**The potential of *Pseudomonas* strains application in bioremediation of polluted water**

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**Introduction**

Bioremediation is a process that uses the metabolic potential of microorganisms for the treatment of contaminated areas (1). Synthetic dyes, which are now widely used, are structurally phenolic compounds, and they are very toxic when they enter the environment through wastewater (2). Laccases, versatile enzymes that belong to the oxidases, are used in bioremediation of environments contaminated with phenolic compounds (3). It's known, from the literature, that laccases can be found in strains of genus *Pseudomonas* (3)*.* The aim of this study was to investigate which strains of the genus *Pseudomonas* (from the laboratory collection) possess an enzyme laccase and have the ability to oxidize synthetic colors.

**Methods**

Four strains of the genus *Pseudomonas* from laboratory collection (F6, KT2440, CA3, MT2) were analyzed. The strains were grown in LB liquid medium (4). Bacterial cultures (grown overnight) were treated with lysozyme to release all proteins from the cells and then the protein concentration was determined using the Bradford method and spectrophotometer (5). Laccase activity was determined with laccase test using ABTS substrate, which is specific for this enzyme (6). Same concentration of proteins (100μg) was added to the reaction for each sample. The reactions were incubated 30 minutes at 37 ° C. The absorbance of the ABTS oxidation product was measured using spectrophotometer at 420 nm. The most active strains were then seeded into Erlenmeyer flasks in LB medium with added colors at concentration of 0.05%. We used two synthetic colors: phenol red and rhodamine B, and textile color and food color for the eggs. Laccase activity leads to the change in medium color and it can be visually observed.

**Results**

Strains F6 and KT2440 showed the greatest laccase activity. Results of laccase test can be seen in the picture 1. After cultivation with colors, in four samples oxidation occurred and the color of the medium has changed. Strains F6 and KT2440 oxidized phenol red and textile color. As expected, food color for the eggs is not oxidized, because of different chemical structure.

Picture 1. Laccase activity of *Pseudomonas* strains

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**Conclusion**

Among four strains of the genus *Pseudomonas*, two strains showed a significant activity in the laccase test with ABTS - strains F6 and KT2440. That strains were used in the experiment with colors. Phenol red and textile color were well-oxidized by both strains, which shows that they have potential for use in bioremediation of waters polluted by synthetic dyes. Future research should be focused on examining the ability of these strains to oxidize colors with other pigments, as well as the involvement of other *Pseudomonas* strains in the study.

**Literature**

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