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# INFLUENCE OF DRYING THE SEEDS AT DIFFERENT TEMPERATURE ON SEED QUALITY OF KM 2 BAJRA HYBRID*

K. VANANGAMUDI[1] and K. R. RAMASAMY[2]

Seed samples when dried at temperatures of 29, 38, 43, 48 and 53±0.5°C showed that (i) the removal of moisture was very fast during the first hour of drying; (ii) the moisture decreased to 9-10 per cent from 24-25 per cent after 24, 9, 6, 4 and 3 hours of drying at drying temperatures of 29, 38, 43, 48 and 53±0.5°C, respectively; and (iii) seeds dried at 38 and 43±0.5°C recorded significantly the highest germination and seedling vigour.

Drying of seeds to bring the moisture content to safe level is important in quality seed production programme. Drying of seed leads to evaporation of moisture from its surface accompanied by the transfer of moisture from its interior to its surface. If evaporation from the seed surface occurs too rapidly, the extreme moisture stress that develops can damage the embryo. The reduction in viability and vigour due to drying of seed at high temperatures has been reported by many workers (Mironenko *et al.*, 1978; Azin *et al.*, 1979). Therefore, seed drying has to be carried out carefully to prevent stress damage (Philpot, 1976).

## MATERIALS AND METHODS

Seeds of KM 2 recording initial moisture content of 24-25 per cent were dried at (i) 38±0.5°C, (ii) 43±0.5°C, (iii) 48±0.5°C and (iv) 53±0.5°C to bring the moisture content to 10±0.5 per cent in Kilburn electric-oven. A portion of the sample was also dried under sunlight (29±0.5°C) as control. The samples after drying were tested for (i) reduction in moisture content (ii) germination (iii) vigour index (iv) germination and seedling vigour after accelerated ageing (Woodstock and Feeley, 1965) and (v) electrical conductivity (Presley, 1958).

## RESULTS AND DISCUSSION

The removal of moisture was very fast during the first hour of drying, and as the time progressed the rate of drying become progressively slow (Table 1). Singh *et al.* (1975) in groundnut and Bhole and Suryanath (1976) in paddy arrived at similar conclusions. At the end of first hour of drying, the reduction in moisture was 1.8, 4.4, 5.2, 8.3 and 8.5 per cent, respectively for drying temperatures of 29, 38, 43, 48 and 53±0.5°C. Kreyger (1963) reported that when the initial seed moisture is high, the rate of drying is faster if the temperature is high. Higher the drying temperature, shorter the time taken for dry-

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1 Assistant Professor of seed Technology TNAU, Coimbatore-3

2 Dean (Agri.) TNAU, Coimbatore.

Table 1. Influence of drying the seeds at different temperature on rate of reduction in seed moisture

| Time (Hrs) | Drying temperature levels (°C) | | | | |
|---|---|---|---|---|---|
| | 29 | 38 | 43 | 48 | 53 |
| 0 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 |
| 0.5 | 23.4 | 22.7 | 21.0 | 19.5 | 19.0 |
| 1 | 22.6 | 20.9 | 19.2 | 16.1 | 15.9 |
| 2 | 21.5 | 18.2 | 17.9 | 13.2 | 12.3 |
| 3 | 20.3 | 15.5 | 15.1 | 13.2 | 0.1 |
| 4 | 19.8 | 14.6 | 11.9 | 9.8 | — |
| 5 | 19.2 | 13.9 | 10.4 | — | — |
| 6 | 18.7 | 13.0 | 9.8 | — | — |
| 7 | 18.1 | 11.3 | — | — | — |
| 8 | 17.7 | 10.8 | — | — | — |
| 9 | 17.0 | 10.1 | — | — | — |
| 12 | 15.0 | — | — | — | — |
| 15 | 13.5 | — | — | — | — |
| 18 | 12.0 | — | — | — | — |
| 21 | 10.6 | — | — | — | — |
| 24 | 9.6 | — | — | — | — |

Table 2 Influence of drying the seeds at different temperature on germination, vigour index and electrical conductivity in KM 2 hybrid seed

| | Drying temperature levels °C | | | | | |
|---|---|---|---|---|---|---|
| | 29 | 38 | 43 | 48 | 53 | CD |
| Germination (%) | 98.0 | 95.0 | 94.3 | 78.7 | 72.0 | 5.7** |
| Vigour index | 3427 | 3113 | 3094 | 2171 | 1897 | 210** |
| *Accelerated ageing test* | | | | | | |
| Germination (%) | 86.7 | 80.7 | 81.3 | 61.3 | 54.7 | 2.6** |
| Vigour index | 2638 | 2242 | 2227 | 1489 | 1279 | 200** |
| Electrical conductivity (Micromhos/cm) | 55 | 61.6 | 63.8 | 68.2 | 74.8 | — |

ing the seed to 9-10 per cent. The seed moisture content decreased to 9-10 per cent from 24-25 per cent after 24, 9, 6, 4 and 3 hours of drying at drying temperatures of 29, 38, 43, 48 and 53 ±0.5°C, respectively.

Drying of seed at higher temperatures significantly affected the germination and seedling vigour (Table 2). The reduction in viability due to drying of seed at too high temperatures has been reported by many workers (Mironenko *et al.*, 1978; Azin *et al.*, 1979). Mironenko *et al.* (1978) suggested that the decrease in germination under high temperature was associated with the state of cell membrane. The activity of glutamate dehydrogenase gets decreased with increase in drying temperature. The activity of X-amylase and protease as well as the soluble protein content decreased greatly at higher temperature resulting in the loss of viability and vigour of seed (Nierle *et al.*, 1978). Seed dried at 38 and 43±0.5°C recorded significantly higer germination and seedling vigour than that dried at 48 and 53±0.5°C . Nierle *et al.*, (1978), Azin *et al.*, (1979) and Dudas *et al.*, (1979) have reported that the drying temperature should not exceed 43°C for cereal and millet seed for retaining the seed quality. Further, the electrical conductivity of seed leachate increaeed with the increase in drying temperature. Seed dried at 53±0.5°C recorded the maximum value, while the minimum was recorded in sun dried seed. The cell membranes tended to stretch excessively and break during rapid drying which resulted in the destruction of cell membranes leading to increased electrical conductivity of seed leachate (Iljin, 1957; Mironenko *et al.*, 1978).

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