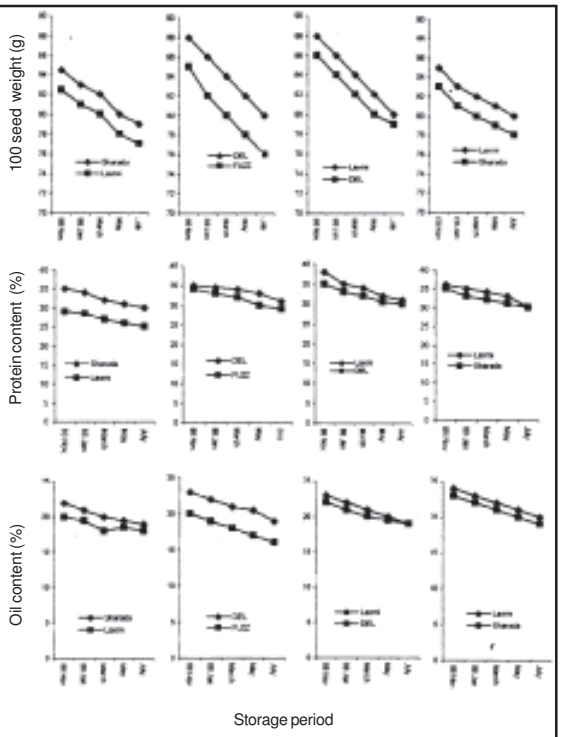

Fig. 2. Change of composition in cotton seeds as influenced by storage period

to be better. Interaction effects among varieties, packaging material, seed treatment and delinting were significant for oil content, non-reducing sugars and EC of seed leachate for few months. Fuzzy seeds of Sharada variety treated with ceresan and packaged in polyethylene bag of 400 gauge thickness was better upto end of storage period.

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