A CERÂMICA MEDIEVAL NO MEDITERRÂNEO OCIDENTAL

LISBOA, 16 - 22 DE NOVEMBRO 1987

CAMPO ARQUEOLÓGICO DE MÉRTOLA

Ficha técnica:
Coordenação - Luis Alves da Silva
Rui Mateus
Design gráfico - Rui Mateus
Secretaria/Processamento de texto: Mª da Graça Colaço
Composição - Gabinete de design / C.A.M.
Impressão e acabamento: Rainho & Neves, Lda / Santa Maria da Feira
Edição - Campo Arqueológico de Mértola
Exemplares - 500
Depósito legal - 51346/91

Ilustração da capa:
Tijela do século XI, de provável origem tunisina (Museu de Mértola)

A CERÂMICA MEDIEVAL NO MEDITERRÂNEO OCIDENTAL

LISBOA
16 -22 novembro 1987

Edição:
CAMPO ARQUEOLÓGICO DE MÉRTOLA

Apoio:
ASSOCIAÇÃO DE DEFESA DO PATRIMÓNIO DE MÉRTOLA
CÂMARA MUNICIPAL DE MÉRTOLA
COMISSÃO DE COORDENACÃO DA REGIÃO ALENTEJO
FUNDAÇÃO CALOUSTE GULBENKIAN
INSTITUTO PORTUGUÊS DO PATRIMÓNIO CULTURAL
JUNTA NACIONAL DE INVESTIGAÇÃO CIENTÍFICA E TECNOLÓGICA

1991

Tema 2

A cerâmica do mundo islâmico e o seu envolvimento europeu

Chemico-physical studies for sampling of Medieval and Post-medieval majolicas from primary italian centres

G. W. CARRIVEAUX, G. C. BOJANI, A. KRAJEWSKI, A. RAVAGLIOLI

Introduction

Following up a previous work by same authors (1), some interesting biunivocal relations between certain contained elements present in traces were individuated in a considerable quantity of samples, mostly from the Faenza and Firenze area with many pieces from other sites.

The correspondences specifically concerned two straight lines showing a clearly distinct relationship between the Cerium content and the Hf, Co, Fe, La and Th one. Further relations were determined, some by demonstrating their separability always into two straight lines, though less reliably, while into two straight lines, though less reliably, while in other cases the relatioships pointed to a line alone. The Cerium content consequently appears a good statistical estimator parameter in order to discriminate preliminarly the place of origin. We defined by convention one of the lines as the Florence one (because quite all the samples from Florence are located along it) in the same way as always by convention and always for the same reasons the other line was previously defined as the Faenza one.

Along the Florence line were grouped samples from three sites (Florence, Urbino, Palermo) while the other line was determined by all the remaining sites (seven) (§).

Therefore the problem concerning the separation in two groups is also that of knowing how thickly populated the two lines are with respect to the origin of the samples. To confirm the observed trends we went on with the statistical survey of a wide range of samples coming from more places of origin.

Materials

A research was carried out on 22 samples, all taken from pieces now kept in the Faenza Ceramics International Museum. In this case special priority was given to some samples coming from kiln dumps.

The samples are coming from recents digs and the ones taken into consideration, divided according to their origin, are described in Table1. In Fig.1 are indicated the Italian sites (Pesaro and Palermo excepted) where the examined samples were found.

In the case of Siena, analyses were carried out also on four samples taken from quarries supposedly utilized in the late Middle Ages.

Methods

The samples to be analysed were taken, in the quantity of few milligrams, from the inside of the biscuits and were tested at the Michigan Phoenix University Reactor Laboratories. During analysis, the treatment procedures were always the same in all cases by adopting sampled quantities in the range between 50 and 100 mg.

The samples underwent neutron irradiation under a flux of 1012 neutrons x cm2 sec.-1 activated twice for a time period varying from 1 h. to 24 h. After a few days´rest the samples underwent counting in oder to resolve the nuclear emission spectra of the various elements.

Some sampling were several times done on the same samples, to submit them to the same series of testes, but by different oporators, with the aim of evaluating to what extent the procedure errors or the possible non-homogeneity of the original samples might affect the total error associated to the concentration value of each element. It was ascertained that the total error by far exceeds the one inherent in the standard error connected with the only instrumental measurement performed by the counting apparatus. The total error, defined for the sake of simplicity as error in the treatment procedure of the samples, was calculated on the basis of the standard deviation deriving from the different concentration values obtained for each element by submitting the different specimens drawn from the same samples (as aldready indicated).

(•) This work was carried out with the financial support of the Arthur Sackler Foundation (New York).

(§) The samples from certain sites were provided by the "Sovrintendenza dei Beni Artistici e Storici" depending on the Ministry for Cultural Environmental Weals of the Venice and Naples areas.

(1) G.C. Bojani, G.W. Carriveau, A. Krajewski, A. Ravaglioli: "Chemico-Physical Characterizations of Majolica Samples Primarily from the Medieval Tuscany-Romagnolo Area", Proceedings of the Meeting: "Medieval Ceramics in the West Mediterranean Area", (Siena-Faenza,1984), Edizioni all'Insegna del Giglio, Firenze 1986, pp. 425-541.

Fig.1- Sites of provenience of the studied samples in this and in the previous (1) papers.

Results

NAA investigations have resulted in the elaboration of Table 2, which reports the content of the different elements that were examined for each samples after the samples were divided according to their origin.

As concerns the evaluation of the total error incurred during analysis for the various elements of the tested samples, the relevant data appear in Table 3 (column 4). This table also indicates the standard instrumental error occurred during counting and the number of times the samples indicated a concentration value below the threshold of sensibility.

From Table 2 derive the graphs of Fig.2 showing biunivocal relations between Cerium and the series of significant elements already defined in the introduction. Fig.3 features a relation between Yb and Sm which had not been considered in the previous work (1).

Discussion

According to the graphs of Fig.2 all the examined samples can be located along the line previously defined Faenza. This supports the statistical validity of the relation previously determined in the case of the Faenza line, which also results the statistically more populated as concerns the origin of the samples. None of the tested samples falls along the Firenze line, which so far results to be followed only by the sites named in the introduction and the existence of which needs further confirmation.

Before continuig our work we also decided to ascertain that the concentration differences relative to all the elements useful to define the two separating lines were significant and were not caused by substancial errors connected with the nature of the samples or the analysis procedures. As for the percentage error on the instrumental counting measures, it appears to be a complex function of the type:

$$E\,\% = \frac{K}{\sqrt{N}} \left(\frac{S}{So-S} \right) f(x)$$

Where:

K= constant;

N= number of countings, proportional to the number of scattering sources, proportional to the concentration of the element;

S= offset time;

So= constant;

f(x)= function of the variable 'and of the proximity of the threshold concentration value;

x= elapsed real time/ elapsed life time.

The total error, besides including the instrumental error, also includes errors deriving from factors inherent in the composition of the samples as well as from factors associated with sampling and manipulation.

The first factor is tied up with the nature of this kind of ceramic samples, whose composition presents a certain non homogeneity much higher than e.g. the one of some metal alloys. The sampling factor is bound up with the procedures used to obtain from the original samples the materials suitable for analysis, in terms of quantities of sampled, of identification of this sampled quantity inside the original sample, of error occurred during weighting, etc.

The manual factor refers to the cheminal and physical treatment methods applied to the sampled quantities to make them suitable for the operation of neutronic activation, for the procedures employed in this activation, and for the methods used to feed the counting apparatus.

According to Table 3, the instrument error is always lower than the one connected with the total error. It is also observed that, in many cases, the orders of magnitude of the two errors are comparable, while in other cases the fact that we are working the threshold of sensibility influences the total error.

As for the elements which can help to determine the separating biunivocal relations, the total error is low enough not to invalidade the reliability of the analyses. For these elements the error source is probably connected with factors inherent in the composition of the samples.

From surveys made here and there on the concentration of some elements have emerged great deviations particularly in relation with Sr and Ni.

The Ni concentration exceeds by over two orders of magnitude the average value in three samples from Faenza (FZ4, FZ8, FZ12) all related to saggars. Correspondingly we have always observed a proportionally high content of Sr, which however appears to be present with high values also by iteself.

Test on quarry samples coming from Siena, made up on three samples of clay raw materials (SIR2, SIR3, SIR4) and one of sandy raw materials (SIR1), proved that Th is an element almost exclusively typical of clays, while sands show richer percentages of elements in traces Au, Ba, Sr, Hg, Zn, Ag, Se. In the sandy sample the Ba, Sr, Se and Ni elements display a concentration ratio of about 1/10 in comparison with the fired products. Analyses show that none of the SIR samples could be related to the raw materials that were

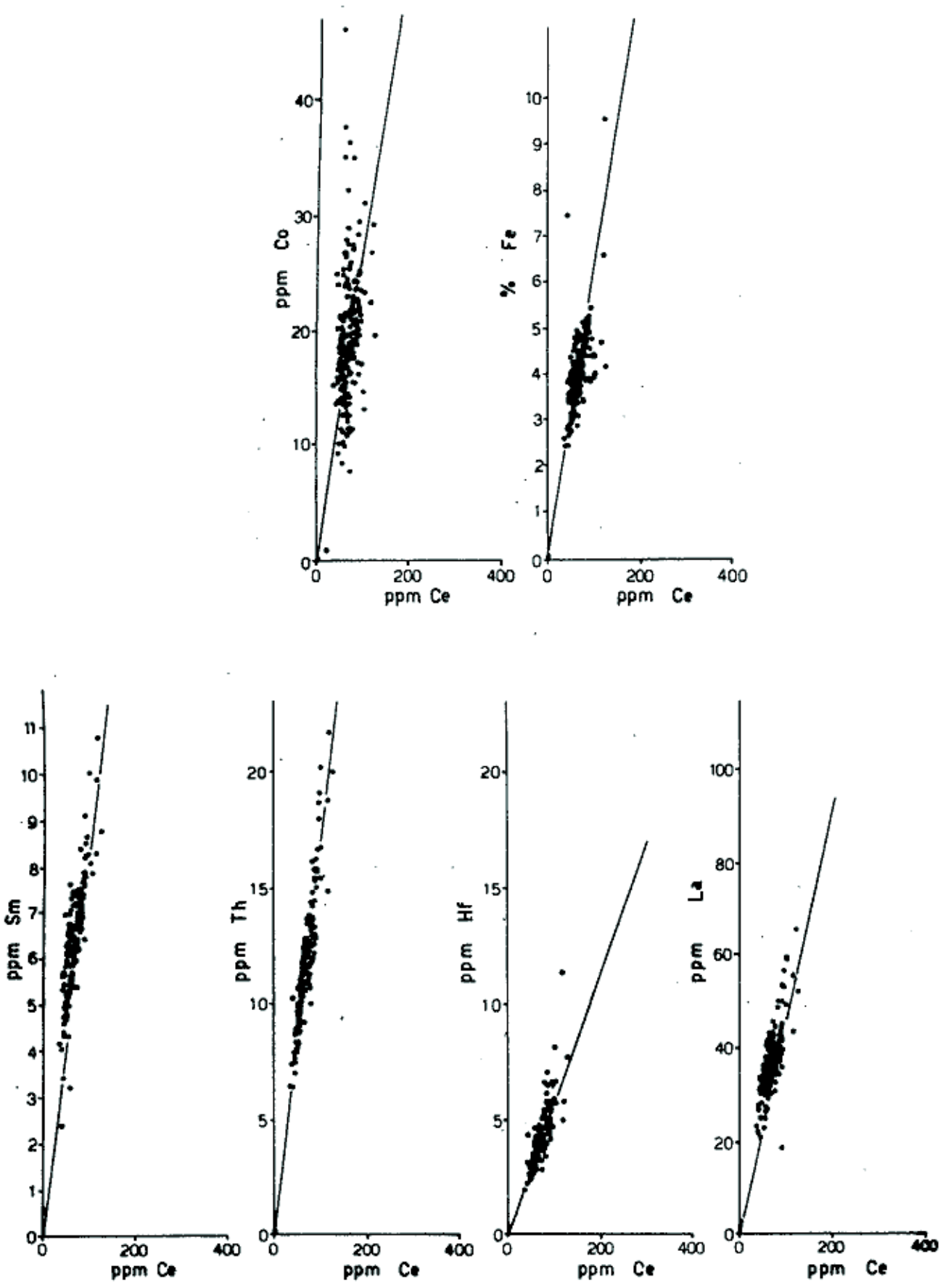

Fig.2- Biunivocal correlatioons between Cerium and a single stimator element as indicated in each graph.

employed at that time, because the indicator elements (Ce, La, etc.) always have lower concentration values compared with those of the examined samples. Thought the characteristics of the SIR4 sample are the nearest to those examined in the fired products from Siena, we note in all the SIR samples a high As percentage and a low Cr percentage as against the fired products.

