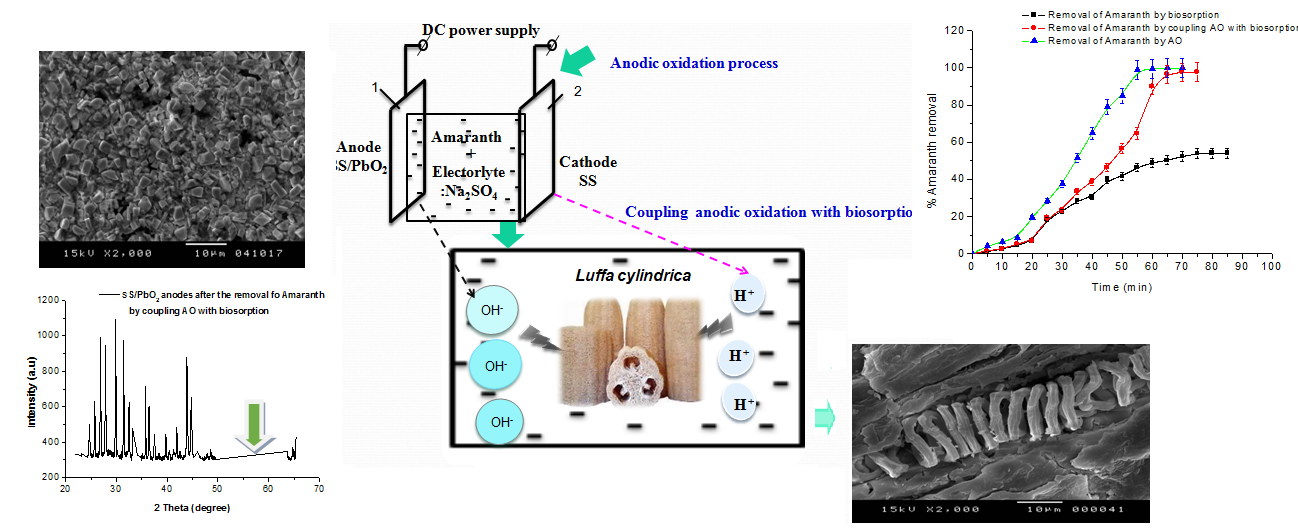
**Graphical abstract**

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**Highlights**

* Coupling biosorption with anodic oxidation offers high efficiency at low energy consumption when degrading Amaranth Red (E123)
* Coupling process is proved to be effective for the enhancement of the stability of SS/PbO2 anodes
* *Luffa cylindrica*  ability for reuse was confirmed after three regeneration cycles