Physiological and Biochemical Mechanisms of an EMS-Induced Cowpea (*Vigna unguiculata*) Mutant Associated with its Resistance Trait to Cowpea Severe Mosaic Virus

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INTRODUCTION. Cowpea is an important crop that makes major nutritional contributions as a source of proteins and carbohydrates in the diet of many people worldwide. However, its production is impaired due to various stresses including those of biotic origin. Cowpea Severe Mosaic Virus (CPSMV) infects cowpeas leading to severe symptoms and low productivity. Therefore the mechanisms involved with cowpea resistance to CPSMV need to be understood. **OBJECTIVE:** The aim of this study was to investigate some physiological and biochemical parameters of a susceptible cowpea cultivar (CE-31) in comparison with its derived resistant mutant both infected with CPSMV. **MATERIALS AND METHODS:** Mutant resistant plants were obtained after treatment of CE-31 seeds with 0.04% ethyl methanesulfonate (EMS). Virus inoculation was done in trifoliate leaves, 15 days after planting, and the physiological and biochemical parameters measured in leaves collected 7 days after inoculation (DAI). **RESULTS AND DISCUSSION:** Mutant resistant plants infected with CPSMV (MCPI group) maintained high photosynthesis index and also increased chlorophyll and carotenoid contents than the plants originated from CE-31 untreated seeds (CPI group), equally inoculated. Biochemical analysis showed that chitinase, superoxide dismutase, phenylalanine ammonia lyase activities, and H_2O_2 and phenolic contents were significant higher in MCPI compared to CPI. As expected, CPI presented severe disease symptoms in parallel with CPSMV accumulation in the leaf tissues as seen by RT-PCR. Interestingly, both catalase (CAT) and β-1,3-glucanase (GLU) activities were higher in CPI compared with MCPI. CAT removes H_2O_2, which promotes programmed cell death, and GLU breaks callose at plasmodesmata that occludes the viral systemic movement. Therefore higher levels in CPI than in MCPI favored the susceptibly trait of CE-31. **CONCLUSION:** Treatment of the susceptible CE-31 genotype with the mutagenic agent EMS induced genomic alterations generating a cowpea mutant resistant to CPSMV by apparently inducing classical biochemical and physiological responses against infection.

Keywords: *Vigna unguiculata*, Cowpea, CPSMV, Plant defense

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