No further relations were ascertained beyond the ones so far known and shown in Fig. 2 and 3, useful to individuate new indicator elements, even though some significance may be attributed to the loose relationship between Ag and Br (in the formation of insoluble salts?) and to the inverse relationship between the sum of the values of Sr and Ba contents as against Cerium.

The content of certain elements and particularly of the alkaline ones, which may produce soluble salts in drainage waters, is not very significant, as they may have been brought or subtracted by ground dampness.

Their content might consequently vary from place to place also depending on the ancient manufacturing methods. This series of samples also proves the incoherence in the As and Sb content which had been pointed out in the previous work (1).

Conclusions

This work confirms the existences of a perfect biunivocal linear correlation between the content of Cerium and the content of a series of elements such as Hf, Co, Fe, La, Th, which the authors in a previous work (1) defined as useful to separate the late Medieval and Renaissance majolica samples into two groups of place of origin.

All the samples examined in this work have further populated the straight lines conventionally defined Faenza. From a careful survey of the total error that can be incurred (both in terms of procedures and of nature of the materials) it is proved that those elements are reliable for a differentiation into two groups, provided that the existence of the second line may be demonstrated in a next study. A wide variability has been confirmed for elements such as As and Sb, but while the Sb variability can be put down to a very high rate of possible total error, in the case of As a logical explanation will have to be found.

With respect to the error which may be committed, the great variations of Ni content in the Faenza saggars must be regarded as real, while those of Sr fall within the range of the error that may be incurred.

Acknowledgements:

The Authors thank all the persons and Institutions for kindly and freely placing samples of their places in the Faenza's Ceramics International Museum for the appropriate studies

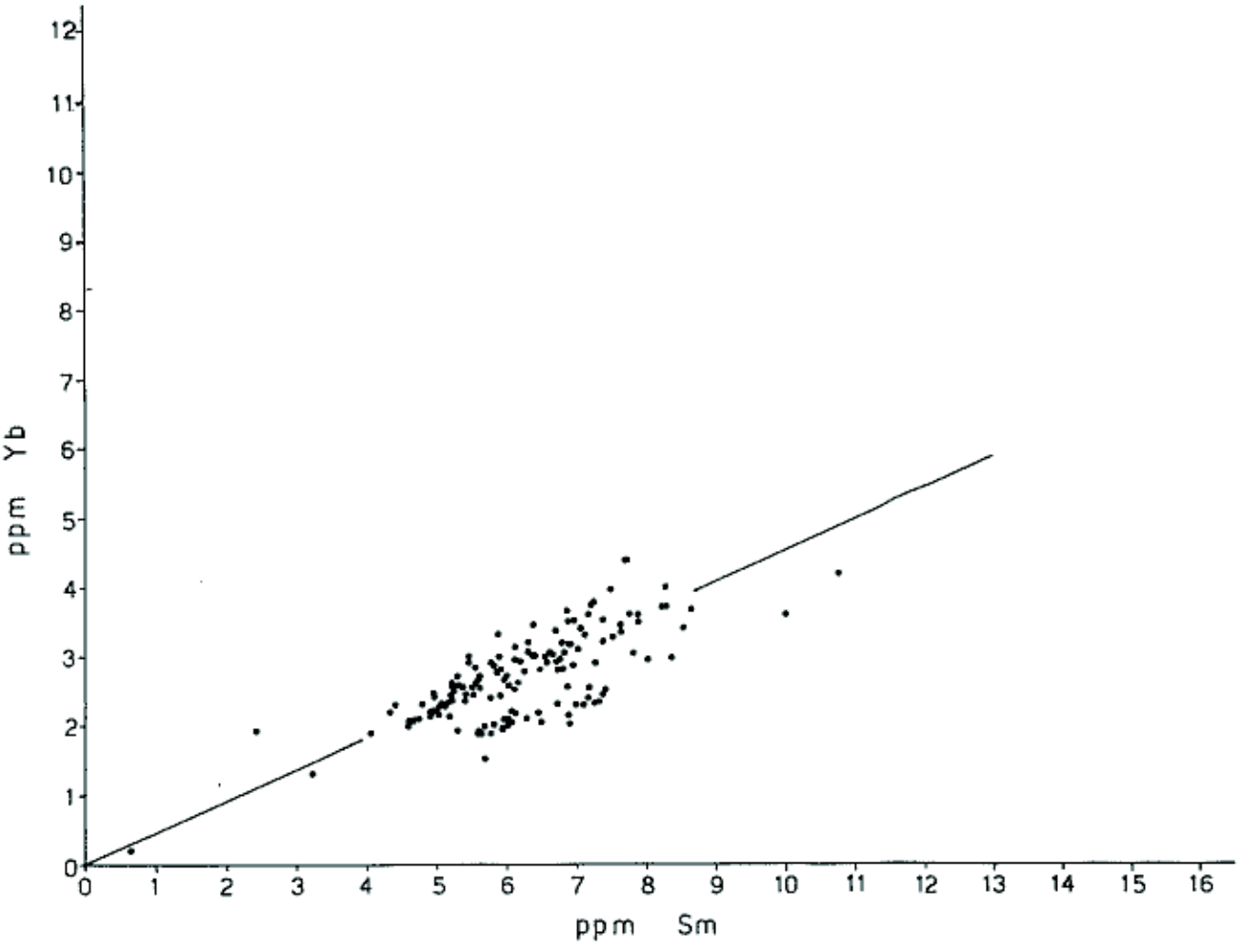

Fig.3- Correlation existing between Samarium and Ytterbium

Table 1 a - Samples put at disposal by E. Tongiorgi, coming from Pisa sites (Porta a Mare, Simonelli Lungarno, Solferino Bridge).

P I 1	XIV cent.
First firing sherd of a fragment of an open shape of arcaic majolica	
P I 2	XIV cent.
First firing sherd of a fragment of a mug base in arcaic majolica	
P I 3	XV cent.
First firing sherd of jar fragment in arcaic majolica	
P I 4	XI-XVI cent.
First firing sherd of a fragment of an engobed and graffito dish	
P I 5	XVI cent.
First firing sherd of an open shape in engobed and graffito ceramic	
P I 7	XVI cent.
First firing sherd of an open shape in engobed and graffito ceramic	
P I 8	XVI cent.
First firing sherd of an open shape in engobed and graffito ceramic	
P I 9 .	XVI cent.
A fragment of a foot of a kiln sherd in graffito ceramic, invitriated with colourless glass	
PI 10	XVI cent.
Second firing sherd of a too much fired fragment in engobed and graffito ceramic of a foot covered with colourless glass	
PI 11	XVII cent.
First firing sherd of a fragment of engobes and graffito dish	
PI 12	XVII cent.
First firing sherd of a fragment engobed and graffito with a heraldic bearings as decoration	
PI 13	XVI-XVII cent.
First firing sherd of a fragment of dish in marmorized ceramic	

Table 1 b - Samples put at disposal by Schiafancia Civic Museum of Ferrara and Pasetti's Colection, coming from Ferrara sites (Compato S. Romano).

FE 1	RMP 1982	XIV cent.
A fragment of jug in arcaic majolica		
FE 2	RMP 1982	XIV-XV cent.
Bicomic in arcaic majolica with geometric decorations on alterated enamels		
FE 3	RMP 1982	XIV cent.
Decorated glass in arcaic majolica with a drowed bird		
FE 4	RMP 1982	XIV cent.
Decorated glass in arcaic majolica		
FE 5	RMP 1982	XIV cent.
A fragment of a bowl wall in arcaic majolica with an anomalous red body		
FE 6	RMP 1982	XIV-XV cent.
Ovoidal bowl of arcaic graffito padana with fused parts		
FE 7	RM 4001	XIV cent.
First firing sherd of a basin fragment with arcaic graffito padana with in flowers decorations		
FE 8	RM 4097	XV-XVI cent.
Fragment of drim neck of prabable "impagliata" with rinascimental polycromic graffito and painted in "ramina" and "ferraccia"		
FE 9	RM 4097	XV-XVI cent.
A fragment of a small bowl bottom with rinascimental polycromic graffito painted in "ramina" and "ferraccia"		
FE 10	OA 118 (Colli	XIV-XV cent.
Second firing sherd of a too much fired bowl bottom with arcaic padana graffitto and decorated in the interior with a leaf within a whirl		
FE 12	OA 154 (Coll.	XIV-XV cent.
First firing sherd of a engobed graffito and painted-without glaze bowl- in rinascimental polycromy		
FE 13	OA 114 (Coll.	XIII-XIV cent.
Bowl base with arcaic padana graffito and internal decoration painted in "ferraccia" and "manganese"		
FE 14		XVI-XVII cent.
First firing sherd of a big bowl base with post medieval graffito representing a flowering tree.		

Table 1 c - Samples put at disposal by the "Sovraintendenza per i Beni Artistici e Storici di Venezia", coming from Venice sites (Fusina, Malcontenta).

VE 1	MBCA 1	XIV cent.

A fragment of a dish base in engabed and polycronic graffito Fajence with traces of ironish yellow and verdigris

VE 2	MBCA 2	XV cent.

A fragment of bowl having a rounded rim lightly extroflexed in engobed fajence and polycromic graffito with partially glazing alsoo at the exterior. A symbolic animal is reported on the bottom within a medallion with bond meander at the walls

VE 3	MBCA 3	XV-XVI cent.

A fragment of dish with engobed and polycromic graffito fajence with centered a stylized whirl motif with around a straight band and fillet at meanders

VE 4	MBCA 4	XVI cent.

A fragment of a dish base in engobed fajence and graffito at "punta a stecca" with writing and typical venetian panada

VE 5	MBCA 5	XVI cent.

A fragment of dish base with wide traces of blenish enamel at the interior and exterior

VE 6	MBCA 6	Late XVI cent.

A fragment of calotte bowl in majolica with pod shaped on the walls and circular decorations in the bottom

VE 7	MBCA 7	XVI cent.

A kiln sherd fragment dish in engobed fajence and graffito, without glazing and uniformerly blackened

VE 8	MBCA 8	XVII cent.

A fragment of dish base in engobed fajence and polycromic graffito with a bird on field, coloured in verdigris and ironish yellow

VE 9	MBCA 9	XVII cent.

A fragment of invitriated ceramic plate with pale-brown pigments in the interior

VE 10	MBCA 10	XVII cent.

A crockery in pink-ocra invitriated ceramic with a short neck and small taped drim

VE 11	MBCA 11	XVII cent.

A fragment of bowl wall in engobed fajence painted and invitriated in the interior and exterior

VE 12	MBCA 12	XVI cent.

A fragment of majolica plate painted in compendiario style with uniform crazing enamel

VZ 13	MBCA 13	XVII-XVIII cent.

A fragment of a conventual bowl in engobed fajence graffito and with pale-brown glazing.

Table 1 d - Samples put at disposal by Mr. Angeloni, coming from Gubbio sites (S. Giovanni, Via Vantaggi, Butto of Via Picotti, garden of Benvenuti Palace).

GU 1	Box. n.1	XIV-XV cent.

A fragment of arcaic majolica bolw, handled with phytomorphic decoration in green manganese

GU 2	Box n.2	XV cent.

A fragment of majolica jug in severe style with in relief decoration in green manganese

GU 3	Box n.2	XVI cent.

A fragment of engobed graffito and painted small basin with phytomorphic decorations enclosed iinto compartments

GU 4	Box n.4	XV cent.

A fragment of small arcaic bowl with cross in manganese at the center

GU 5	Box. n.5	XVI cent.

A fragment of dish with geometric decorations in the repertory of the flowered style

GU 6	Box. n.6	XVI cent.

A fraagment of dish with leaf decorations into compartments in monocromic deep-bleu

GU 7	Box. n. 8	XVII cent.

A fragment of jug with geometric decoration at diamond in the central medallion

GU 9	Box. n. 9	XVII cent.?

