



Tenebrio molitor as a valuable tool for the valorisation of agro-industrial by-products in the circular bioeconomy perspective



Salvatore Dimatteo, Simona Errico, Paola Sangiorgio, Anna Spagnoletta, Stefania Moliterni, Alessandra Verardi, Ferdinando Baldacchino, and Roberto Balducchi

To fill the “protein gap”, we need to produce new foods and feeds from new sources, as well as valorise agro-industrial waste and by-products (FLW). These strategies can have some help from the use of insects as new bio-farms.

Among insects, *Tenebrio molitor* (TM) is a good solution, because it is one of the edible insects that can represent an alternative source of proteins, showing a nutritional profile that compares favourably with meat. The valorisation of FLW by using this insect as a bio-converter to produce proteins and other useful nutrients and compounds make TM right for the circular bioeconomy.

Materials and Methods

Tenebrio molitor larvae were reared on a standard bran-based diet and then fasted for 2 days, washed, blanched (to increase the shelf-life of the resulting flour), and dried in a ventilated oven at 60°C for 24 hours. Subsequently, the TMLs were milled with a beater. The resulting powder was analysed by Kjeldhal to determine protein content and by Aqualab instrument to determine water activity at 24.6 °C.

Results

Flours we produced in the tests showed a protein content of 40% in the powder obtained by TML fed 95% bran and 5% zootechnical yeast, which is in line with values reported in the literature. The water activity in the powder, being 0.374, makes it suitable for storage for a long time without getting mouldy or losing organoleptic characteristics. We are applying this protocol to larvae reared on different diets to test how the composition of the diet influences the protein content of the resulting flour.

Tenebrio molitor is the first insect approved by the European Commission as a Novel Food

