

relatively high. In summary, in this case, the mechanical seed dispenser needs to be further improved and optimised, so that its performance can be comprehensively improved to better meet the actual needs of the sowing work.

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EDEM SIMULATION ANALYSIS OF JAMMED SPECIAL HOLE PUNCHED ROW TUPE TIGERNUT SEEDER

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Summary. Through the use of EDEM simulation software, the establishment of the tigernut particle model and the card position special hole punch row tigernut precision seeder model, simulation analysis, to verify the seeding performance of the seeder.

Simulate the seed guiding tube and the seed filling, guiding and conveying involved in the process of seed sowing from the seed dispenser to the ground. On the basis of determining the material properties of tigernut and obtaining relevant information and data support, the corresponding particle model is established and the relevant boundary parameters are set. Through the establishment of the particle model of oil soybean seeds, the 3D model of the oil soybean seed distributor, which was saved as a STEP file format at a scale of 1:1, was imported into the EDEM discrete element simulation software.



Figure 1 – Discrete element model diagram of tigernut



Figure 2 – Olea europaea in arc segment diagrams

According to the actual field operation situation and the agronomic sowing technical requirements of tigernut, the speed of the seeder was set to 3 km/h, the rotational speed of the seed dispenser was set to 20 r/min, and the tangent inclination angle of the seed-guiding cylinder curve was set to 75°, so as to analyse the movement state of tigernut seeds in the seed-guiding process. The total simulation time was set to 25 s.



Figure 3 – Seeding process diagram

Clearly observe the state of tigernut separating from the population, entering the type hole to fill the seed in the seed guide cylinder to the conveyor belt. The results are shown in fig. 3: the single hole of the seed dispenser is rotated and disturbed to form a layer of seeds with uneven speed; the tigernuts are thrown out through the opening of the seed dispenser into the seed-guide cylinder; the tigernuts slide steadily in the curved track of the seed-guide cylinder; and the tigernuts are fed to the conveyor belt at the seed-dropping port under the combined effect of their own gravity to realise the relative zero-speed. The seed discharge performance of the jammed special hole punching and discharging type tigernut precision seed discharger was verified by simulation analysis.