A fragment of closed shape with brown painting at the exterior

GU 10	Box. n.9	XVI-XVII cent.

A fragment of dish-drim with decoration in green leaves

GU 11	Box. n. 10	XV cent.

A fragment of panada decorated with girales motives in bleu and spottiness in manganese

Table 1 e - Samples coming from Faenza's digs (ACLI, Popolare Bank, Portello walls).

FZ 1	AB 4455/2	XV cent.
Second firing sherd of a zaffer jug		

FZ 2	+ 8490-C.231/5	XIV-XV cent.
Second firing sherd of a graffito basin		

FZ 3	+8490-C.633/4	XIV-XV cent.
First firing sherd of a graffito		

FZ 4	17144/1	XIV-XV cent.
Second firing sherd of an arcaic jug.		

FZ 5	20903	XV cent.
Second firing kiln sherd of a zaffer jug base		

FZ 6	20902-C.117	XV cent.
Second firing sherd of a gotic dish "at cold palette"		

FZ 8	20899-C.232	XV-XVI cent.
Saggar		

FZ 10	20899-C.232	Xvi cent.
Bowl sticked to the saggar FZ8 as second firing sherd		

FZ 11	20900	XVI cent.
Kiln brick		

FZ 12	20900	XVI cent.
Saggar		

FZ 14	20897-C.217	XVI-XVII cent.
Second firing sherd of drinking trough		

FZ 16	20904-C.553	XIV-XV cent.
Arciac jug with encrustments		

FZ 17	11429-C,277	XIV-XV cent.
.A fragment of the upper part of an arcaic jug.		

FZ 18	20910-C.205	XV cent.
A fragment of thinner zaffera jug		

FZ 19 11603-C.62 XIV-XV cent.

A fragment of arcaic jug at manganese and verdigris

FZ 20 20913 DID XV cent.

A fragment of arcaic jug at manganese and bleu

FZ 21 20912-C.205 XV cent.

A fraglent of a piece of decorated jug at manganese and thinner zaffer

FZ 22 20905 XV cent.

A fragment of jug, probably sherd of first firing, coming from the ACLI dig.

FZ 23 20909 XV cent.

A fragment of a dish at manganese at bleu

FZ 24 +20906 XV cent

A fragment of graffito bowl coming from Popolare Bank dig

FZ 25 20908 XV-XVI cent.

A fragment of graffito bowl with narrow brim coming from Popolare Bank dig.

FZ 26 20907 XV-XVI cent.

A fragment of engobed and graffito basin coming from ACLI dig.

Table 1 f - Samples coming from digs in Ravena.

RA 1	20876-C.554	XVi cent.
A second firing sherd of majolica		

RA 2	20877-C.560	XVI-XVII cent.
A second firing shard od majolica		

RA 3	20881-C.554	XV-XVI cent.
Firing sherd of a majolica biscuit painted with bleu, yellow and orange		

RA 4	20874-C.554	XV-XVI cent.
A first firing sherd of graffito		

RA 5	20875-C.554	XV-XVI cent.
A first firimg sherd of graffito		

RA 6	20880-C.554	XV-XVI cent.
Cock-scrowles on majolica		

RA 7	20879	XV-XVI cent.
Cock-scrowles on graffito coming from dig		

RA 8	29878	XV-XVi cent.
First sherd of a graffito coming from dig		

RA 9	20883	XVI-XVII cent
First firing sherd of rinascimental graffito coming from dig.		

RA 10	20882	XV cent/.
First firing sherd of arcaic majolica coming from dig.		

Table 1 g - Samples coming from digs in Rimini.

RI 1	9132	XV cent.
A fragment of decorated jug at zaffera in relief		
RI 2	8131	XVI cent.
First firing sherd of glazed jug.		
RI 3	8131	XV-XVI cent.
Second firing sherd of jug.		
RI 4	8124	XV-XVI cent
Unfired enamelles plate		
RI 5	8124	XV-XVI cent.
A small jug having traces of unifered		
RI 6	8125	XV-XVI
Cock-scrowle in red-body		
RI 7	8125	XV_XVI cent.
Cock-scrowle in pale-yellow body		

Table 1 h - Samples coming from a like cellar room under the Siena Duomo chapter-house.

SI 10	XVII-XVIII cent.
A fragment of basin with extroflexed rim and flower decoration	
SI 11	XVII-XVIII cent.
A fragment of basin with extroflexed rim and stylizated decorations	
SI 12	XVII-XVIII cent.
A fragment of clased shape with flowered stylizated decorations.	
SI 13	XVII-XVIII cent.
A fragment of basin with coil decorations and stripes on engobe.	
SI 14	XVII-XVIII cent.
A fragment of dish drim with strokes of brush fish-bone	
SI 1	XV-XVI cent.
A fragment of dish drim with porcelain decoratiion and white geometric motives	
SI 2	XV-XVI cent.
A fragment of an open shaped with writtings	

SI 3	XV-XVI cent.
A fragment of dish drim with bow-bands and geometric decorations	
SI 4	XVII cent.
A fragment of basin with an extroflex rim with decoration by bleu spots groups	
SI 5	XVIII cent.
A fragments of dish drim with bouquettes	
SI 6	XVIII cent.
A fragment of dish drim with bouquettes	
SI 7	XVII-XVIII cent.
A fragment of dish with stylized decoration enclosed within manganese stripes	
SI 8	XVII-XVIII cent.
A fragment of stylized decoration dish with bleu stripes	
SI 9	XVII-XVIII
A fragment of an open shape bleu stylizations	

SI 17 XVIII cent

A fragment of a closed shape in painted terracotta, a handle with rosette in relief

SI 18 XVIII cent.

A painted terracotta

SI 19 XVII-XVIII cent.

A terracotta with green vernish on engobe

SI 20 XVII-XVIII cent.

Closed form base terracotta

SI 21 XVII-XVIII cent.

A fragment ofclose shape terracotta

SI 22 XVIII cent.

A fragment of open shape terracotta

SI 24 XVIII cent..

A platic fragment of a stoup-tank with face of a winged putto.

SIR 1 n.1 ===

A greyish sample of sand clay coming from an Anciano quarry.

SIR 2 n.2 ===

A citrine-yellow sample of a clay coming from an Anciano quarry

SIR 3 n.3 ===

A "terra di Siena" sample of a clay coming from an Ancaino quarry

SIR 4 n.4 ===

A brownish ocra samples of a clay coming from an Ancaino quarry

Table 1 i - Samples coming from the ancient dump under the Pompei house in Castelli (Teramo).

CAS 1	CA 1	XV cent.
A fragment of tricromic dish with lanceolate leaves and graffito		
CAS 2	CA 2	XV cent.
A first firing sherd fragment of a graffito and engobed body		
CAS 3	CA 3	XV cent.
A first firing sherd fragment of a bowl bottom. engobed		
CAS 4	CA 4	XV cent.
A first firing sherd of engobed jug		
CAS 5	CA 5	XV-XVI cent.
A fragment of majolica bowl		
CAS 6	CA 6	XV-XVI cent.
A fragment of a majolica closed shape with shrinked enamel		
CAS 7	CA 7	late XV
A fragment ofa majolic closed shape with decorations similar to those of the heraldic bearings of the Calabri Duke Alfonso II		
CAS 8	CA 8	XVI cent.
A dish drim of deep bleu majolica		
CAS 9	CA 9	XVI cent.
A fragment of majolica jug decotrated with white and bleu		
CAS 10	CA 10	XVII cent.
A fragment of majolica bowl trichromic decorated in compendiario style		
CAS 11	CA 11	XVI cent.
A fragment of trichromic closed shape with very bright glaze		
CAS 13	CA 13	XVII cent.
A fragment of plastic shape with majolica		
CAS 14	CA 14	XVI cent.
A fragment of majolica bowl, white with strong fairing.		

Table 1j - Samples put at disposal by the Roma's Museum, coming from various different sites of the town and proposed in the catalogue "La raccolta delle ceramiche del Museo di Roma" (1968).

ROMA 1	XVI-XVII cent.
Kilm sherd of a flat plate	
ROMA 2	XIII cent.
Kiln sherd of a jug	
ROMA 3	XVII cent.
Kiln sherd of a big plate	
ROMA 4	XII-XIII cent.
A small cap sample	
ROMA 5	XVI cent.
A dish with a poor enamel 1	
ROMA 6	XV cent.
A jug with the heraldic-bearings of Colonna's family	
ROMA 7	X cent.
A jug with heavy glaze	
ROMA 8	XV-XVI cent.
A small dish	
ROMA 9	XV cent.
A jug of the transition period	
ROMA 10	XV cent.
Bowl	
ROMA 11	XVII-XVIII cent.
A big jar with pipe of roman typology	
ROMA 12	XVI cent.
A dish of "landscape master" typology	
ROMA 13	XV cent.
A dish with drim	
ROMA 14	XV cent.
A big bowl	
ROMA 15	XIII cent.
Olla for water	

Table 1 k - Samples put at disposal by the Municipality Authorities of Fabriano, coming from the Podestà's Palace and Captain Tower.

FAB 1	V 7	XV cent.
A fragment of closed form with severe style flowering gothic family decorations coming from Podestà Palace :Trabocchetto"		
FAB 2	V 276	XVI-XVII cent.
A fragment of an open shape with polycromic phytomorphic decoration on engobe		
FAB 3	V 209	XVI cent.
A fragment an hystoriated open shape		
FAB 7	SN	XV-XVI cent.
A fragment of a bisquit close shape of medieval sump		
FAB 8	N 512	XV cent.
A fragment of an open form with a womanly profile in severe style		
FAB 9	N 537	XVI cent.
A fragment of an open shape with hystoriated decorations		
FAB 11	N 320	XV cent.
A fragment of an open form with flowering gothic family in severe style		
FAB 12	N 351	XV-XVI cent.
A fragment of an open shape with graffito decoration on engobe and underglaze		
FAB14	N 125	XV cent.
A fragment with an open form with a pierced heart painted in the center		
FAB 15	N. 472	XV cent.
A fragment a majolica closed shape with at relief green decorations and manganese in severe style		
FAB 16	NN 640-646+3	XVI cent.
A fragment ofan open shap[e with an hystoriated scene		
FAB 17	N 50	XV cent.
A fragment of an arcaic majolica closed form		
FAB 18	N 360	XV cent.
A terracotta samples from Podestà Palace		

Table 1 1 - Samples given by the Municipality Authorities of Deruta and sprung out during the upkeep of the local aqueduct.

DE 1	XVI cent
A kiln sherd of majolica dish with decoration at peacock-feather age	
DE 2	VXI cent.
A kiln sherd of majolica dish with geometric decorations and bleu tiled	
DE 3	XVI cent.
A fragment of majolica sherd with bleu and orange decoration at peacock-feather eye	
DE 4	XVI cent.
A fragment of majolica pot with a"berrettino" background and wolf teeth and stylized flowers	
DE 5	XVI cent.
Kiln sherd of white decorated majolica dish welded at tripod during firing	
DE 6	XV cent.
A fragment of majolica rim decorated whit bleu and orange sharp leaves.	
DE 7	XV cent.
A kiln sherd of a majolica dish decorated on the rim with orange and bleu sharp leaves	
DE 8	XV cent.
Kilns sherds of a majolica dish with bleu, orange and virdgris geometric decorations	
DE 9	XV cent.
A fragment of majolica bowl with flat bottom and with expecial reversed graffito	
DE 10	XV cent.
A fragment of flattened bottom majolica bowl, engobed and invitriated with trilobated sharped graffito leaves in virdgris and brownish	
DE 13	XV cent.
First firing sherd of a flattened bottom ceramic bowl, engobed and graffito with trilobated leaves decoration	

Table 1 m - Samples coming from the neighbourings of Salerno (the castle and S. Pietro a Corte).

