

Evaluation of the suitability of hemp production side-streams for the rearing of edible insects

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In recent years, hemp cultivation has been considerably increased across EU, as hemp can be exploited for a number of applications of the textile and the pharmaceutical industry, as well as of the food and feed sector. During hemp production, several side-streams are produced, however, these materials remain largely untapped. Insects can serve as efficient bioconverters of agricultural side-streams contributing to the upcycling of these residual resources to high-value end-products [insect meal, insect oil etc]. However, studies on the suitability of hemp side-streams for insect rearing are limited. Therefore, the aim of the present study was to evaluate the suitability of four by-products of hemp production as insect feed for the larvae of the yellow mealworm, *Tenebrio molitor*, the lesser mealworm, *Alphitobius diaperinus*, the superworm, *Zophobas morio*, and the black soldier fly, *Hermetia illucens*. In this regard, we studied three side-streams of the hemp seed production [*Cannabis sativa* L. var. Fedora19], i.e., cold-pressed hempseed press cake, hemp plant biomass leftovers on the field (hemp stalks, leaves and stems,) and the by-product of hemp seed cleaning process (small and broken hempseeds), and one side-stream of the hemp flower bud production [*C. sativa* L. var. Futura75] (grinded buds and leave remains, secondary stems, hempseeds). In a series of laboratory trials, early-instar larvae were fed on each of the by-products tested and larval growth parameters were recorded. Based on the results, larval growth and performance varied depending on the insect species and the by-product tested. In general, the hempseed press cake could efficiently support the larval growth and development of all species tested, as in most cases a similar to the control growth rate was recorded when larvae were fed on this by-product. These results aim to integrate two relatively new and innovative agricultural activities, i.e., insect farming and hemp production, into a sustainable, based on circular economy, farming system.

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