DEVELOPMENT OF MULTI-CROP SEED COATING MACHINE

ANGELO VINCENT D. ESCUADRO

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX TABLE

LIST OF APPENDIX FIGURES

LITERATURE CITED

Abd-Al Fattah (2015.). Figure (1): Isometric sketch of the seed-coating machine ResearchGate. https://www.researchgate.net/figure/Figure-1-Isometric-sketch-of-the-seed-coating-machine-Abd-Al-Fattah-et-al-2015_fig1_355108318

Afzal, I., Javed, T., Amirkhani, M., & Taylor, A. G. (2020). Modern Seed Technology: Seed Coating Delivery Systems for Enhancing Seed and Crop Performance. Agriculture, 10(11) 526. https://doi.org/10.3390/agriculture10110526

Andrews, C. H. (1965). "Mechanical Injury in Seeds" Proceedings of the Short Course for Seedsmen. 148. https://scholarsjunction.msstate.edu/seedsmen-short-course/148

Ashraf (2005) Improvements on Physiological Seed Quality of Festuca arundinacea Schreb by Encrusting Technology: Products and Storage Effects. (2005). Retrieved July 15, 2022, from Scialert.net website: https://scialert.net/abstract/?doi=rjss.2017.33.37

Avelar (2019). Seed Coating: A Tool for Delivering Beneficial Microbes to Agricultural Crops. Frontiers in Plant Science, 10. https://doi.org/10.3389/fpls.2019.01357

Belonio, A. T. (2006). Agricultural engineering formula. BAHÁNDÌAN, Institutional Repository of Central Philippine University. https://repository.cpu.edu.ph/handle/20.500.12852/1842

Curesma and Cabanayan (2012). Eng'g Econ Manual.pdf - PDFCOFFEE.COM. pdfcoffee.com. https://pdfcoffee.com/engx27g-econ-manualpdf-pdf-free.html

Farooq, M.S.M.A.; Basra, S.M.A.; Saleem, B.A.; Nafees, M.; Chishti, S.A. Enhancement of tomato seed germination and seedling vigor by osmopriming. Pak. J. Agric. Sci. 2005, 42, 3–4.

Ford (1986), Market Entry - Seed Coating Industry in China: Analysis of Growth, Trends and Progress. Retrieved July 13, 2022, from Mordorintelligence.com

Fowler, A. (2017, December 1). Alys Fowler: why seeds need a cold snap. The Guardian. https://www.theguardian.com/lifeandstyle/2016/dec/10/alys-fowler-seed-stratification

Gorim, L. Y., & Asch, F. (2017). Seed Coating Increases Seed Moisture Uptake and Restricts Embryonic Oxygen Availability in Germinating Cereal Seeds. Biology, 6(4), 31. https://doi.org/10.3390/biology6020031

Gupta and Staden (2021) Biostimulants for Crops from Seed Germination to Plant Development. ScienceDirect.

https://www.sciencedirect.com/book/9780128230480/biostimulants-for-crops-from-seed-germination-to-plant-development

Hacisalihoglu, G., G, T. A., H, P. D., B, H. M., & A, K. A. (1999). Embryo elongation and germination rates as sensitive indicators of lettuce seed quality: priming and aging studies. HortScience, 34(7), 1240–1243. Retrieved from https://eurekamag.com/research/003/431/003431975.php

Halmer, P. (2008). Seed technology and seed enhancement. Acta Hort. 2008. 771, 17–26.

Hancock, J. N., L. D. Swetnam, and F. J. Benson. (1991). Calculating Farm Machinery Field Capacities. Agricultural Engineering Extension Publications. 20. University of Kentucky, College of Agriculture Cooperative Extension Services. Volume V: 1991, Pp 1-5. https://uknowledge.uky.edu/aen_reports/20

Iannotti (2021, September 23). The Spruce. https://www.thespruce.com/what-is-direct-seeding-or-direct-sowing-1403094

Ibrahim E.A (2016). Impacts of osmopriming on mitigation of the negative effects of salinity and water stress in seed germination of the aromatic plant Lavandula stoechas L. Journal of Applied Research on Medicinal and Aromatic Plants, 31, 100407. https://doi.org/10.1016/j.jarmap.2022.100407

Javed, T., & Afzal, I. (2020, March). Impact of seed pelleting on germination potential, seedling growth and storage of tomato seed. Retrieved July 16, 2022, from ResearchGatewebsite:https://www.researchgate.net/publication/339877393_Impct_of_seed_pelleting_on_germination_potential_seedling_growth_and_storage_of_tomato_seed

Jeffs, K.A. Seed Treatment, 2nd ed.; The British Crop Protection Council (BCPC) Publication: Surrey, UK, 1986; p. 332.

