

# Influence Of Seed Coat Colour On Seed Quality In Horsegram

**S.Ezhil Kumar**

Dept of Genetics and Plant Breeding  
Faculty of Agriculture Annamalai University, Annamalai nagar

**Abstract-** An experiment was conducted to study the effect of seed coat colour variation on seed quality parameters in horsegram and the seeds were visually graded in to light brown, brown and cream colour and bulked seed as control. Significant differences were observed among the colour grades for germination, seedling length, vigour index and electrical conductivity. The results indicated that the light brown seeds were superior to other colour grades for all the seed quality parameters.

## I. INTRODUCTION

Horsegram (*Macrotyloma uniflorum* (L.) is an important pulse crop belonging to the family leguminosae, also known as a poor man's pulse and is distributed in southern India. It is drought tolerant crop and fixes atmospheric nitrogen. It is cultivated in areas having the annual rainfall of 300-600 mm and it is susceptible to flooding. The seeds is generally used as cattle feed. The seed, sprout and whole meal can be used by large populations in rural areas (Kanaka, 2012). The seeds are rich in tannins and polyphenols as compared to the other legumes (Kadam and Salunkhe, 1985). It is used as human food, feed, fodder and green manure. It forms the cheap source of vegetable protein, vitamins, calcium and iron and owing to its diuretic property. It is good for patients suffering from urinary and kidney problems. Being a leguminous crop, seed polymorphism has been noticed in the crop with respect to seed coat colour and seed size. The seed polymorphism plays an important role in crop improvement programme since the variability in seed quantitative characters exhibit a direct relation with the seed yield of the crop. Seed colour is a simple and excellent indicator of seed quality. Dharmalingam and Basu (1993) in greengram indicated that off coloured seeds were poor in quality. Kozlowski (1972) also reported about the less vigorous nature of off coloured seeds in alfalfa, due to physiological or pathological disorders. Considering the impact of seed coat colour in various crops, studies were undertaken to trace the effect of seed coat colour on seed quality in horsegram cv. Paiyur 2

## II. MATERIALS AND METHODS

The present study was conducted to ascertain the effect of seed coat colour on seed quality. Seeds of horsegram cv. Paiyur 2 were obtained from pulses breeding station of Tamil Nadu Agricultural University, Coimbatore was used as an experimental material. The seeds were grouped into light brown, brown and cream coloured seeds based on visual observation. Ungraded bulk seeds served as control. The following seed quality characters were recorded viz., germination percentage (ISTA, 1999), seedling root and shoot length, seedling dry matter production, vigour index. (Abdul-Baki and Anderson, 1973).

### Germination (%)

Four replicates of hundred seeds were sown in sand medium and kept under the test conditions of  $25^{\circ} \pm 1^{\circ}\text{C}$  and  $95^{\circ} \pm 3$  per cent relative humidity maintained in a germination room illuminated with fluorescent light. After the test period of seven days the normal seedlings were counted and the mean values expressed as percentage (ISTA, 1999) to the total number of seeds placed for germination.

### Root length (cm)

At the time of germination count, ten normal seedlings were taken at random. The length between the collar and tip of the primary root was measured as root length and the mean length expressed in centimeter.

### Shoot length (cm)

From the ten seedlings used for measuring the root length, the length between collar and tip of the primary shoot was measured as shoot length and the mean value expressed in centimeter.

### Dry matter production (mg 10 seedlings-1)

Ten normal seedlings from the germination test were selected at random, dried in a hot air oven maintained at  $85^{\circ}\text{C}$  for 48 h and cooled in a desiccator for 30 minutes, and weighed in an electronic digital balance. The mean weight was

expressed as dry matter production 10 seedlings-1 in milligram (Gupta, 1993).

### Vigour index

The Vigour index values were computed, adopting the procedure of Abdul-Baki and Anderson (1973) as given below and expressed as whole number.

Vigour index = Germination (%) x Total seedling length (cm).

The field emergence potential was evaluated by sowing 100 seeds in each grade in four rows of 25 seeds each in the raised seed bed. The number of seedlings emerged from the field were counted ten days after sowing in each of the grade and the results were expressed as percentage. The data were analyzed for significance as per Panse and Sukhatme (1999).

### III. RESULTS AND DISCUSSION

Highly significant results were obtained due to seed coat colour for the seed quality characters (Table 1). Seed coat is one of unique genetic factor that varies with crop and sometimes with varieties and seed coat colour as a factor of seed quality (Dharmalingam, 1989; Rajasekaran, 1997 and Vakeswaran, 1998) and related the seed coat colour variation to seed quality variations. The colour variation available in horsegram seed was found to be light brown, brown and cream colour. The germination potential was high in light brown colour seeds (75%) followed by brown colour seeds (71%) and germination of cream colour seed was 62%. Vigour parameters like seedling length, dry matter production and vigour index values also showed similar trend as that of the germination in which the light brown colour seeds were superior to other colour grades. The light brown colour seeds recorded higher speed of germination followed by brown and cream coloured seeds. The untreated seeds (bulk seeds) recorded very low germination and other quality parameters. The maximum value of 72 per cent field emergence was recorded by light brown seeds followed by brown colour seeds (62 per cent) which were on par with each other (Table 1.). Poor seed quality parameters of the cream and bulk seeds of the present study might be due to the senescence or ageing processes of seeds that might had been occurred due to accumulation of poly phenols in the seed coat which lead to the change of seed coat colour. The variation in the seed coat colour due to the accumulation of phenols was also reported by Pathak and Prasad (1988) in sunflower. Among the colour grades, the leachate obtained from light brown seeds recorded the lowest value of 1.45 dSm-1 while cream seeds recorded the highest value of 2.50 dSm-1 might be due to the loss of

semipermeable nature of the deteriorated cell as reported by Vakeswaran (1998) in peas. Apart from the genetic variation of seed colour, the off colour occur either due to the seasonal variations or due to rain or high relative humidity or influence of maturity status of seed or due to onset of ageing. However, the present investigation highlighted that seeds with light brown colour followed by brown colour registered better seed quality characters due to their better stamina in physical, physiological and biochemical phenomenon.

### IV. CONCLUSION

Thus the present study revealed that light brown coloured seeds were better in seed quality characters in horsegram cv. Paiyur 1.

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Table 1. Effect seed coat colour variations on seed quality parameters

Seed colour	Germination (%)	Root length (cm)	Shoot length (cm)	Seedling dry weight (mg)	Vigour index	Speed of germination	Field emergence (%)	EC value dSm <sup>-1</sup>
Bulked seed	44	4.8	4.2	36.7	211.2	4.8	42	2.15
Light brown	75	7.5	6.3	45.3	525.0	6.2	72	1.45
Brown	71	7.0	5.9	40.2	497.0	5.6	68	1.72
Cream	62	6.1	5.4	37.5	378.3	4.9	61	2.30