SA 1	XIII cent
A fragment of a little cup in spiral-ware decorated in green and manganese brown	
SA2	XIII cent.
Second firing sherd of an invitriated jug fired in reduced atmospere with wide bubbles with spiral decoration	
SA 4	XIII-XIV cent.
A fragment of cavetto and border of small jug with polycromic glazing of RMR class with geometric decoration, in manganesa and red	
SA 5	XIII-XIV cent.
A fragmente of conic shaped basin with polycromic glazed decorations of RMR CLASS in green manganese and red	
SA 6	XIII-XIV cent.
A fragment of biconic small jug in majolica with monochromic geometric decoration in manganese	
SA 7	XIII-XIV cent.
A fragment of biconic cavetto of a small cup in majolica with anabstract flowering decoration in green and manganese	
SA 8	XIV-XV cent.
A fragment of a majolica basin bottom with flowers decoration in green and manganese	
SA 9	XV-XVI cent.
A fragment of polichromic graffico bowl decorated with leaves and geometric tracts in green and ocra	
SA 10	XV-XVI cent.
A fragment of a polychromic graffito bowl with decorations in white, green and ocra	
SA 11	XV-XVI cent.
A fragment of a graffito bowl with bichromic decoration in green and ocra	
SA 12	XV-XVI cent.
A fragment of a cylindric ggraffito mug decorations in green and ocra	

Table 1 n - Samples coming from Castel Delfino (Savona) during accurated stratigraphic escavations

GS1	US B1 III	XIII cent.
Invitriated olla		

GS2	US B1 III	XIII cent.
Monocromic graffito		

GS3	US B1 III	XIII cent.
Engobed monocromic terracotta		

GS4	USL, FL R78	XIII cent.
Invitriated saucepan		

GE7	GE7A	XVI cent.
Dish of rare kind of majolica		

GE8	GE108	XVII cent.
Basin of engobed rare kind of majolica		

GS8	US H10 43	XVI cent.
Monochromic graffito terracotta		

Table 1 p - The series of samples coming from Genova town sites (S. Vincenzo and Maragliano street) with GE codes and Genova-Savona area (S. Silvestro and Commenda di Pré: area Q) with GS code.

GS5	USL1, FL R78	XIII cent.
Arcaic graffito		

GS6	USL1, FL R78	XIII cent.
Cobaltmajolica		

GS7	USL1, PL R78	XIII cent.
A majolica imitating approtomajolica		

GE1	GE1	XVI cent.
Jug of fragment ind of majolica		

GE2	GE2	XVI cent.
Dish of fragment kind of majolica		

GS9	XVI cent.
Anomalous graffito lath	

GS10	XVI cent
Majolica graffito at whire	

GS 11	US E9 IIA/f	XVI cent.
Majolica berrettina at leaves		

GS12	US E9 IIA/f	XVI cent.
Jug in majolica berrettina		

GS13	US G8 1 IIa	XVII cent.
Monochromic graffito jug.		

GS14	US G3 1 IV	XVII cent.
Majolica with vegetable motives in white and bleu		

Table 1 q - Samples coming from Montelupe Fiorentino.

ML2	XV cent.
A wide bowl at a flat bottom of "the green family"	
ML3	XV cent.
A wide bowl at a flat bottom of "the green family"	
ML4	XV cent.
Hemispherical small bowl of "Italo-Moresca" typology	
ml5	XV cent.
A jug of tricoloured typology	
ML6	XV cent.
Big bowl with wide drim and hemispheric cavetto of "Italo-Moresca" typology	
ML7	XV cent.
A bowl-shaped plate of "Italo-Moresca" typology	
ML9	XV-XVI cent.
A small bowl with a wide drim of "persian palmetto" style	

ML10	XVI cent.
A flat plate with decoratiob" at porcelain"	
ML11	XVI cent.
A flat plate with decoration at cracked little ribbons	
ML12	XVI cent.
A flat plate with decoration at "ovals and rhombis"	
ML13	XVI cent.
A flat p[late with decoration at "graffito bleu"	
ML14	XVI cent.
A flat plate with decoration at tiles structures	
ML16	XVI cent.
A flat pplate with decorations at "spirals in orange"	
ML17	XVI late
A jug with decoration at the "polycromic stripes"	

ML18 XVII cent.

A jug in "CompendiarioToscano"

ML19 XVI cent. late

A flat plate in "Compendiario a paesi"

ML21 XVII cent.

A flat plate with decorations with leaves and fruits

ML22 XVIII cent.

A flat plate with decoration in green leaf in "cabbage leaf style"

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
PII		6.7155	0.6014	3.4706	483.08	8.0987	123.71	1.2148	37.328	26.834	1.3884	0.6664	14.650	199.73	0.8685	3.6362	11.013	
		58.077	2.3366	149.21	6.9084	1.7713	15.839	4.1905	1.2773	92.543	47.939	2.0735	0.0420	184.61	59.248	4.6979	——	
PI2		7.1106	0.6282	4.1544	563.98	19.554	137.41	0.9011	42.779	36.362	1.6200	13.180	8.4938	298.28	1.1123	20.911	12.389	
		66.098	2.3132	172.97	8.8699	1.6352	18.725	4.8942	1.4653	127.75	45.354	2.8068	0.0394	206.74	2.2026	3.7185	——	
PI3		7.3776	0.6307	3.3828	485.11	7.5622	150.73	0.8383	42.650	28.978	1.5272	0.8787	11.756	159.99	0.9637	2.4410	12.442	
		66.211	2.4514	172.45	8.7723	1.5389	18.540	4.9205	1.4607	77.412	51.143	2.4349	0.0338	185.23	20.071	3.6652	——	
PI4		7.4321	0.6614	3.2588	537.78	7.1959	133.49	0.9707	41.770	27.469	1.5155	1.2617	7.9905	203.34	0.9517	2.4728	12.735	
		67.818	2.5261	160.47	7.8991	1.8116	18.068	4.7208	1.5431	65.136	40.975	2.3870	0.0319	177.29	1.9395	3.9949	——	
PI5		7.2550	0.6644	3.1064	517.18	8.6922	148.91	0.6445	42.843	26.647	1.4666	0.6515	6.4206	139.09	0.9564	1.6588	11.812	
		63.911	2.3343	170.06	10.196	1.0244	19.331	4.9679	1.3635	85.714	42.177	2.2697	0.0310	151.50	1.9451	2.9492	——	
PI7		7.6455	0.5403	3.8987	673.76	9.5695	168.21	1.0086	43.226	22.606	1.4919	8.4047	6.1860	265.74	1.1199	1.7734	15.399	
		89.621	3.4850	178.49	8.2971	1.1335	17.899	5.0909	1.4054	51.325	32.077	2.4796	0.0050	113.05	1.3067	5.5836	——	
PI8		7.1833	0.4552	40.0466	553.08	10.009	187.74	1.0057	40.078	21.048	1.4264	9.2383	6.3065	251.90	1.0800	1.7060	14.855	
		84.545	3.6047	175.35	8.1458	1.0381	17.293	4.9515	1.3759	70.535	29.460	2.5300	0.0071	59.798	1.6432	4.7366	——	
PI9		7.8915	0.4602	4.1323	556.16	12.415	187.90	0.9983	44.745	24.959	1.5018	2.5947	7.6048	267.69	1.1363	3.8302	15.893	
		92.192	3.5235	198.36	9.5013	0.5940	18.636	5.1944	1.3241	67.485	32.970	2.5222	0.0061	62.951	1.7295	5.0029	——	
PI10		7.8992	0.4844	3.1052	550.35	8.5251	171.57	0.8559	45.433	25.202	1.4985	0.7185	6.5218	284.26	1.2011	2.3427	15.736	
		94.578	3.6558	201.57	9.7204	1.7617	19.261	5.4535	1.2562	37.939	42.024	2.6694	0.0260	66.197	1.1625	5.4585	——	
PI11		7.7503	0.4870	4.1102	502.84	11.124	167.71	0.7854	44.217	23.552	1.4779	2.1012	6.3056	293.94	1.2414	3.0957	15.768	
		94.016	3.6098	201.00	9.7384	1.1459	19.387	5.4548	1.2986	76.117	38.662	2.4308	0.0141	68.886	1.9054	4.8388	——	
PI12		7.7180	0.4579	4.3407	570.70	7.0359	167.01	1.0697	42.455	24.856	1.5156	0.4890	6.8807	200.2	1.1734	2.9597	15.298	
		89.681	4.4224	180.46	8.2069	0.7658	17.616	5.1462	1.3087	67.053	36.401	2.6060	0.0102	64.060	1.7873	5.7882	——	
PI13		7.5389	0.4605	4.3074	489.41	9.7636	165.21	0.7036	43.754	21.942	1.3902	1.4033	6.1423	257.03	1.1352	2.2006	15.031	
		92.329	3.2730	178.50	8.5950	1.6855	18.829	5.2927	1.3085	60.664	48.553	2.2300	0.0109	62.461	1.7401	4.1840	——	

Table 2a - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Pisa

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
FE1		5.56	0.39	1.55	305.0	8.32	137.1	0.998	35.2	18.3	1.03	1.64	——	294.0	——	——	11.5	2.158
		62.7	2.39	137.1	8.8	0.74	14.0	4.23	1.08	——	23.7	——	——	113.0	——	3.77	——	8.26
FE2		5.65	0.44	1.71	428.0	9.16	161.1	0.948	35.9	17.0	1.06	6.22	——	401.0	——	——	12.1	2.259
		63.2	2.55	140.9	9.4	0.76	14.0	4.09	1.07	——	——	——	——	115.9	——	4.07	——	9.44
FE3		6.21	0.41	1.90	418.0	10.69	147.9	1.069	39.0	16.2	1.19	2.51	——	284.0	——	——	12.5	2.280
		70.1	2.79	167.1	8.7	1.00	14.7	3.59	1.22	——	21.6	——	——	106.9	——	4.65	——	8.73
FE4		5.92	0.37	2.21	446.0	10.69	158.9	1.439	37.7	19.7	1.14	2.55	——	304.0	——	——	12.2	2.339
		65.9	2.65	140.0	8.6	0.92	14.6	3.55	1.09	——	29.1	——	——	109.0	——	467	——	7.11
FE5		6.04	0.38	1.22	350	18.11	181.1	1.199	38.8	17.9	1.20	1.61	——	275.0	——	——	12.6	2.388
		68.2	2.77	150.0	9.4	0.86	15.6	3.08	1.16	——	26.6	——	——	125.0	——	4.09	——	4.47
FE6		6.03	0.44	1.67	500.0	10.69	187.9	1.710	37.4	14.5	1.17	1.77	——	454.0	——	——	12.0	2.382
		66.8	2.68	153.1	8.7	0.85	14.7	2.85	1.09	——	27.5	——	——	154.2	——	4.86	——	7.10
FE7		6.21	0.39	1.47	640	15.21	152.1	0.791	38.5	18.8	1.14	1.21	——	406.0	——	1.3	12.4	2.489
		68.9	2.92	187.1	7.9	0.74	15.9	3.74	1.13	——	——	——	——	206.1	——	4.04	0.01	6.37
FE8		5.40	0.38	2.30	383.0	7.45	182.8	0.662	34.4	15.0	1.03	0.90	——	679	——	——	10.8	2.317
		60.8	2.54	136.1	7.5	0.61	14.1	3.48	1.01	——	17.3	——	——	127.1	——	3.52	——	11.59
FE9		6.21	0.35	1.31	313	9.68	166.0	0.796	39.0	19.0	1.17	3.73	——	441.0	——	2.1	12.9	2.570
		71.6	3.09	186.2	8.80.8	0.90	16.0	3.85	1.28	——	31.5	——	——	136.1	——	4.11	0.01	5.52
FE10		5.98	0.44	1.81	405.0	16.41	133.0	0.847	37.3	24.1	1.16	24.72	——	——	——	1.3	12.3	2.239
		66.4	3.02	237.9	7.2	0.84	15.8	4.47	1.16	——	——	——	——	119.1	——	4.33	——	8.57
FE12		6.25	0.36	——	498	21.88	184.9	0.667	38.6	20.4	1.19	1.71	——	284.0	——	3.6	12.8	2.449
		71.6	3.21	223.9	9.1	0.70	17.3	4.82	1.31	——	——	——	——	200.0	——	3.74	——	7.03
FE13		6.11	0.48	1.66	474.0	12.11	157.0	0.875	37.8	23.0	1.13	1.59	——	327.0	——	2.7	12.2	2.438
		66.7	3.26	231.7	7.9	1.04	16.1	4.52	1.28	——	31.7	——	——	139.0	——	4.62	0.01	6.44
FE14		5.89	0.41	1.99	484.0	15.10	157.0	0.659	37.7	21.6	1.14	1.50	——	390	——	——	12.4	2.328
		65.6	2.90	209.9	8.3	0.80	16.3	4.38	1.00	——	23.3	——	——	123.0	——	3.76	——	7.69