Jensen, B., Knudsen, I. M. B., Madsen, M., & Jensen, D. F. (2004). Biopriming of Infected Carrot Seed with an Antagonist, Clonostachys rosea, Selected for Control of Seedborne Alternaria spp.. Phytopathology®, 94(6), 551–560.https://doi.org/10.1094/phyto.2004.94.6.551

Karthik et. al (2017): Sweet Corn – Nutrition and Food Safety. https://uwyoextension.org/uwnutrition/newsletters/summers-sweet-crop-sweet-corn/

Larum, D. (2022, September 27). Greenhouse Seed Starting – When To Plant Greenhouse

Liu, Y., (2010). Effect of seed coating on plant growth and soil conditions: A preliminary study for restoration of degraded rangeland in the Qinghai-Tibetan Plateau, China. Grassland Science, 56(3), 145–152. https://doi.org/10.1111/j.1744-697x.2010.00187.x

El-Attar, Ebaid, M. T., Adel Al-Gezawy, & Cairo, E. (2016). Factors Affecting Mechanical Coating of Fennel Seeds. Retrieved July 21, 2022, from ResearchGatewebsite:https://www.researchgate.net/publication/346311984_Factos_Affecting_Mechanical_Coating_of_Fennel_Seeds

Ma Y. (2019) Seed coating with beneficial microorganisms for precision agriculture. Biotechnology Adv. 2019 Nov 15; 37(7):107423. doi: 10.1016/j.biotechadv.2019.107423. Epub 2019 Aug 6. PMID: 31398397.

Olivera, M.E.,Ferrari, L., Araoz, S., & Postulka, E. (2016). Improvements on Physiological Seed Quality of Festuca arundinacea Schreb by Encrusting Technology:... Retrieved July 14, 2022, from ResearchGate website: https://www.researchgate.net/publication/309380389_Improvements_on_Physiological_Seed_Quality_of_Festuca_arundinacea_Schreb_by_Encrusting_Technology_Products_and_Storage_Effects

McGregors (2018) Why you should soak some seeds before planting. https://www.mcgregors.co.nz/genius-idea-article/why-you-should-soak-some-seeds-before-planting

Mohamed M., Satryojati B. Mercado (2015) US7487892B1 - Powdered seed treatment applicator - Google Patents. (2015, October 3). Retrieved July 14, 2022, from Google.com website: https://patents.google.com/patent/US7487892B1/en

Nasirembe Wanjala. (2022). Development, fabrication and testing of Seed dresser. Retrieved July 20, 2022, from Academia.edu website: https://www.academia.edu/7413273/Development_fabrication_and_testing_of_Seed dresser

Novita Ardiarini , Jonathan Anugrah Lase, Yayat Hidayat, and Kisey Bina Habeahan (2021): The effect of seed scarification on the germination process and the growth of long bean (Vigna sinensis) sprout; Retrieved from: https://www.e3s conferences.org/articles/e3sconf/pdf/2021/82/e3sconf_icadai21_01002.pdf

Obaia, A., Al-Rajhi, M., Yusuf, Y., & Tantawy, M. (2020). Developed Equipment for Seed Coating of some Crops. Journal of Soil Sciences and Agricultural Engineering, 11(4), 105–111. https://doi.org/10.21608/jssae.2020.96013

Pedrini, S., Merritt, D. J., Stevens, J., & Dixon, K. (2017). Seed Coating: Science or Marketing Spin? Trends in Plant Science, 22(2), 106–116. https://doi.org/10.1016/j.tplants.2016.11.002

