

Anodic Sampling of Standard Elements in Noble Dental Alloys (In, Sn, Pt, Zn, Cu) by Thin-Layer Chromatography

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A lot of different dental alloys are disposable to be used in prosthodontics. In theory, up to 14 different alloys can be incorporated in one oral cavity. To avoid the possibility of biodegradation it is necessary to know the composition of any alloy, used in oral cavity.

Anodic sampling method combined with thin-layer chromatography were used to establish the behaviour of indium, tin, platinum, zinc and copper on thin layer.

The analysis was performed in water-HCl (conc.) solution in a 10:1 volume ratio using a 4.5 V battery. The time of sampling was 30 seconds and transfer of dissolved cations to the chromatographic plates took 15 seconds.

Standard solutions ($\text{In}_2(\text{SO}_4)_3$, SnCl_2 , H_2PtCl_6 , ZnSO_4 , CuCl_2 0.1 mg/ml) and samples of standard elements were applied to HPTLC plates 10x10 cm, precoated with cellulose. Plates were developed in saturated glass chamber to the distance of approximately 8 cm. Mobile phase was *iso*-amyl alcohol (3-methyl-1-butanol) – HCl (36.5 %) – acetonitrile in a volume ratio 5.4:4.3:0.3. After development, plates were dried in a steam of hot air and the spots were visualised by spraying with the saturated ethanolic solutions of alizarin, diphenylcarbazide and quercetin. The plates were dried and exposed to NH_3 vapour.

R_F values for each standard element (Table 1) were obtained.

Table 1. R_F values of analysed standards.

	Indium		Tin		Platinum		Zinc		Copper	
	R_F	colour	R_F	colour	R_F	colour	R_F	colour	R_F	colour
Alizarin	0.37	pink	0.82	pink-orange	0.76	purple	0.75	purple	0.59	purple
Diphenylcarbazide		pink		pink		pink		pink		white with a pink edge
Quercetin		dark yellow		yellow		dark blue		yellow		brown in the middle with a yellow edge

Described method is suitable for the analysis of indium, tin, platinum, zinc and copper. It is important to have those preliminary results that dental alloys of unknown composition could be analysed.