Table 2b - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Ferrara

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
VE1		8.65	0.58	3.20	649	67.92	238.2	1.449	56.6	21.4	1.55	2.49	——	——	——	——	18.0	2.618
		95.7	3.68	173.0	10.2	1.03	17.3	4.42	1.58	——	34.8	——	——	162.9	——	6.44	——	——
VE2		6.4624	0.6147	2.4438	453.47	17.501	134.77	0.8367	37.431	35.144	1.2847	1.3521	6.1358	427.73	0.7568	2.3275	10.722	
		55.945	2.1860	184.70	8.3150	1.9807	16.382	4.2654	1.1870	84.234	41.243	2.0447	0.0378	138.94	4.6382	3.0765	——	
VE3		8.53	0.50	2.47	618.0	26.12	228.0	1.030	56.5	17.2	1.57	1.65	——	——	——	——	18.7	2.723
		96.4	3.42	96.8	9.9	1.26	17.2	4.78	1.30	——	45.1	——	——	157.0	——	4.70	——	7.36
VE4		7.1563	0.6158	2.4933	577.88	24.157	159.80	0.9083	43.086	18.660	1.4581	4.8791	6.5146	234.03	0.8726	2.6121	13.564	
		73.356	2.4009	90.216	9.8699	1.9633	16.138	3.6458	1.0067	37.825	38.780	2.6748	0.0407	154.43	11.263	2.9357	——	
VE5		7.26	0.47	3.07	473	48.75	86.1	1.770	48.9	23.6	1.32	4.76	——	——	——	——	16.2	1.079
		84.5	2.92	90.2	7.4	1.07	15.7	3.87	1.17	——	42.2	——	——	144.9	——	4.37	——	14.00
VE6		6.00	0.44	1.95	458.0	9.16	157.0	0.693	38.9	19.7	1.17	1.65	——	504.0	——	——	12.5	1.820
		68.9	2.72	190.1	8.0	0.81	15.7	4.15	1.27	——	25.8	——	——	110.9	——	4.16	——	10.40
VE7		8.3748	0.8297	2.7768	559.70	19.417	188.40	1.7762	50.066	15.470	1.6051	1.0297	7.0244	181.96	0.8584	6.9221	14.201	
		84.808	2.9781	79.321	7.9704	1.5508	15.562	3.9305	1.4451	42.890	38.677	2.1626	0.0355	142.78	1.4035	6.0797	——	
VE8		10.027	0.8986	3.4715	809.19	30.423	205.38	1.3821	59.132	23.289	1.8878	1.3672	9.0075	203.10	0.9620	5.9666	16.806	2.931
		102.49	3.5169	100.47	10.663	2.6381	18.430	4.4303	1.6547	47.532	52.706	2.5541	0.0449	177.13	1.9443	5.7516	——	——
VE9		7.64	0.52	2.32	522.0	30.83	216.8	1.690	50.2	22.2	1.38	3.16	——	201	——	——	15.8	2.818
		90.2	3.37	136.1	8.7	1.10	16.1	4.59	1.34	——	35.5	——	——	107.9	——	5.56	——	4.62
VE10		8.22	0.37	3.72	361.0	33.04	222.8	1.600	53.2	20.8	1.47	3.80	——	——	——	10.1	16.7	3.062
		95.5	3.73	93.1	9.1	1.22	15.3	3.85	1.33	——	26.7	——	——	132.1	——	6.62	0.02	——
VE11		10.79	0.61	——	516.0	76.74	289.7	1.671	65.5	29.3	1.93	3.66	——	——	——	11.5	21.7	3.499
		121.1	4.20	105.0	12.1	1.47	18.5	6.58	1.35	——	59.2	——	——	141.9	——	5.78	——	——
VE12		5.61	0.31	2.46	509	12.91	80.4	1.194	34.4	15.7	1.08	3.18	——	478	——	10.2	10.7	1.730
		62.2	2.70	115.1	4.8	0.80	13.3	3.69	1.04	——	17.8	——	——	107.9	——	4.21	0.01	14.09
VE13		7.3265	0.5910	3.4612	603.42	9.8877	176.66	1.1669	44.546	18.654	1.4052	1.4163	8.5008	194.52	0.8955	17.560	13.800	
		76.180	2.3500	90.591	10.204	0.9958	16.555	3.4500	1.0603	31.955	39.868	2.2518	0.0368	211.65	1.9678	3.6627	——	

Table 2c - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Venezia

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
GU1		5.5576	0.6803	1.9720	325.14	4.7877	122.21	0.4939	31.837	17.568	1.1107	0.5319	4.7242	480.28	0.7976	1.6624	9.2012	
		49.990	1.9469	90.878	5.3926	1.3259	14.275	3.9108	1.0052	32.986	27.270	1.5123	0.0074	121.39	1.4912	2.5340		
GU2		6.1410	0.6997	2.0316	525.26	4.6640	130.50	0.6209	35.489	19.463	1.2478	0.5478	4.6303	654.62	0.8559	2.7061	10.022	
		53.331	2.1860	104.58	6.4435	1.3735	15.291	4.0353	1.1865	41.325	36.744	1.2581	0.0069	139.41	3.5522	2.8998		
GU3		7.1676	0.8496	1.9778	552.39	6.0818	150.57	0.7106	41.578	26.505	1.5116	0.9274	8.6200	501.33	0.9280	2.5221	11.341	
		62.761	2.5743	139.97	6.9714	1.7675	17.854	4.6661	1.3556	62.654	26.868	1.7610	0.0074	122.32	5.9044	3.0961		
GU4		5.9679	0.6905	2.2090	395.93	5.2215	126.65	0.8160	34.167	19.686	1.2183	1.7079	6.1540	512.53	0.8558	1.9588	9.6070	
		52.567	2.1068	112.98	4.9209	1.2943	15.364	3.7581	1.1279	44.162	29.765	1.5459	0.0083	136.77	1.3396	2.5980		
GU5		6.0299	0.7532	2.0989	148.82	7.8671	133.73	0.5930	34.034	21.207	1.2125	1.0695	7.3983	287.25	0.8590	2.2091	9.4565	
		50.976	2.1115	109.99	6.1612	1.8800	15.135	3.9761	1.2534	58.808	24.949	1.4573	0.0063	117.02	1.6717	2.7579		
GU6		4.95	0.39	2.40	535	8.95	121.1	0.647	30.5	14.9	0.94	0.82		656.0			9.9	1.622
		52.1	2.47	110.9	5.8	8.68	12.1	3.41	0.97		21.0			94.6		3.55		21.58
GU7		4.81	0.33	1.86	604.0	6.62	132.1	0.485	30.0	46.2	0.90	0.89		622.0			9.7	1.690
		52.2	2.32	110.9	5.5	0.66	12.0	4.38	0.94		21.4			99.8		3.45		20.42
GU9		5.24	0.36	2.35	359.0	6.58	99.5	0.973	33.8	15.9	1.01	0.77		618.0			10.4	1.941
		56.4	2.39	132.1	4.6	0.88	13.9	4.01	1.15		23.7			105.0		3.44		16.11
GU10		5.31	0.39	2.92	407	6.75	125.9	0.910	33.2	18.0	1.03	1.56		564.0			10.0	1.641
		57.4	2.70	143.9	6.4	0.83	13.6	3.98	1.04		23.6			105.9		3.61		15.70
GU11		5.0250	0.3350	2.57	231.0	5.725	167.55	0.6315	31.5	14.25	0.98	0.775		711.0			9.95	1.8685
		54.3	2.2350	119.5	7.0	0.6750	12.8500	3.47	0.89		24.0			96.95		3.1450		16635

Table 2d - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Gubbio

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
FZ1	Faenza	6.2935	0.3309	4.3773	504.61	11.888	268.5	0.8653	35.187	21.589	1.2359	6.9877	0.7017	818.93	0.7515	4.9089	13.817	
		79.031	2.7319	149.15	9.614	1.0848	16.712	4.7045	1.1067	43.258	23.990	1.9321	0.0152	156.77	2.0541	3.9374		
FZ2	Faenza	6.1932	0.406	3.5385	430.15	6.9479	190.92	0.6887	34.340	19.077	1.2245	0.8568	0.8296	513.49	0.7286	3.6357	12.548	
		78.390	2.5927	138.44	8.4144	0.9899	14.870	4.2191	1.0021	28.756	31.421	1.8721	0.0058	199.25	1.3994	5.3062		
FZ3	Faenza	6.5539	0.3935	3.8718	426.14	7.9051	198.46	0.6326	37.021	19.668	1.3314	1.0610	0.7477	759.20	0.8222	4.7849	13.757	
		84.288	2.6682	153.20	10.089	1.0289	16.625	4.6874	1.0844	33.578	50.324	1.9858	0.0059	145.03	1.5709	4.8774		
FZ4	Faenza	6.1852	0.3358	3.6122	442.92	7.1011	251.60	0.7043	35.126	20.596	1.3265	2.5103	0.0178	519.36	1.1189	2.3949	14.357	
		81.482	2.8455	213.74	11.095	0.5280	18.600	5.1344	1.3622	892.88	26.535	3.0142	0.0189	171.09	1.5435	3.8920		
FZ5	Faenza	6.1983	0.5033	2.8433	376.06	19.149	157.89	0.9161	35.943	24.802	1.2450	9.8413	7.5630	346.07	0.9494	3.5348	10.525	
		55.654	2.1253	134.98	6.1819	1.7660	16.045	4.1541	1.2419	56.429	46.611	2.2480	0.0344	151.50	1.3892	2.8605		
FZ6	Faenza	6.5974	0.6299	2.6323	416.87	19.527	130.08	1.1019	37.245	25.319	1.3308	6.5373	6.8662	475.78	0.8464	2.4550	10.744	
		56.338	2.4505	134.68	7.7288	2.4164	16.148	4.2320	1.2350	42.486	40.884	2.1441	0.0400	158.37	1.3704	3.2685		
FZ8	Faenza	6.4024	0.3912	3.3551	454.89	10.075	191.38	0.6997	35.109	20.880	1.2184	0.9786	0.8743	518.37	0.9113	2.4192	12.515	
		79.667	2.9037	143.05	8.8721	0.5704	14.981	3.9957	1.1113	5376.1	31.322	2.3251	0.0068	128.21	1.6560	5.2851		
FZ10	Faenza	6.2558	0.6405	2.8859	434.08	31.113	123.66	1.0367	35.221	37.730	1.2909	4.5876	7.4076	257.76	0.9153	6.8144	10.097	
		55.304	2.2281	123.12	6.4900	0.8275	15.075	3.8610	1.1191	35.124	56.868	2.1640	0.0434	153.77	1.3200	3.8834		
FZ11	Faenza	6.1833	0.3775	3.2085	449.00	9.0720	184.55	0.7300	34.517	35.125	1.3013	0.9141	0.6837	491.38	0.7050	33.212	12.700	
		76.819	2.7382	130.01	7.8612	1.0256	14.559	4.1178	1.1544	44.705	30.364	1.7130	0.0046	140.01	1.3431	5.4521		
FZ12	Faenza	6.5952	0.4363	5.5786	388.47	11.760	218.51	0.7381	34.361	22.705	1.2094	1.2159	1.6114	1137.2	1.9701	5.2832	13.608	
		86.270	3.1986	156.63	8.6043	0.5582	15.852	4.4172	1.2880	7079.5	58.577	6.1361	0.0174	180.82	3.4983	5.8188		
FZ14	Faenza	8.2660	0.5113	4.0474	510.62	13.067	168.77	1.0295	43.826	22.528	1.5874	1.7484	0.7715	338.08	0.7938	14.010	18.793	
		118.35	3.8142	148.25	8.6951	1.0418	17.809	4.7102	1.5170	75.733	30.229	2.0226	0.0062	40.456	1.5097	11.281		
FZ16	Faenza	6.3119	0.4052	3.0770	458.59	8.9723	192.14	0.4374	36.146	17.756	1.2722	0.7978	0.9409	744.76	0.7270	1.6362	13.214	
		79.340	2.5829	130.94	7.9642	0.7014	16.353	4.5828	1.0237	37.053	53.438	2.2556	0.0048	163.05	1.3898	4.0550		
FZ17	Faenza	5.8623	0.3747	2.9319	664.75	8.8618	190.62	0.4063	32.883	16.408	1.1942	2.2346	0.7017	818.10	0.7326	1.6129	11.997	
		73.445	2.3539	135.18	8.3702	0.7286	15.705	4.4739	0.9324	37.936	21.021	1.7803	0.0063	140.59	1.3862	3.3403		
FZ18	Faenza	6.3841	0.4662	3.0533	472.82	10.307	91.655	1.2108	36.559	25.570	1.3194	1.8357	0.7307	557.71	0.8297	2.1948	12.446	
		70.050	2.2208	157.14	8.9641	1.0966	17.317	4.7577	1.2289	52.979	27.061	2.039	0.0579	166.02	3.4838	3.7691		
FZ19	Faenza	7.1198	0.4092	4.1307	445.33	7.6926	289.16	0.8733	37.418	20.122	5.4806	0.7667	0.7292	545.43	0.7608	2.2120	14.458	
		87.583	3.3381	161.84	9.7318	1.7163	17.936	4.9593	1.0599	40.354	24.949	1.8385	0.0049	192.93	1.4574	4.0094		
FZ20	Faenza	6.1449	0.4175	3.0267	406.64	8.1924	190.88	0.5967	34.197	19.798	1.2637	0.9283	0.9181	787.47	0.8087	2.3166	12.413	
		78.769	3.0397	142.80	8.9833	0.7796	15.793	4.4854	1.0999	54.940	19.030	1.8194	0.0054	140.97	1.4224	4.9694		
FZ21	Faenza	5.5588	0.3381	2.9036	564.01	4.2800	89.094	0.2157	32.094	32.201	1.1954	0.8480	0.7224	1870.5	0.7511	2.1108	9.2888	
		63.985	2.5836	110.37	4.3485	0.6496	12.645	3.4414	0.8483	35.769	25.544	1.6882	0.0048	119.31	1.2716	2.9553		
FZ22	Faenza	6.6260	0.3881	5.0912	490.85	7.0323	213.39	0.7307	35.668	17.339	1.3130	0.9885	1.0252	804.92	0.8192	6.7258	13.096	
		80.919	2.9120	155.33	10.337	1.3252	17.250	4.7644	1.1043	44.943	23.337	2.0999	0.0063	198.89	1.5193	3.4573		
FZ23	Faenza	5.3636	0.3165	2.6830	496.94	5.9034	127.50	0.7136	30.73	15.574	1.0729	0.6636	0.6464	746.81	0.6573	1.9903	11.078	
		77.160	2.8732	131.85	6.3518	8.8482	12.342	3.4462	0.8425	53.166	19.304	1.6865	0.0085	129.55	1.2439	4.6105		
FZ24	Faenza	8.7713	0.5249	3.4179	685.74	21.096	244.70	1.0904	52.107	19.691	1.7515	1.4185	0.7963	342.15	1.1941	5.8689	19.948	
		128.70	4.2344	90.291	11.093	1.1088	16.851	4.1933	1.3036	25.498	49.439	2.0655	0.0069	192.28	1.5285	7.6917		
FZ25	Faenza	9.1092	0.8515	2.8129	621.63	42.755	193.36	1.4593	53.790	19.624	1.6903	9.7371	9.3237	205.18	23.998	4.5189	16.298	
		92.372	2.7944	91.514	10.016	2.6530	17.412	3.9228	1.5020	35.185	53.339	2.2482	0.1279	222.57	1.7609	5.3184		
FZ26	Faenza	6.3707	0.3693	3.1262	395.91	7.4507	198.41	0.4950	35.657	16.252	1.3120	0.5169	0.7726	1118.0	0.8001	2.2509	12.847	
		92.648	2.6787	122.75	8.4274	0.5941	16.702	4.0985	1.1205	48.306	28.224	2.0454	0.0059	150.11	1.5220	4.1797		

