PORTUGUESE COIN - 1 ESCUDO - 1962 - CU ZN NI - MODERN TIMES

Artefact name	Portuguese Coin - 1 Escudo - 1962
Authors	Catarina. Cordeiro (Universidade Católica Portuguesa, Porto, Porto, Portugal)
Url	/artefacts/1337/

The object

Credit C.L.Cordeiro.

Fig. 1: Views of both sides of a Portuguese coin (front and back, respectively),

Description and visual observation

Description of the artefact	Portuguese coin (Escudo from 1962) with brown and green corrosion products. Dimensions: about 2.7 cm in diameter.
Type of artefact	coin
Origin	Lisboa, Portugal
Recovering date	Unknown
Chronology category	Modern Times
chronology tpq	1962 A.D.
chronology taq	----
Chronology comment	20th century
Burial conditions / environment	Unknown

Artefact location	Cordeiro Lopes Catarina, Porto
Owner	Cordeiro Lopes Catarina, Porto
Inv. number	None
Recorded conservation data	N/A

Complementary information

None.

Study area(s)

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Fig. 2: Study area - detail of the location of Fig. 3 (front of the coin),

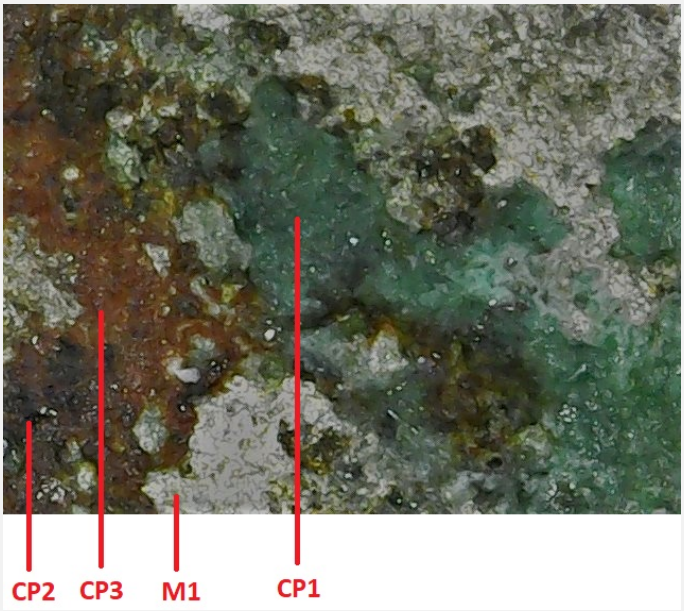

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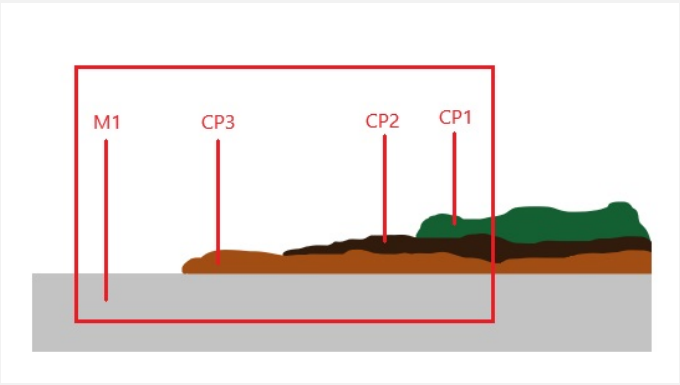
Fig.3: Detail of the corrosion structure. Used as reference for Fig. 4,

Binocular observation and representation of the corrosion structure

The schematic representation below gives an overview of the corrosion structure encountered on the coin from a first visual macroscopic observation.

Stratum	Type of stratum	Principal characteristics
CP1	Corrosion product	Cluster, dark green, medium, isolated, compact, very soft
CP2	Corrosion product	Layer, dark brown, thin, discontinuous, compact, soft
CP3	Corrosion product	Layer, brown, thin, discontinuous, compact, soft
M1	Metal	Light grey, metallic, continuous, compact, hard

Table 1: Description of the principal characteristics of the strata as observed under binocular and described according to Bertholon's method.



Credit C.L.Cordeiro.

Fig. 4: Stratigraphic representation of the corrosion structure of the coin based on visual observation under a microscope with indication of the corrosion structure used to build the MiCorr stratigraphy of Fig. 5 (red square),

MiCorr stratigraphy(ies) – Bi

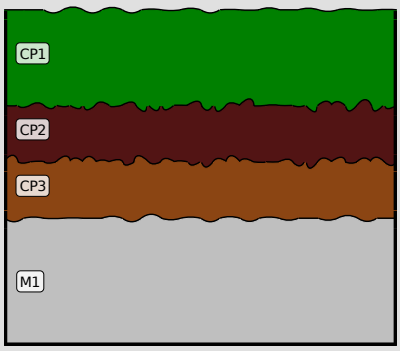


Fig. 5: Stratigraphic representation of the corrosion structure of the coin observed under microscope using the MiCorr application. The features of the strata are only accessible by clicking on the drawing which redirects you to the search tool by stratigraphic representation, credit C.L.Cordeiro.

Sample(s)

Description of sample	No sample was taken.
Alloy	Cu Zn Ni
Technology	Unknown
Lab number of sample	

Sample location	None
Responsible institution	None
Date and aim of sampling	

Complementary information

None.

Analyses and results

Analyses performed:

Non invasive approach

- XRF with handheld portable X-ray fluorescence spectrometer (NITON XL3t 950 Air GOLDD+, Thermo Fischer®). General Metal mode, acquisition time 60s (filters: Li20/Lo20/M20).

Non invasive analysis

The XRF analysis was carried out without sampling. All strata, from corrosion products to metal, are analyzed at the same time. The metal is presumably an alpacca (German silver), while Si, Cl, S and P probably originate from the burial environment.

Element	Mass %
Cu	61
Zn	17
Ni	16
Si	3
S	<0.5
Fe	<0.5
P	<0.5

Table 2: Chemical composition of the surface of the coin. Method of analysis: XRF, UR-Arc CR.

Metal

None.

Microstructure	Unknown
First metal element	Cu
Other metal elements	Ni, Zn

Complementary information

According to the Catalogue "Moedas Portuguesa e do Território que hoje é Portugal" (Portuguese Coins and the Territory that is now Portugal) [1] and because it is a coin verified by the Mint, it is possible to state that the present alloy is an alpacca (Cu, Zn, Ni). The composition as given by Gomes [2007] should be:

Element	%
Cu	61
Zn	20
Ni	19

Table 3: Composition of the coin according to Gomes, 2007 [1].

It appears from table 2 that the concentrations of Zn and Ni are slightly higher than expected.

Corrosion layers

The coin presents 3 types of compounds, two with brown tones that occupy most of the surface and one with a green tone (copper-based compound) that is locally distributed and which could be due to chlorides (handling).

Corrosion form	Unknown
Corrosion type	Unknown

Complementary information

None.

MiCorr stratigraphy(ies) – CS

Synthesis of the binocular / cross-section examination of the corrosion structure

None.

Conclusion

The coin under study is recent (1962). From literature, it should be alpacca also known as German silver. It was confirmed through non invasive XRF anaalysis.

Regarding the corrosion products, the coin presents 3 types of compounds, two with brown tones that occupy most of the surface and one with a green tone (copper compound) that is localised and could be due to handling (chlorides were detected).

References

References on object

1. Gomes, A, ***Moedas Portuguesas e do Território que Hoje é Portugal,*** 5th edn., Associação Numismática de Portugal, 2007, pp. 399.