



Seed Pelleting: An Effective Technique for Better Seed Handling and Crop Establishment

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Seed is the basic input of crop production, and its quality strongly influences crop establishment and final productivity. However, many seeds are very small, irregular in shape, or difficult to handle during sowing. Such seeds may be distributed unevenly in the field, planted at an inappropriate depth, or lost because of wind and poor soil contact. Seed pelleting is a useful seed-enhancement technique developed to overcome several of these difficulties. In this process, a thin layer of suitable materials is built around an individual seed to improve its size, shape, weight, and handling characteristics. Seed pelleting is particularly useful for small-seeded vegetable, forage, flower, and other crops in which precise placement is important. A well-designed pellet can make a tiny seed easier to sow mechanically or manually and can also provide an opportunity to incorporate selected beneficial materials around the seed.

What Is Seed Pelleting?

Seed pelleting is the process of coating individual seeds with inert or biologically active materials until they become relatively uniform in size and shape. Unlike simple seed coating, pelleting generally produces a more substantial layer that changes the physical form of the seed. The objective is not merely to cover the seed but to create a smooth, manageable unit that can be accurately handled and planted. Pelleting materials may include fillers, binders, and other compatible ingredients. Common filler materials can be selected according to the crop and the required pellet characteristics, while binders help the coating particles adhere to the seed surface. Depending on the purpose, a pellet may also be designed to carry nutrients, microbial inoculants, or crop-protection products. However, all added materials must be compatible with the seed and should not interfere with germination.

Why Is Seed Pelleting Important?

One of the main advantages of pelleting is improved seed handling. Very small seeds are often difficult to pick, count, and place at regular intervals. After pelleting, their increased size and more uniform shape can make precision sowing easier. This can be especially valuable in nursery production and in crops where plant-to-plant spacing affects crop quality. Pelleting can also improve the physical distribution of seeds. Uniform pellets are less likely to behave unpredictably during mechanical sowing, helping growers achieve more consistent seed placement. Better placement may contribute to more uniform crop establishment, provided that the seed itself has good physiological quality and the field conditions are favorable. Another important feature is that pelleting can act as a delivery system. Carefully selected ingredients can be incorporated into the pellet so that useful materials are positioned close to the emerging seedling. This possibility has encouraged research into pelleting approaches involving beneficial microorganisms and other seed-enhancement inputs.

Basic Process of Seed Pelleting

The pelleting process generally begins with the selection and preparation of high-quality seed. Seeds should be clean, healthy, and sufficiently uniform for efficient processing. The seed is then placed in a pelleting system where a controlled amount of filler is added along with a suitable binder. As the seeds rotate or move, coating particles gradually adhere to their surfaces. Additional layers may be added until the desired pellet size and shape are obtained. The process must be carefully controlled because excessive coating can make pellets too large or may create an unsuitable environment for germination. After pelleting, the seeds are dried under appropriate conditions to reduce excess moisture and stabilize the coating. The finished pellets are then evaluated for uniformity, strength, moisture content, and germination performance. Successful pelleting requires a balance between physical improvement and biological performance. A pellet that looks uniform but delays emergence or reduces germination is not a successful seed-enhancement product. Therefore, processing conditions and materials should always be selected according to the crop and seed characteristics.

Major Advantages

Seed pelleting offers several practical benefits. It can make small seeds easier to handle, improve precision during sowing, and produce more uniform seed units. This may reduce problems associated with uneven distribution and can support better use of seed in precision planting systems. Pelleting may also protect the seed surface from minor mechanical stresses during handling and provides a convenient platform for incorporating selected seed-treatment materials. From a crop-management perspective, more accurate placement can help reduce the need for repeated sowing or excessive thinning in some production systems. In high-value crops, where uniformity and efficient seed use are particularly important, these benefits can be economically meaningful. Nevertheless, the actual benefit depends on the quality of the pellet, seed vigor, sowing method, and environmental conditions.

Limitations and Precautions

Despite its advantages, seed pelleting is not suitable for every situation. The additional coating increases the size and mass of the seed, which can alter water uptake and oxygen availability around the seed. If the pellet is too dense, too large, or made from unsuitable materials, germination and seedling emergence may be affected. Therefore, pelleting should be optimized rather than applied simply for appearance. Storage conditions also require attention. Pelleted seeds can respond differently to moisture and temperature than untreated seeds, so appropriate packaging and storage are important. In addition, the materials used in a pellet should be safe for the seed, crop, operator, and environment. Any biological or chemical additive should be used according to validated recommendations and applicable regulations.

Future Scope

Modern agriculture is increasingly focused on precision, resource efficiency, and improved crop establishment. In this context, seed pelleting has considerable potential. Advances in formulation technology may allow pellets to be designed with better water relations, improved mechanical strength, and more targeted delivery of beneficial ingredients. Research on microbial seed treatments and precision sowing may further expand the usefulness of pelleting. The future of seed pelleting will depend on developing crop-specific formulations rather than relying on a single standard recipe. Combining good seed quality with scientifically optimized pelleting can help make sowing more accurate and efficient while supporting uniform crop establishment.

Conclusion

Seed pelleting is a practical seed-enhancement technique that transforms small or irregular seeds into more uniform and manageable units. Its major value lies in improving seed handling, precision sowing, and the possibility of delivering selected beneficial materials close to the seed. At the same time, pelleting must be carefully designed so that the coating

does not compromise germination or emergence. With appropriate materials, processing, drying, storage, and quality testing, seed pelleting can be a valuable tool in modern crop production.

References

1. Copeland, L. O., & McDonald, M. B. Principles of Seed Science and Technology. Springer.
2. Basra, A. S. Seed Quality: Basic Mechanisms and Agricultural Implications. CRC Press.
3. International Seed Testing Association (ISTA). International Rules for Seed Testing.