Table 2e - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Faenza

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
RA1	Ravenna	6.2194	0.5775	2.8072	444.80	26.488	128.03	0.8203	33.805	21.238	1.1779	13.342	6.4321	447.25	0.8052	3.6895	9.6787	2.239
		51.401	2.0393	120.22	6.2881	1.5151	14.403	3.7471	1.0519	45.718	32.105	2.0201	0.0636	123.52	2.0872	3.1659		14.89
RA2	Ravenna	5.78	0.32	2.51	447.0	10.79	150.0	0.794	36.7	18.6	1.05	1.72		598.0			11.08	2.421
		63.5	2.54	238.2	4.5	0.85	15.3	4.12	1.03		20.7			238.8		3.10		11.40
RA3	Ravenna	4.1671	0.4212	2.1913	245.19	17.294	87.559	0.3936	23.428	15.300	0.8021	10.513	6.0150	446.09	0.7205	2.7040	6.4993	1.770
		36.415	1.6017	81.410	6.2748	0.5686	10.231	2.5904	8123	36.076	39.605	1.7043	0.2314	83.854	1.4165	2.0479		22.28
RA4	Ravenna	5.22	0.33	2.36	406.0	10.09	125.0	0.664	33.4	16.2	0.97	0.99		542.0			10.6	2.388
		59.2	2.38	134.9	7.3	0.62	14.1	3.87	0.97		24.7			114.0		3.18		13.40
RA5	Ravenna	6.0318	0.5448	2.9947	429.64	6.5901	138.81	0.8004	33.365	19.012	1.2164	0.7288	9.5382	642.19	0.8321	2.5014	9.9845	2.070
		51.140	2.0439	123.58	8.5287	1.0585	14.861	3.8433	1.1890	55.031	42.617	1.9843	0.0401	127.07	1.6824	3.1142		14.59
RA6	Ravenna	5.557	0.36	2.96	353.0	10.99	139.0	0.841	35.0	17.9	1.03	1.44		501.0			11.0	2.360
		6.5	2.55	138.0	7.8	0.64	14.4	3.97	1.01		22.0			115.1		3.78		13.00
RA7	Ravenna	5.64	0.39	1.52	275	9.20	174.2	0.820	36.6	17.7	1.05	1.20		586		1.2	11.3	1.849
		64.1	2.42	157.0	8.6	0.65	15.0	4.17	1.01		22.4			118.0		3.37		19.41
RA8	Ravenna	5.57	0.43		259	9.04	1.65	0.836	35.6	17.1	1.03	1.22		615		1.4	11.7	2.000
		63.1	2.59	140.9	8.6	0.77	14.7	4.04	1.04		27.9			110.9		3.44	0.01	17.42
RA9	Ravenna	6.05	0.46	1.85	447.0	7.94	182.0	0.746	38.7	18.6	1.16	1.27		714.0		2.9	12.8	2.559
		68.1	2.77	151.0	8.2	0.60	16.1	4.41	0.99		23.3			129.1		3.53		14.29
RA10	Ravenna	6.22	0.33	1.27	390.0	9.10	216.8	0.731	42.0	21.8	1.15	2.09		692.0			13.4	2.158
		73.3	2.39	169.8	10.6	0.73	17.4	4.88	1.23		23.1			134.0		4.01		13.61

Table 2f - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Ravenna

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
RI1		5.8025	0.6893	2.0806	220.38	16.052	128.90	1.2888	36.3	18.572	1.2396	4.9156	5.2072	350.28	0.8497	3.2700	9.0577	1.300
		52.647	1.7584	113.23	5.1579	1.6027	14.516	3.9491	1.3321	45.793	23.550	1.5270	0.069	119.87	1.6859	3.4088		11.30
RI2		6.0967	0.7094	2.7088	417.60	50.283	101.96	0.8193	33.893	27.420	1.2137	3.9111	8.7234	396.96	0.7985	8.0221	9.4865	1.932
		55.696	2.1541	113.88	5.3491	2.1761	14.994	4.0111	1.3015	44.111	33.184	2.5611	0.0259	123.21	1.7886	3.5975		11.80
RI3		5.35	0.36	2.25	388.0	56.89	114.0	0.838	36.1	19.5	1.01	5.42		643.0			10.9	1.849
		61.7	2.54	218.8	8.2	0.62	14.4	3.94	1.01		30.3			110.9		3.35		10.30
RI4		5.25	0.27	2.30	282.0	18.79	137.1	0.745	33.7	16.0	1.00	34.43		689.0			9.9	2.198
		58.2	2.48	171.0	5.9	0.56	12.6	3.59	0.99		20.4			279.9		3.85		11.80
RI5		4.95	0.32	2.12	507.0	10.50	152.1	0.766	31.0	13.8	0.93	1.80		564			9.1	2.028
		53.5	2.22	106.9	5.4	0.70	12.1	3.37	0.97		29.6			99.3		3.52		12.50
RI6		5.3778	0.5755	2.2552	382.92	10.370	93.047	4.4802	30.141	16.756	1.0981	1.3189	4.7255	185.38	0.7775	1.7879	7.9127	2.259
		46.191	1.8735	74.488	4.6761	1.0995	12.793	3.4503	1.0600	44.180	24.008	1.4765	0.0073	105.67	1.4532	2.6295		9.73
RI7		5.50	0.46	1.77	324.0	11.30	174.2	0.675	35.4	16.5	1.06	1.83		501.0		2.1	10.5	2.080
		61.9	2.58	169.0	7.4	0.57	14.2	4.01	1.08		22.0			109.9		3.99		17.70