Porter, F., & Scott, J. (n.d.). Seed Coating Methods and Purposes: A Status Report Seed Coating Methods and Purposes: A Status Report. Retrieved from https://scholarsjunction.msstate.edu/cgi/viewcontent.cgi?article=1357&context=seedsmen-short-course

Shivani, R (2016, July 28). 3 Techniques for Detection of Fungal Pathogens in Plants. Biology Discussion. https://www.biologydiscussion.com/plants/plant-diseases/3-techniques-for-detection-of-fungal-pathogens-in-plants/43184

Scalera, S. F. T. (2020, May 15). Sally Scalera: Here's an easy, fun way to germinate seeds in a paper towel. Florida Today. https://eu.floridatoday.com/story/life/2020/05/15/heres-easy-fun-way-germinate-seeds-paper-towel/5202823002/

Scott, J. M. (2020). Seed Coatings and Treatments and Their Effects on Plant Establishment. Retrieved July 15, 2022, from undefined website:https://www.semanticscholar.org/paper/Seed-Coatings-and-Treatments-andTheir-Effects-on-Scott/11711f260761bc16fdba72a9831584984e945f20

Sharma, K., Singh, U., Sharma, P., Kumar, A., & Sharma, L. (2015). Seed treatments for sustainable agriculture-A review. Retrieved July 14, 2022, from undefined website: https://www.semanticscholar.org/paper/Seed-treatments-for-sustainable agriculture-A-Sharma-Singh/0400285f8d4488c112959d970c1be848c9ed3837

SEARCA (2023). Aging farmers could add to food insecurity - SEARCA. www.searca.org. https://www.searca.org/press/aging-farmers-could-add-food-insecurity

Seed Treatment Oregon Pesticide Applicator Training Manual. (n.d.). Retrieved from https://www.oregon.gov/oda/shared/documents/publications/pesticidesparc/pesticideapplicatorseedtreatmenttrainingmanual.pdf

Silva, L. B. T., & Vieira, P. C. (2021). Environmental Enrichment as a Strategy to Confront Social Isolation Under the COVID-19 Pandemic. Frontiers in Behavioral Neuroscience, 14. https://doi.org/10.3389/fnbeh.2020.564184

Soyoye, Ademosum, Agbetoye (2018). Study of Selected Physical-Mechanical Properties of Corn Grains Important from the Point of View of Mechanical Processing Systems Designing. Materials, 14(6), 1467. https://doi.org/10.3390/ma14061467

Taylor, A.G.; Amirkhani, M.; Hill, H. Modern Seed Technology. Agriculture 2021 11,630.https://doi.org/10.3390/ agriculture11070630

Tatipata, A. (2009). Effect of seed moisture content packaging and storage period on mitochondria inner membrane of soybean seed. Journal of Agricultural Technology, 5(1), 51–64. Retrieved from https://www.thaiscience.info/Journals/Article/IJAT/10842910.pdf

Taylor, A.G. Seed treatments. In Encyclopedia of Applied Plant Sciences; Thomas, B.D.J., Murphy, B.G., Eds.; Elsevier Academic Press: Cambridge, UK, 2003; pp. 1291 1298.

Vaishali Ashok Pawar, & Laware, S. L. (2018, October 31). Seed Priming A Critical Review. Retrieved July 16, 2022, from ResearchGate website: https://www.researchgate.net/publication/330164933_Seed_Priming_A_Critical_Review

Yehia, I. (2008). FACTORS AFFECTING THE DESIGN OF COATING MACHINE FOR CROP SEEDS. Retrieved July 21, 2022, from undefined website: https://www.semanticscholar.org/paper/FACTORS-AFFECTING-THE-DESIGN-OF-COATING-MACHINE-FOR-Yehia/f81f6a3dd143e23c1f240d0d15a499c36fa75a01

Zinsmeister, Julia; Leprince, Olivier; Buitink, Julia. (2020) «Molecular and environmental factors regulating seed longevity». Biochemical Journal, Vol. 447, issue 2 (Jan. 2020), p. 305–323. DOI 10.1042/BCJ20190165