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OC2. Construction and evaluation of a histamine potentiometric sensor

Ana Rita Pereira [a,*], Célia Gomes Amorim [a], Alberto Araújo [a], Maria da Conceição Montenegro [a]

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Ana Rita Pereira [a,] *, Célia Gomes Amorim [a], Alberto Araújo [a], Maria da Conceição Montenegro [a]

[a] *LAQV/REQUIMTE, Department of Chemical Sciences, Faculty of Farmacy, University of Porto, Portugal*
* *up201305740@ff.up.pt*

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Histamine (HS) is a biogenic amine that results from enzymatic decarboxylation of the amino acid histidine. It is synthetized and released from many cells (mast cells, basophils, platelets, histaminergic neurons, etc.). A strongly potential therapeutic exploitation in allergy, inflammation, autoimmune disorders and possibly cancer has been reported in preclinical data for HS [2]. Histamine is the most important inflammatory mediator during an allergic reaction and plays a significant role in anaphylaxis cases [3]. Furthermore, it is regarded as one of the biomarkers for quality control during the food production and transportation [4].

Different methods have been applied into determination of HS, namely GC, HPLC, capillary electrophoresis and biochemical assays. However, potentiometric sensors have been described as an alternative due to being simpler, faster, portable and cheaper than the other analytical methods referred above [4].

In the present work, the HS sensor is optimized by using different membrane polymers, ionophores, solvent mediators in the presence of anionic additive. The effect of multiwalled carbon nanotube (MWCNTs) was also considered. The sensor with the best analytical response is composed of 1.0% (w/w) of cucurbit[6]uril, 66.8% (w/w) of 2-nitrophenyl phenyl ether as plasticizer, 29.8% (w/w) of polyvinylchloride, 0.3% (w/w) of potassium tetrakis(4-chlorophenyl) borate and 2.0% (w/w) of MWCNT. The HS sensor´s performance is characterized by a slope of 30.9±1.2 mV dec^{-1}, a detection limit of (3.01±0.61) $\times 10^{-7}$ mol L^{-1} and a lower limit of linear range of (2.99±0.00) $\times 10^{-7}$ mol L^{-1}. This sensor has been used and optimized under flow conditions, to carry out sequential injection chromatography.

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