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Sommario/riassunto	The aim of this thesis was to verify the feasibility of the hydrogen production process with purple non sulfur bacteria both under sunlight irradiation in an up-scaled system and with the use of low cost substrates. Among the products offermentations tested the best results were obtained with a medium derived from vegetable wastes. The use of a genetically modified strain of Rhodopseudomonas palustris insensitive to ammonium opened the way towards the use of wastes with attainment of high hydrogen yields also in inhibiting conditions. The experimentation carried out under natural irradiation demonstrated the full feasibility of the process using sunlight instead of artificial light in a semi-pilot reactor: the production rates were the highest so far reported for comparable outdoor systems.