

Bacterial Enzyme Detective Story: A Freedom-to- Operate Investigation CASE STUDY

THE MISSION

We ventured on an exciting freedom to operate (FTO) hunt for a special bacterial enzyme spanned over multiple jurisdictions: US, WO, EP, and CN. Our target? A specific lactoperoxidase that needed to match at least 80% pairwise sequence identity with CyanoPOX and figure out how to package in a tiny biological container called encapsulin and further used in various applications such as personal care.

THE MYSTERY WE NEEDED TO SOLVE

Bacteria (nature's tiny factories) have been helping humans for millennia, from making your morning yogurt to producing life-saving vaccines. But here's where it gets interesting!

We needed to find a specific bacterial enzyme that could:

- ▶ Act as a natural antimicrobial agent
- ▶ Work as hydrogen peroxide
- ▶ Match CyanoPOX's sequence by at least 80%
- ▶ Be safely packaged in a biological container

OUR DETECTIVE WORK

We approached this like scientific detectives:

Phase 1

THE TRADITIONAL HUNT

This involved carefully analyzing the invention's components and functions, identifying crucial keywords, classes and developing search strategies to establish our initial search foundation.

Phase 2

BROADENING HORIZONS

We expanded our search scope to encompass all aspects of genetic engineering & industrial biotechnology. Our goal was to understand and uncover valid results related to sequence similarity and the potential applications of this novel peptide across various fields.

Phase 3

THE DATABASE DEEP DIVE

We conducted exhaustive searches across multiple jurisdictions using both paid databases like Orbit and Patsnap, and free resources such as Lens.org, NCBI Blast, and Google Patent. We left no stone unturned, employing diverse search strategies, including biosequence analysis, keyword searches, classification studies, and both assignee & inventor investigations. Additionally, we conducted similarity and citation searches to ensure complete coverage.

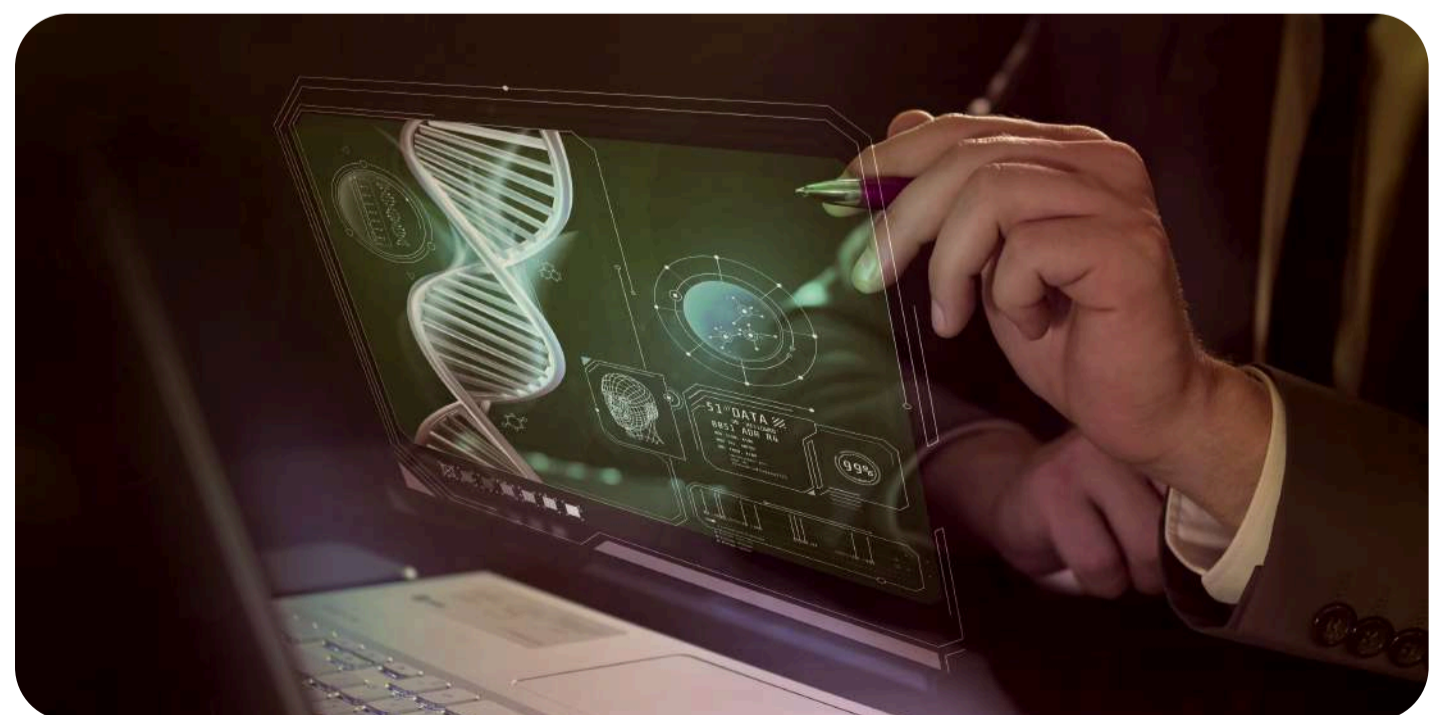
THE PLOT TWISTS

We came across references that showed similarity to our subject sequence, but those findings did not act like peroxidase, or they were from different sources.

FINDINGS

Here are the key findings of our search:

- ▶ US***** discusses a sequence similarity of around 82% with the given CyanoPOX strain sequence.
- ▶ CN***** discusses the 75% show strain similarity with CyanoPOX strain sequence as well as the use of the bacterial synthesized peroxidase in detergent & personal care products.
- ▶ WO***** discusses a sequence similarity of 61.54% alignment with the CyanoPOX sequence. Also, it discusses the use of bacterial heme peroxidase, which is sourced from cyanobacteria like Hydrocoleum sp. or Okeania sp.
- ▶ CN***** discusses sequence similarity 50 to 60% similarity to the given CyanoPOX strain sequence. It discusses the encapsulation with the use of bacterial peroxidase in a hygienic agent.



TECHNICAL FUN FACTS

▶ **Natural Antimicrobial Power:**

Lactoperoxidase acts as a powerful natural defense mechanism. It can generate hypothiocyanite, a potent antimicrobial compound that effectively combats harmful bacteria, viruses, and fungi. This makes it incredibly valuable in both medical and food preservation applications.

▶ **Versatile Environmental Adaptation:**

Bacterial lactoperoxidase demonstrates remarkable adaptability, functioning efficiently in various environmental conditions. It can operate effectively in low-oxygen environments and maintains stability across a range of pH levels and temperatures.

▶ **Oxidative Stress Warrior:** The enzyme plays a crucial role in managing oxidative stress. It can neutralize hydrogen peroxide, transforming potentially harmful reactive oxygen species into less damaging compounds. This protective mechanism is essential for cellular health and survival.



THE TAKEAWAY

While we found many pieces of the puzzle, the complete picture (80% sequence match + encapsulation + applications) remains unique, yet we managed to find evidence.



Expert

- She serves as a Senior Patent Analyst at Wissen Research, specializing in life sciences. Her expertise Sequence searches, biotechnology domain. Leading diverse intellectual property initiatives, She conducts novelty searches, invalidation assessments, infringement analyses, & technology-related projects.
- She holds a bachelor's and master's degree in Biotechnology.

Contact Us :

