Electronic Supplementary Information (ESI)

Fully Edible Biofuel Cells

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Electrode compositions

Edible electrodes

The edible mushroom/olive oil/charcoal bioanode was prepared by thoroughly grinding 250 mg of the preconcentrated mushroom extract, 67 μL of olive oil, and 250 mg of dietary charcoal in an agate mortar. The resulting homogenous paste was packed into the support cavity to obtain a workable electrode. Similarly, edible mushroom/corn oil/charcoal and mushroom/sesame oil/charcoal anodes were prepared, but the olive oil was replaced by corn and sesame oils, respectively. In addition, the edible apple/olive oil/charcoal biocathode was prepared by thoroughly mixing 250 mg of the preconcentrated apple extract, 67 μL of olive oil, and 250 mg of dietary charcoal in an agate mortar. Similarly, the edible apple/corn oil/charcoal and apple/sesame oil/charcoal cathodes were prepared, but the olive oil was replaced by corn and sesame oils, respectively. The edible plum/olive oil/charcoal and banana/olive oil/charcoal cathodes were also prepared in a similar process as the composition for the edible apple/olive oil/charcoal biocathode, but the apple solution was replaced by plum and banana solutions, respectively. Moreover, the control edible electrode without the tissue extracts was prepared in a similar process by using the homogeneous paste consisting of 250 mg of dietary charcoal and 200 μL of olive oil.

Non-edible electrodes

The non-edible alcohol oxidase (AOx)/tetrathiafulvalene (TTF)/mineral oil/graphite anode was prepared by thoroughly mixing 80 μL of five-fold-diluted AOx solution, 40 mg of TTF, 150 μL of mineral oil, and 250 mg of graphite in an agate mortar. The resulting homogenous paste was then packed into the support cavity to obtain a workable electrode. The non-edible AOx/mineral oil/graphite without TTF was also prepared in a similar process, but TTF was not added. In addition, the non-edible Ag_2O/Nafion®/graphite cathode was prepared by the following. Graphite/Ag_2O mixture was prepared by thoroughly grinding graphite with Ag_2O powder (2:3 wt. ratio) in an agate mortar. The cathode paste was obtained by mixing 250 mg graphite/Ag_2O composite with 900 μL of a 2 wt% Nafion in ethanol to obtain a homogeneous composite material.

The homogenous paste was then packed into the support to obtained the non-edible Ag_2O/Nafion®/graphite cathode.