

Abstract

The Rhizobiaceae bacteria are known for its varied nitrogen metabolism: especially its nitrogen fixation, so called diazotrofia, its capability of symbiosis with plants, or on the contrary plant pathogenesis (genus *Agrobacterium*). *Rhizobium radiobacter* R89 (stored in Czech Collection of Microorganism, in Brno as R89-1) is bacteria strain capable of codeine and morphine biotransformation to whole spectrum of pharmacologically significant derivates.

This work is focused on purification and characterization of two selected enzymes that catalyze oxidation-reduction reactions, the crucial beginning of morphine skelets biodegradation.

At the first, the biotransformational potential of the strain was evaluated and biochemical, molecular biological and bioinformatical approaches were employed to purify the responsible enzymes. Considering unsuccessful purification from *Rhizobium radiobacter* R89-1, the proteins structural genes were cloned and heterologously expressed in bacterial system and afterward characterized. Found protein sequence and enzyme characterization (basic kinetic measurements, substrate specificity and thermostability) have revealed different origin of the enzymes and clarify reasons why the original purification procedure was not successful.