

This work analyses rapeseed (*Brassica napus*) and *Brassica carinata* chains, cultivated in central and southern Italy for the production of biodiesel, through the Life Cycle Assessment methodology. The production chains differed by the use of the oilcake: for animal feed in the rapeseed chain, while for biofumigation treatments in the chain of *B. carinata*, following patented formulation and pelletization. The emission allocation was calculated by the energy content criterion proposed by European Commission and the results compared with the substitution approach (system extension) and the calculation of emissions avoided by replacing the equivalent chemicals by co-products. Among the different options considered, the case of system extension to soil fumigant is able to determine a net reduction of greenhouse gasses in the *B. carinata* biodiesel supply chain.