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# SOLID-BINDING PEPTIDES AS AFFINITY TAGS FOR ONE-STEP PURIFICATION AND IMMOBILIZATION OF RECOMBINANT PROTEINS

## Bioreactors, Biocatalysis, Separation Processes and Biosensors

### OP - (761) - SOLID-BINDING PEPTIDES AS AFFINITY TAGS FOR ONE-STEP PURIFICATION AND IMMOBILIZATION OF RECOMBINANT PROTEINS

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#### Body

Solid-binding peptides (SBPs) are short peptides that show selectivity and bind with high affinity to the surfaces of specific solid materials, such as metals, metal-oxides, and polymers, via non-covalent interactions [1]. When attached to functional proteins, SBPs direct their immobilization onto solid supports without compromising their functionality. Therefore, SBPs have been fairly used in applications such as recombinant protein purification and immobilization, and material functionalization [1].

Affinity tags have become indispensable tools for the purification of recombinant proteins, due to the simplicity, versatility and high-efficiency of affinity tag-based separation and recovery systems. For practical, ecological and economic reasons, the integration of recombinant protein purification and immobilization in a single-step is highly desirable in applications such as enzyme immobilization and material functionalization, being this a very active field of research [1].

This study aimed at comparing the performance of different SBPs in one-step purification and immobilization of recombinant proteins, using low-cost, earth-abundant and eco-friendly purification/immobilization matrices such as silicon dioxide (SiO<sub>2</sub>) and iron oxide (Fe<sub>3</sub>O<sub>4</sub>) particles. For that, the SBPs His6 [2], Car9 [2] and CotB1p [1] were fused to a EGFP model protein alone or in combination. After recombinant production in *Escherichia coli*, the cellular lysates containing the tagged EGFP protein were incubated with different amounts of solid matrices and the performance of the tag(s)-matrix pairs used were compared by determining the binding yield and purity of tagged EGFP. Depending on the system, purity levels of up to 96 % could be obtained with different binding yields. The combination of tags improved the binding, which is advantageous for immobilization purposes.

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#### References

[1] Tag-mediated single-step purification and immobilization of recombinant proteins toward protein-engineered advanced materials, Freitas et al., *J Adv Res*, 36, 249-264 (2022).

[2] Bare silica as an alternative matrix for affinity purification/immobilization of His-tagged proteins, Freitas et al., *Sep Purif Technol*, 286, 120448 (2022).

#### Image Legends

**Palavras-chave : Solid-binding peptides, Affinity purification/immobilization tags, One-step protein purification and immobilization**