

SEED COATING TECHNOLOGIES EMPLOYING A PLANT-BASED GREEN BINDER

*Masoume Amirkhani¹, Morad Mortaz², Anil Netravali³, Alan Taylor¹

1. Cornell University, Department of Horticulture, Geneva, New York
 2. University of California, Plant Science Department, Davis, California
 3. Cornell University, Department of Fiber Science & Apparel Design, Ithaca, New York
- *ma862@cornell.edu, m.amirkhani@gmail.com

DESCRIPTION OF SEED ENHANCEMENTS

- Seed enhancements may be defined as post-harvest treatments that improve germination or seedling growth, or facilitate the delivery of seeds and other materials required at the time of sowing (1). Enhancements include seed coating, priming and conditioning.
- Coating includes three techniques routinely used for vegetable crop seeds: film coating, encrusting and pelleting. Most coating formulations are inert and have little effect on seedling growth (2).

OBJECTIVES

The overall objective of this project is to develop coating formulations with desired properties including growth enhancement using a renewable resource for the coating binder.

The specific objectives of the study are:

- Develop a seed coating using soy flour (SF) as the binder.
- Determine the effect of binder concentration on coating integrity.
- Determine the effect of binder concentration on germination and early seedling growth.

METHODS & MATERIALS

- Broccoli seeds were coated using soy flour dissolved in water as the binder and diatomaceous earth as the inert filler.
- The soy flour binder was applied at 5.0, 7.5 and 10%.
- The coating was applied with rotary pan technology with 25% build-up.
- The coating strength was examined by two methods: time for the coating to dissolve in water (Soaking test) and the mechanical integrity (Coating loss by Ro-Tap Testing Method).
- The percent germination and germination rate were recorded daily.
- Root and shoot lengths were recorded after 1 week.

ACKNOWLEDGEMENTS

Germination and seedling growth tests were conducted with facilities of the New York State Seed Testing Laboratory. The project was supported by Hatch funds to the third and fourth authors at Cornell University.

EFFECT OF SOY FLOUR ON PHYSICAL COATING QUALITY

Increasing the binder concentration increased the coating strength.

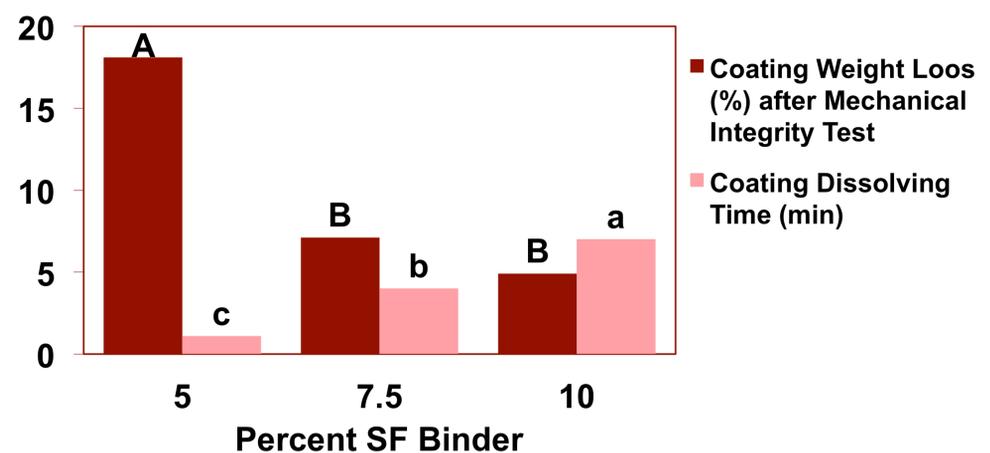


Fig 1: Percent seed coating loss and time to coating to fracture in water

EFFECT OF SOY FLOUR ON GERMINATION CHARACTERISTICS

The 10% SF binder did not affect the germination percentage or rate in comparison with the non-coated control.

EFFECT OF SOY FLOUR ON PLANT GROWTH

Root and shoot length from the 10% SF treatment was greater than the control.

Table 1: The effect of binder concentration on shoot and root length

Treatments	Shoot Length (cm)	Root Length (cm)
Control	4.1 ^c	5.8 ^B
5% SF	4.3 ^{bc}	6.6 ^A
7.5% SF	4.8 ^{ab}	6.6 ^A
10% SF	5.0 ^a	6.8 ^A

Soy flour provides a non-synthetic green seed coating binder and also enhances early seedling growth (3).

REFERENCES

1. Taylor, A. G. 2003. Seed treatments. In: Thomas, B, D. J. Murphy and B. G. Murray. Encyclopedia of Applied Plant Sciences. Elsevier Acad. Press. p. 1291-8.
2. Taylor, A. G., P. S. Allen, M. A. Bennett, K. J. Bradford, J. S. Burris and M. K. Misra. 1998. Seed enhancements. Seed Science Research 8: 245-256.
3. US patent application number: 12/777,804

