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ANALISYS OF A SEED'S PNEUMATIC DOSAGE SYSTEM. COMPARISON BETWEEN LABORATORY TESTS AND NUMERICAL SIMULATION RESULTS

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Abstract. In Argentina, soya (Glycine max L.) is the main extensive culture, with 19.000.000 ha of sown area and 54.384.926 tons of production (2009/10 growing season). The different soya species sown in a given zone need an adequate distance between each seed (dosage-distribution), in order to truly express its performance. In precision sowing, the more widespread dosage system is the monograin metering. At the present work, soya seed trajectories in a monograin metering system are studied. Comparison between laboratory tests and numerical simulation results are made. Tests consists on the seeds trajectory shooting, using a high speed video camera (420 frames per second), on a static sowing unit. This unit has a seeds hopper, a monograin dosage system air pressure assisted, and a seeds drop tube. Regarding to the numerical model, the mixing air-particles is considered as a dilute phase flow, where a one way coupling between each other is used. A Lagrangian approach is applied to particles, while an Eulerian approach is used for the fluid. The fluid is modeled with the Navier Stokes equations, using the Reynolds Average Navier-Stokes Standard (RANS) resolution technique, with a K – Epsilon turbulence model.