

## ECOSURF EH3 - A Taq DNA Polymerase Enhancer

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**Abstract :** ECOSURF™ EH-3 Surfactant (EH3) is a nonionic surfactant and has superior wetting and excellent oil removal properties. It is biodegradable with low toxicity and meets or exceeds US EPA Design for the Environment Criteria, and is widely used as a home cleaner, commercial and industrial degreaser. We have recently found that EH3 also possesses a special function which is characterized as an enhancer to Taq DNA polymerase and ameliorator to reduce the effects of PCR inhibitors, i.e., blood, urea, Guanidinium thiocyanate, Humic acids, polyphenol, and Polysaccharides. This is a new kind of PCR enhancer that does not work on relieving secondary structures of GC-rich templates. We have compared EH3's effects on Taq DNA Polymerase along with other well-known enhancers, such as DMSO, betaine, and BSA, using GC rich or deficient template and found that, unlike DMSO and Betaine, the EH3 boosting effect on PCR reaction is not through reducing Tm. The results show the same increase of PCR products regardless of the GC contents or secondary structures. The mechanism of EH3 enhancing PCR is through its direct interaction with or stimulation of the DNA polymerase and making the enzymes more resistant to inhibitors in the presence of EH3. This phenomenon has first been observed for EH3, a new type of PCR enzyme enhancer. Subsequent research also shows that a series of similar surfactants boost Taq DNA polymerase as well.

**Keywords :** EH3, DNA, polymerase, enhancer, raw biological samples

**Conference Title :** ICBTBA 2022 : International Conference on Biomedical Technologies and Biomedical Applications

**Conference Location :** Los Angeles, United States

**Conference Dates :** October 27-28, 2022