

## Probiotics to improve bioconversion and growth of black soldier fly larvae

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*Hermetia illucens* (Diptera, Stratiomyidae), also known as the black soldier fly, can successfully grow on several organic matters, converting them into larval biomass rich in protein and lipids. Today, the mass rearing of its larvae is of particular attention for the production of alternative source of protein to be used in animal livestock. Insect gut microorganisms play an important role influencing different traits of the insect, as nutrition, growth and reproduction. Moreover, the supplementation of viable beneficial microbes in insect's diet is way to improve overall health status and prevent diseases in the mass rearing. This study intended to assess the influence of different agro industrial by-products on the larval gut microbiome, and explore whether probiotic supplementation could enhance BSF growth and bioconversion ability.

Brewer's spent grains, okara, potato selection waste and potato peels were used as larval growing media leading to different results in terms of growth and bioconversion; best results were obtained with okara, while on the other by-products the development was slower, and on potato peels a high mortality was assessed (67%). Therefore, we administered probiotic bacteria to BSF larvae reared on suboptimal diets to evidence any potential probiotic impacts on BSF larvae. Sporeformer bacteria and lactic acid bacteria, previously isolated from the BSF gut, were tested both considering active and heat-inactivated cells.

Supplementation with active bacteria indicated a potential positive influence, while higher final weights were achieved with the administration of heat-inactivated bacteria. However, heat-inactivated bacteria also resulted in a longer duration for the larvae to reach the prepupal stage. Overall, the supplementation of bacterial probiotics represents an intriguing strategy to improve BSF mass rearing.