Background (35 seconds)

Did you know? Azo dyes are a type of widely used industrial dyes, whose discharge poses serious threats to the environment and human health. Azo dyes have carcinogenic, genotoxic and mutagenic effects, and are resistant to natural degradation. Currently, the treatment methods for azo dyes mainly include physical, chemical and biological ones, but they all have drawbacks such as low efficiency, high cost, and harmful intermediates. Is there a better way to solve this problem?

Experiment part (60 seconds)

Our team proposed a dual-bacterial system based on Shewanella and Pseudomonas fluorescens, which can degrade azo dyes efficiently, low-costly and harmlessly. Our system consists of two steps: First, we use Shewanella under anaerobic conditions, to reduce azo dyes to aromatic amines by electron transfer, thus achieving decolorization; Second, we use Pseudomonas fluorescens under aerobic conditions, to further oxidize aromatic amines to harmless products by lignin degradation system, thus achieving degradation. We genetically modified Shewanella, to enhance its reduction rate of azo dyes, and designed three suicide mechanisms, to ensure its biosafety. We also immobilized Pseudomonas fluorescens, to prevent its pollution to the environment.

Conclusion part (20 seconds)

Our project provides an innovative biological solution for the treatment of azo dyes, which has the advantages of being eco-friendly, efficient and low-cost, and also aligns with the vision and goals of iGEM. We hope our project can attract social attention and support, and contribute to the treatment of azo dyes and environmental protection.

项目背景（35秒）

你知道吗？偶氮染料是一种广泛应用于工业领域的染料，它们的排放对环境和人类健康造成了严重的危害。偶氮染料具有致癌、遗传毒性和诱变性，而且难以被自然降解。目前，偶氮染料的处理方法主要有物理、化学和生物三种，但它们都存在效率低、成本高、中间产物有害等缺点。那么，有没有一种更好的方法来解决这个问题呢？

实验部分（60秒）

我们的团队提出了一个基于希瓦氏菌和荧光假单胞菌的双菌联合处理系统，它可以高效、低成本、无害地降解偶氮染料。我们的系统分为两个步骤：第一步，我们利用希瓦氏菌在厌氧条件下，通过电子传递将偶氮染料还原为芳香胺，从而实现脱色；第二步，我们利用荧光假单胞菌在好氧条件下，通过木质素降解系统将芳香胺进一步氧化为无害的产物，从而实现降解。我们对希瓦氏菌进行了基因改造，提高了其还原偶氮染料的速率，并设计了三种自杀机制，保证了其生物安全。我们还对荧光假单胞菌进行了固定化处理，防止了其对环境的污染。

总结部分（20秒）

我们的项目为偶氮染料的处理提供了一种创新的生物解决方案，它具有环保、高效、低成本的优势，同时也符合iGEM的理念和目标。我们希望我们的项目能够引起社会的关注和支持，为偶氮染料的处理和环境保护做出贡献。