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# II CONVEGNO **AISSA #UNDER40**

**>> Sassari, 1-2 luglio 2021 <<**

**BOOK OF ABSTRACT**

## ***#P56 Tractor equipped with an external electric generator combined with electric powered Sprayer and Mulcher performances evaluation***

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In the last decades many studies were conducted on tractor and agricultural machinery electrification. In particular, the electrification of traditionally PTO powered implements could provide many benefits such as improved comfort and safety during connection, less noisiness, accurate implement rotational speed control and fuel consumption reduction. However, commercially available tractors do not generate sufficient electric power to run electrified implements. One available solution to this issue is to mount on the front Three Point Hitch of the tractor an external electric generator (Power Pack) powered by the PTO. The aim of the study is to evaluate the performances of the combination of a tractor equipped with an Power Pack and electric powered sprayer and mulcher (eSprayer and eMulcher) compared with their PTO powered versions (mSprayer and mMulcher). Field tests were performed acquiring essential parameters such as tractor engine speed and power, traveling speed, fuel consumption, power generated by the Power Pack and power absorbed by both mechanical and electrified implements. Moreover, implements noisiness and hitching time were measured. Results show that on the electrified implements the absence of the cardan shaft and hydraulic remotes shortened the implements hitching time and improved comfort and safety during the operation. In addition, the electrified implements were generally less noisy, especially reductions up to 11.7% of the pressure sound level were measured with eSprayer. Field tests demonstrated that the electrified implements permitted an improvement of the fuel consumption per hectare, up to 34% and 31% lower than their PTO powered homologue for the eSprayer and the eMulcher, respectively. This is mainly due to the independence of the eSprayer and eMulcher rotational speed from the engine speed of the tractor, allowing the engine to run slower and save fuel.