Effect of pre-sowing seed treatments for invigoration and better crop establishment of mungbean
Mungbean

- Important crop in South East Asia
- India’s 3rd most important crop after chickpea and pigeon pea
- Dietary protein
- Grown in all seasons on 3.63 mha; production of 1.05 m tonnes
Specific problems and potential solutions

- Mungbean absorbs water vapour in humid atmosphere
- Rapid seed ageing, decline in germination and viability
- Particular problem in hot humid climates as in India
- Goal – to improve emergence and stand establishment
- Seed invigoration treatments can improve seed performance
- Priming: partial hydration of seeds; metabolic activities proceed but radicle protrusion prevented; seeds dried back to the original moisture level
OBJECTIVES

- To develop efficient seed invigoration treatments for mungbean
- To ensure rapid and uniform field emergence under a wide range of conditions
**MATERIALS AND METHODS**

*Seed materials*

Variety: WGG 37

Fresh seed lot: Initial germination above minimum (75%)

Revalidated seed lot: Germination just below minimum (68%)

*Seed treatments*

T0: Untreated control

T1: Hydration (2h) and drying below 25°C (room temperature, RT)

T2: 2% CaCl$_2$ at RT and surface drying

T3: Hydration with 50 ppm GA$_3$ and surface drying at RT

T4: Hydration (2h) followed by dry dressing with Thiram@ 0.25% (priming + fungicidal protection)

T5: 0.5% KNO$_3$ hydration and drying at RT
**Experimental technique:**

- **Season:** Summer (2005 & 2006)
- **Soil:** Sandy loam
- **Design:** FRBD
- **Replications:** 3
- **Plot size:** Five rows of 4 m length
- **Spacing:** 30 x 10 cm

**Recommended package of practices**
Data recorded

1. Germination (%)  
2. Field emergence (%)  
3. Seedling dry weight (g)  
4. Seedling vigour  
5. Field emergence index  
6. Final stand  
7. Seed yield (per m$^{-2}$)

Statistical Analysis: The data were statistically analyzed using analysis (ANOVA) procedure
RESULTS

- In fresh / revalidated lots, all treatments significantly enhanced
  - germination percentage,
  - seedling vigour,
  - final plant stand in field
  - seed yield

- Most effective treatments:
  - Hydration (2h) followed by dry dressing with Thiram
  - 2% CaCl$_2$ & surface drying
Fig. 1: All treatments involve hydration and improve germination.
Fig. 2: T3 (+GA$_3$) and T4 (+thiram) show greatest improvement
Fig. 3: Final stand most improved when fungicide included: T4
Fig. 4: Highest seed yield for T4, with highest final stand
Significant improvement of germination and seedling vigour

Hydration, used in all treatments – repair and advancement?

Additions to hydration – additive effect with:
- Thiram: Hydration + control of seed-borne infection
- $\text{GA}_3$: elongation growth
- $\text{CaCl}_2$: Ca linked to membrane repair

Improvement in both fresh and revalidated seeds

Final stand (field) most improved with hydration + thiram
- Improved germination and vigour from hydration
- Thiram protects against seed and soil-borne pathogens
- Improved stand results in higher yield
CONCLUSIONS

- Hydration (2h) + dry dressing with Thiram
  - Effective
  - Low cost
  - Low risk
  - Feasible for Indian conditions

- Effective for both carry over and fresh seeds
Thank you
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