Table 2g - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Rimini

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Ce	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
SI1		6.3772	0.3481	3.7023	334.89	6.4413	151.81	0.5637	36.783	17.711	1.2412	1.5154	6.5475	786.00	1.0701	1.5868	11.263	
		71.014	3.0361	134.64	6.6227	0.9145	14.558	3.9381	1.0348	41.422	29.857	2.5498	0.0053	53.601	1.1531	3.8870		
SI2		6.5923	0.3876	3.1655	335.21	5.9464	149.51	0.8031	33.906	16.436	0.8337	0.8788	7.4710	664.99	1.2760	2.0900	10.994	
		71.270	2.9335	123.61	6.3172	0.8223	14.037	3.9564	0.9968	40.395	38.985	3.7246	0.0105	63.373	1.6808	4.4375		
SI3		6.7763	0.3773	2.8213	487.75	6.5934	182.80	0.8785	40.070	18.164	0.9474	0.8987	9.0369	559.90	2.1760	1.7004	11.567	
		77.457	2.9617	142.56	10.230	0.4382	15.886	3.9903	1.1469	65.993	28.204	3.4505	0.0059	59.105	1.5643	3.7850		
SI4		7.4870	0.3831	4.7337	268.80	5.3818	173.59	0.9514	41.339	19.123	1.4243	0.9641	7.0235	419.77	1.1853	1.8193	12.904	
		83.812	3.9709	169.29	8.1513	0.9444	17.222	5.7849	1.3913	46.433	26.297	2.3216	0.0049	59.105	2.9928	4.8988		
SI5		7.0687	0.3875	2.7850	380.59	4.8935	147.59	0.9067	40.337	22.989	0.7634	0.6615	8.9209	572.40	1.1688	2.1531	11.996	
		77.943	3.4161	134.99	7.3932	0.9353	16.361	4.5946	1.1828	48.009	42.016	2.7829	0.0059	57.994	2.8206	4.1340		
SI6		6.9725	0.3771	2.5240	407.07	6.7716	153.04	0.8955	40.517	22.474	1.3426	1.1652	9.0486	587.42	1.1753	1.8223	11.877	
		77.630	3.5187	137.06	7.0111	0.9885	16.044	4.4827	1.0387	48320	32.030	2.8011	0.0049	58.399	2.5153	4.0883		
SI7		6.8615	0.3991	2.6478	486.05	4.5512	141.74	0.6392	39.702	22.047	0.8920	0.5798	7.7758	575.66	1.2541	2.0476	11.335	
		75.386	3.6583	149.64	6.9594	0.3563	15.836	4.2995	1.0823	41.845	22.512	3.6286	0.0070	62.860	1.9311	4.2857		
SI8		6.3128	0.4089	2.3771	364.34	4.5297	124.33	0.5109	38.829	20.987	0.8874	0.4226	6.1431	667.20	1.1305	1.6575	10.719	
		74.879	3.2168	131.62	6.7769	0.3186	15.324	4.2305	0.9413	47.174	30.524	2.6855	0.0057	56.196	1.5783	3.7563		
SI9		6.8082	0.3619	3.1224	324.75	9.1352	156.85	0.8353	39.839	19.177	1.3751	0.8640	8.9555	286.44	1.1476	2.2558	11.731	
		82.669	3.2149	152.63	7.5198	0.7714	16.385	4.8223	1.1215	47.948	33.517	2.4267	0.0053	57.168	1.9831	4.8294		
SI10		7.2511	0.4157	2.8844	296.99	9.9284	160.14	0.9531	41.873	19.368	1.4984	0.6651	8.3915	409.57	1.2266	3.2773	12.550	
		86.455	3.7903	158.26	8.1523	0.5411	16.711	4.9177	1.1822	39.004	23.424	3.5800	0.0053	61.454	1.7981	4.9040		
SI11		7.2079	0.3638	4.3138	322.94	16.600	193.89	0.9381	39.979	19.902	1.3915	0.9610	7.1317	383.28	1.1511	1.8986	12.453	
		80.273	3.7532	152.94	7.1440	0.8258	16.378	4.8892	1.2314	58.914	34.902	2.4190	0.0049	56.810	1.6762	5.1477		
SI12		6.1335	0.3348	2.8507	176.88	7.2076	147.17	0.7832	36.121	19.386	1.1790	1.3802	8.2452	576.31	1.3633	3.8442	10.694	
		75.638	3.1476	152.33	6.778	0.4310	14.647	4.2254	1.2057	56.536	25.567	3.0702	0.0071	55.186	2.3318	4.3756		
SI13		6.7103	0.3527	3.3441	358.91	11.326	144.78	0.9578	38.549	18.552	0.8765	1.0285	7.6373	332.93	1.1716	2.1974	11.266	
		76.426	3.3755	154.31	7.1936	0.5760	15.472	4.6241	1.2825	33.308	36.305	2.7969	0.0044	58.489	2.0015	4.9084		
SI14		7.3881	0.3690	3.4746	244.95	7.4093	155.23	0.8870	42.788	19.986	1.4507	0.6602	7.9217	355.66	1.1499	1.9898	12.776	
		86.202	3.2461	167.32	7.7343	0.9590	17.102	5.0040	1.3281	62.893	35.318	2.5800	0.0065	57.697	1.6057	5.4270		
SI17		7.3995	0.4221	2.6665	382.41	17.237	150.72	0.9677	37.917	24.267	1.4421	0.6817	8.2145	283.69	1.2008	15.046	12.057	
		77.127	3.5271	164.60	8.0751	0.8140	15.816	5.0990	1.2469	42.537	47.752	2.8717	0.0060	59.223	3.8395	6.4900		
SI18		8.2895	0.4865	4.0278	677.36	7.2583	214.91	1.3606	49.388	31.107	1.6778	0.6827	9.8897	202.13	1.1954	7.7994	15.418	
		101.07	4.0200	199.55	8.6562	1.0699	17.039	4.4583	1.3630	76.438	37.866	2.8616	0.0057	73.350	2.0195	8.13177		
SI19		7.0366	0.3735	3.8035	422.98	10.466	183.80	0.9244	40.400	18.084	1.3806	0.5397	10.427	247.66	1.1981	2.0488	11.923	
		80.164	3.2033	159.98	7.8603	0.5197	16.147	4.6160	1.2911	49.794	21.598	2.8625	0.0060	60.738	1.6539	4.7304		
SI20		6.9499	0.3912	3.5963	276.07	4.4316	156.74	0.8415	42.172	18.951	1.4563	0.5489	7.6390	429.45	1.1498	2.4676	12.490	
		85.053	2.8599	166.02	8.1637	0.6862	16.965	4.7442	1.2712	38.121	42.735	2.7516	0.0051	58.858	1.9751	4.9260		
SI21		6.8662	0.4489	2.9828	328.96	11.961	167.50	0.8426	38.769	24.237	1.4181	0.6538	8.7788	247.08	1.2821	15.704	11.828	
		80.774	3.5207	168.08	7.2383	1.3397	16.550	5.0136	1.1588	53.495	33.937	3.0239	0.0051	63.753	2.1750	6.0164		
SI22		6.3153	0.3444	3.7208	294.40	7.1966	151.78	0.8580	38.067	18.074	1.3282	0.4157	6.9643	215.57	1.1016	2.0285	10.854	
		75.178	3.0693	152.54	7.1487	0.9482	15.439	4.5057	1.1077	45.896	21.659	2.3180	0.0053	55.331	1.3808	4.3416		
SI24		8.2776	0.4233	5.7734	347.35	8.7497	190.58	0.9917	44.341	20.209	0.7950	1.4010	9.7419	281.78	1.2206	2.7452	12.937	
		90.993	3.7225	167.91	8.9976	0.7397	18.954	4.9248	1.3923	37.676	25.121	2.9049	0.0106	61.995	2.1071	5.1391		
SIR1		0.6291	0.0154	0.2031	39.536	0.3236	6.1353	0.0029	2.7082	0.0783	0.1123	0.2746	2.5070	78.526	0.2921	0.5745	0.1246	
		2.7344	0.2337	1.3919	0.2336	0.0657	0.6235	0.0264	0.0559	10.659	6.3141	0.8508	0.0012	12.524	0.4703	0.1269		
SIR2		3.2195	0.2090	5.5819	255.70	60.903	131.04	0.2187	22.135	0.9105	0.2472	25.160	11.248	219.43	0.9491	1.4463	10.204	
		60.091	1.3093	77.734	16.353	0.2318	8.2420	12.899	0.7049	39.146	24.390	14.106	0.0063	36.209	1.2622	4.3205		
SIR3		3.2195	0.2090	5.5819	255.70	60.903	131.04	0.2187	27.256	27.963	0.4234	24.015	18.090	255.13	0.6936	1.4566	10761	
		60.091	1.3093	77.734	16.353	0.2318	8.2420	12.899	0.7580	41.132	22.569	2.5330	0.0060	91.547	1.7044	3.4972		
SIR4		6.4152	0.3631	4.9859	314.76	68.495	118.16	0.2191	34.024	11.109	0.5550	7.3813	6.3740	238.02	1.0237	1.7887	11.540	
		71.708	3.0309	70.998	8.0678	0.5465	11.304	3.7545	0.9794	31.336	35.607	2.9614	0.0038	48.849	1.7009	4.0413		

Table 2h - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Siena
SIR - Siena raw materials

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
CAS1		5.9470	0.6716	1.9208	369.25	8.0374	122.01	0.6402	34.548	18.652	1.2317	4.4472	5.6979	474.75	0.8269	1.4211	9.0132	
		53.273	1.9778	103.52	6.6108	1.2379	15.163	3.8081	1.1980	43.269	43.158	1.8094	0.0059	97.021	1.5413	3.3160		
CAS2		5.8348	0.6916	2.2283	508.65	7.6274	118.71	0.6226	32.824	19.349	1.1409	1.1013	5.7790	673.52	0.8477	2.0391	8.8472	
		52.730	2.0310	75.081	7.2853	1.4266	14.633	3.5978	1.1642	26.697	32.977	1.8335	0.0067	105.90	1.5621	3.2349		
CAS3		5.6111	0.6706	2.5660	444.41	7.5966	101.03	0.5494	33.201	17.245	1.1836	1.1757	5.3921	877.70	0.7949	2.0450	8.9599	
		49.659	1.9054	71.936	5.0484	1.1591	14.352	3.6252	1.1512	33.031	30.932	1.4272	0.0060	120.35	1.2619	2.9208		
CAS4		5.7660	0.6816	1.9030	405.76	8.9213	115.82	0.6086	33.363	18.089	1.2649	1.3690	4.2490	703.76	0.7923	1.6855	8.4097	
		50.835	1.8747	75.567	6.7733	0.7996	14.480	3.6437	1.1476	35.811	29.192	1.4193	0.0057	112.13	1.0659	3.0293		
CAS5		6.0781	0.7016	2.4489	384.48	7.2396	110.19	1.2614	35.405	18.750	1.2847	1.1939	5.6223	338.79	0.8553	2.3244	9.6717	
		56.278	2.0650	108.90	7.9079	1.3820	15.18	3.8294	1.2411	20.975	25.723	1.5408	0.0082	119.97	1.2312	3.0660		
CAS6		5.25	0.38	1.52	284.0	7.06	144.9	0.564	34.2	15.9	1.02	1.17		817.0			10.0	2.328
		59.2	2.51	121.9	7.6	0.58	13.5	3.60	1.07		23.9			83.4		3.77		15.49
CAS7		5.51	0.39	3.02	393.0	8.43	119.1	1.119	35.1	15.3	1.04	1.24		647.0			10.4	1.180
		62.4	2.55	136.1	8.3	0.46	14.2	3.72	0.90		19.6			92.5		3.87		1690
CAS8		5.93	0.41	1.56	3.87	15.89	147.9	1.321	38.0	18.8	1.15	1.02		615.0			11.5	1.291
		67.0	2.82	136.1	8.6	0.77	15.1	4.11	1.09		36.0			89.7		4.22	0.01	14.00
CAS9		6.18	0.39	2.17	198.0	9.64	74.6	1.361	39.8	18.0	1.21	1.10		723.0			11.7	1.409
		70.1	2.61	141.9	10.2	0.79	15.7	4.24	1.21		15.1			105.9		4.69	0.01	15.89
CAS10		5.92	0.42	1.26		7.46	141.9	1.079	37.9	17.5	1.13	1.29		701.0			10.9	1.371
		67.3	2.44	134.0	8.3	0.64	14.8	3.99	1.05		30.8			94.0		4.26	0.01	15.00
CAS11		5.98	0.41	1.14	429.0	11.19	129.1	1.191	39.4	16.8	1.17	1.81		748.0		0.8	11.6	1.698
		68.4	2.67	243.9	9.5	0.75	15.3	4.17	1.10		28.7			104.0		4.54	0.01	12.39
CAS13		5.43	0.43	1.44	348	6.43	293.8	0.873	35.1	16.0	1.10	2.44		787		4.3	10.3	1.950
		62.4	2.37	130.0	9.3	0.64	14.1	3.85	1.04		19.8			95.9		4.04	0.01	14.69
CAS14		5.52	0.47	1.57	210	8.18	181.1	0.614	35.9	15.5	1.05	1.55		679.0		1.0	10.4	2.070
		63.1	2.45	123.9	8.5	0.70	14.0	3.76	1.04		22.5			93.8		4.06		16.71

Table 2i - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Castelli

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
ROMA 1		5.3798	0.2984	5.2335	322.19	8.6008	76.066	0.7075	29.200	9.8938	0.6517	1.1429	5.3160	597.05	0.9189	2.0062	9.5570	
		60.533	2.5664	99.668	2.3306	0.5551	11.361	3.1408	0.9709	38.432	30.847	2.0315	0.0121	47.869	1.3895	3.7211		
ROMA 2		6.3679	0.4001	3.8851	455.40	6.4779	194.48	0.7275	35.596	11.450	1.1332	0.5556	7.0257	894.99	1.1464	5.9761	11.677	
		76.149	3.4646	124.45	6.9297	0.9727	14.548	4.0361	1.1194	46.408	33.733	2.5261	0.0150	258.22	1.1384	4.1763		
ROMA 3		5.4649	0.3475	4.1988	344.17	12.868	111.27	1.0516	30.498	10.782	0.7963	0.9067	5.8367	612.97	0.9380	2.0737	10.321	
		64.137	2.9397	87.554	5.8681	0.4271	12.039	3.3559	1.1078	30.858	30.205	1.9394	0.0044	48.238	1.1372	3.8516		
ROMA 4		4.76	0.35	1.90	452.0	12.19	156.0	0.593	30.6	8.4	0.91	0.48	——	1030.0	——	——	9.1	2.280
		52.2	2.10	95.1	5.7	0.64	11.1	2.74	0.93	——	14.8	——	——	96.6	——	3.24	——	15.70
ROMA 5		5.4772	0.3150	2.9241	1072.5	5.6808	68.794	0.1985	31.785	16.020	1.1483	1.4404	5.4754	1334.5	0.9054	5.8508	8.7109	
		56.764	3.0095	96.013	2.7529	0.7944	11.983	3.2390	0.8595	27.368	29.969	1.8850	0.0081	47.042	0.8726	2.7752		
ROMA 6		5.9154	0.3931	4.2662	400.07	12.535	157.01	0.7952	32.810	12.005	1.1288	0.6571	6.2281	1126.1	0.9455	6.4923	10.919	
		66.534	2.9996	103.24	4.9502	0.9544	12.661	5.5852	1.1086	31.215	22.640	1.9524	0.0046	48.464	1.1451	3.9383		
ROMA 7		5.8436	0.3462	3.6414	549.56	13.723	170.06	0.7463	35.615	18.529	1.2411	1.6056	7.3574	371.13	0.9951	7.3636	12.561	
		70.617	2.8592	127.97	12.133	0.5631	12.917	3.5598	1.0812	29.446	26.833	2.3155	0.0051	49.881	1.4646	3.9805		
ROMA 8		5.04	0.37	2.86	401.0	6.68	212.8	0.644	32.7	11.1	0.98	2.16	——	813.0	——	——	9.8	1.770
		56.8	2.18	116.9	5.9	0.59	12.2	3.71	1.02	——	33.7	——	——	105.0	——	3.47	——	15.60
ROMA 9		5.8934	0.3731	3.7929	356.30	7.3434	234.65	0.8373	32.652	12.873	1.0491	0.4798	6.9419	522.35	1.0939	4.6815	10.535	
		69.340	3.3331	120.34	1.1641	1.1667	13.272	3.7158	1.0872	35.640	33.731	2.9135	0.0045	55.929	1.2572	4.0995		
ROMA 10		4.34	0.30	2.02	232.0	12.50	130.9	0.598	28.2	10.1	0.86	4.26	——	910.0	——	——	8.4	1.390
		48.1	2.20	95.7	4.5	0.66	10.2	2.79	0.82	——	22.9	——	——	84.7	——	2.99	——	20.18
ROMA 11		5.21	0.33	2.65	296	5.87	123.0	0.627	33.7	12.2	1.00	1.04	——	655.0	——	——	9.9	1.770
		56.9	2.44	114.0	6.21	0.85	12.8	3.52	0.97	——	22.1	——	——	94.2	——	3.44	——	16.98
ROMA 12		4.05	0.28	1.76	248.0	5.56	57.3	0.202	26.7	13.7	0.80	4.00	——	1009.0	——	——	6.4	1.009
		40.8	1.90	76.9	2.2	0.56	9.2	2.49	0.69	——	16.1	——	——	80.4	——	2.30	——	29.38
ROMA 13		5.7876	0.3437	3.6706	596.99	9.3134	155.55	0.6690	32.261	11.369	1.0434	0.5014	5.8901	804.14	0.9594	7.6143	10.774	
		68.392	2.9235	110.81	5.7902	0.5663	12.876	3.6896	1.1411	39.386	24.240	2.1084	0.0045	49.056	1.4274	3.7932		
ROMA 14		4.68	0.31	2.82	350.0	7.64	134.0	0.646	30.8	11.4	0.91	1.30	——	807	——	——	9.2	1.730
		52.8	2.07	100.0	5.4	0.77	11.3	3.11	0.91	——	27.2	——	——	90.6	——	3.29	——	19.10
ROMA 15		6.2046	0.3810	3.1171	437.51	9.2931	157.18	0.7363	34.427	11.475	1.0755	1.2231	6.3423	580.04	0.9956	1.7874	11.235	
		71.413	2.9346	109.65	6.2468	0.9847	13.274	3.5631	1.0296	32.925	27.687	2.1937	0.0062	51.363	1.4991	4.2859		

Table 2j - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Roma

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
FAB1		6.7517	0.4012	3.4134	380.48	15.466	157.02	0.8651	38.827	19.863	1.5311	4.9114	0.7959	1115.0	0.8094	4.1342	11.851	
		86.558	2.8008	143.79	10.490	0.9392	17.500	5.0892	1.1990	38.884	32.356	2.0823	0.0066	202.49	1.1974	4.5423		
FAB2		6.5141	5.5150	3.1183	397.84	10.526	130.14	0.6253	38.156	20.893	1.3815	1.2188	5.5620	451.08	0.8706	2.2266	9.6641	
		57.935	2.0619	135.73	9.8721	1.4273	16.798	4.5351	1.1219	64.472	34.120	1.9359	0.0302	164.08	1.4273	3.1508		
FAB3		5.6338	0.5400	3.3312	808.32	14.862	142.09	0.7175	30.659	20.172	1.1418	1.8450	5.7608	483.12	0.7645	2.0028	8.9096	
		46.575	1.9143	101.84	7.2421	1.6579	12.903	3.3940	1.0129	52.960	37.509	1.9412	0.0297	126.08	1.5393	2.6992		
FAB7		6.1354	0.3936	3.5221	617.70	8.7015	151.75	0.4369	35.711	19.046	1.3137	0.8008	0.6709	451.38	0.7496	8.0395	11.251	
		79.399	2.5344	137.23	8.0105	0.4792	16.061	4.5655	1.0328	26.145	26.083	1.8154	0.0064	185.15	1.4435	4.4642		
FAB8		6.6718	0.3869	2.9067	357.06	14.620	193.27	0.7803	38.641	21.675	1.4086	4.5067	0.8106	517.74	1.2309	1.9317	11.989	
		85.913	3.0494	159.15	11.194	1.1972	17.830	5.1032	1.1426	46.790	31.082	2.1100	0.0058	252.73	1.4837	4.6922		
FAB9		6.8604	0.4153	3.3759	380.75	12.417	187.37	0.5589	39.882	20.419	1.4642	1.3823	0.6792	435.00	0.8108	3.2824	12.576	
		89.622	3.1922	156.63	11.439	0.8456	18.054	5.2300	1.0905	36.660	22.676	2.0924	0.0060	275.83	1.5622	4.5515		
FAB11		6.9013	0.7005	3.8664	350.78	14.913	132.73	0.7492	39.385	21.606	1.4323	0.7598	6.3396	327.53	0.9241	2.4421	10.326	
		60.621	2.1530	140.28	10.049	2.1745	17.594	4.6427	1.3339	51.741	44.223	2.3264	0.0402	163.17	1.8889	3.4551		
FAB12		7.0089	0.7183	3.2419	432.58	7.1264	139.58	0.6856	40.629	24.078	1.4576	1.1666	6.8290	396.28	0.9569	2.50099	10.390	
		62.100	2.3118	150.70	11.136	2.7569	17.946	4.8262	1.3880	53.283	43.971	2.4297	0.0316	166.85	7.9250	3.6566		
FAB14		6.7236	0.3889	3.5231	417.15	11.129	190.78	0.7684	38.938	20.868	1.3787	1.1034	0.6792	697.60	0.8269	3.2211	12.151	
		86.621	2.9374	154.57	11.530	0.8022	17.844	5.1516	1.2451	38.892	30.427	2.0052	0.0077	198.35	1.5894	4.5581		
FAB15		6.9162	0.6537	3.1085	395.33	11.174	141.93	0.5868	40.613	23.879	1.4715	0.9695	6.2136	450.36	0.8987	2.3710	10.146	
		59.993	2.0417	246.30	10.083	1.5453	17.710	4.8039	1.3153	44.253	52.817	2.2539	0.0388	175.02	1.8219	3.3446		
FAB16		6.8785	0.3735	2.9152	386.56	10.770	174.64	0.7330	38.724	29.526	1.4141	1.6057	0.7116	555.12	0.8043	1.6751	12.520	
		88.741	2.5509	155.72	11.118	0.8066	17.590	5.0497	1.1489	38.519	20.403	2.1724	0.0086	179.18	1.5464	4.6632		
FAB17		6.8364	0.3803	3.4670	549.48	10.241	173.93	0.4065	18.672	20.512	1.4157	0.6896	0.7669	453.69	0.8193	1.8952	12.451	
		85.462	3.0645	153.78	11.832	0.9312	17.559	5.0199	1.2347	40.112	36.334	1.9840	0.0052	190.15	1.5779	4.4129		
FAB18		6.8483	0.3731	3.2774	352.85	8.8910	177.90	0.4538	39.403	19.629	1.4131	0.8615	0.6948	600.99	0.8061	1.6154	12.132	
		86.920	2.8086	156.11	11.704	0.9772	17.896	5.2377	1.0998	39.693	26.172	2.0645	0.0051	235.42	1.5576	5.0232		

Table 2k - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Fabriano

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
DE1		5.26	0.34	——	——	9.25	134.0	0.713	32.0	17.4	1.05	1.39	——	422.0	——	1.8	9.6	2.000
		56.5	2.59	115.1	5.2	0.93	13.0	3.62	0.94	——	——	——	——	99.1	——	3.93	——	14.59
DE2		5.7028	0.6963	1.7433	432.31	10.771	100.48	0.7432	33.696	24.033	1.0538	4.8934	141.67	377.08	1.2567	14.206	7.9169	
		47.624	1.5376	87.145	4.3523	1.4067	12.476	3.5475	0.9317	168.34	48.435	2.7246	0.0313	307.56	640.05	3.1906	——	
DE3		6.3008	0.7198	2.5725	399.18	9.5495	111.73	0.7562	34.575	19.189	1.3373	14.233	6.7201	454.90	0.8764	2.4486	9.6800	
		54.067	2.1277	101.26	4.5887	1.2506	14.682	3.8308	1.1822	38.197	34.862	1.3834	0.0072	121.36	5.8847	3.6185	——	
DE4		6.0464	0.7002	2.2059	368.48	5.258	107.56	0.6504	35.229	21.180	1.2673	2.3161	4.9871	243.37	0.8248	1.8495	9.3545	
		53.522	2.0139	101.18	4.7146	1.5450	14.686	3.7668	1.0999	37.420	34.098	1.4867	0.0068	115.08	2.3010	3.1145	——	
DE5		6.0931	0.7578	2.5283	522.81	13.697	116.89	0.6964	33.624	20.384	1.2787	4.7927	4.9845	288.86	0.8184	2.3572	9.2798	1.849
		53.402	2.2249	97.672	5.3412	1.0959	14.186	3.7744	1.1891	41.084	29.701	1.4617	0.0080	122.39	1.2288	3.2585	——	15.49
DE6		5.6914	0.7117	1.6774	362.36	3.8438	122.69	0.6621	31.052	18.593	1.1752	1.2410	7.0554	230.73	0.7989	2.3544	8.6955	
		48.535	1.9953	92.819	4.6423	1.2873	13.643	3.8304	1.0848	40.661	33.165	1.3530	0.0069	147.06	3.5060	3.0290	——	
DE7		5.56	0.43	3.33	453	6.34	136.1	0.820	34.1	18.5	1.09	21.28	——	356	——	——	10.3	1.941
		60.0	2.62	132.1	6.3	0.79	13.4	3.50	1.18	——	23.6	——	——	115.9	——	4.30	——	12.19
DE8		4.98	0.40	2.58	361.0	5.64	125.0	0.590	30.5	14.3	0.97	4.76	——	495.0	——	——	9.2	1.690
		53.2	2.22	104.0	5.2	0.57	11.7	3.18	0.99	——	21.1	——	——	94.8	——	3.46	——	17.99
DE9		5.05	0.37	2.49	401.0	4.65	130.0	0.593	30.8	13.8	0.97	1.89	——	575	——	——	9.3	1.888
		54.3	2.30	96.6	5.3	0.63	12.0	3.48	0.97	——	22.2	——	——	104.0	——	3.47	——	17.10
DE10		5.41	0.88	2.84	437.0	4.61	125.0	0.670	34.0	15.8	1.09	3.61	——	513.0	——	——	10.1	2.000
		58.3	2.45	121.9	5.7	0.60	13.1	3.66	1.07	——	31.8	——	——	119.9	——	4.04	——	15.89
DE13		5.56	0.37	2.78	390.0	5.78	134.9	0.705	34.0	15.5	1.07	2.81	——	365.0	——	——	10.5	2.042
		60.4	2.84	118.0	6.1	0.66	13.4	3.73	1.24	——	20.3	——	——	103.0	——	4.11	——	15.00

Table 21 - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Deruta

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
SA1		8.02	0.40	2.55	364.0	17.50	187.1	1.050	59.7	14.7	1.46	1.04	——	285.0	——	1.8	20.2	2.438
		104.0	2.95	97.9	12.2	0.90	13.8	4.03	1.61	——	30.1	——	——	107.0	——	6.61	0.02	6.90
SA2		7.80	0.37	2.32	398.0	20.18	182.0	1.250	59.8	13.5	1.40	1.10	——	365.0	——	8.3	19.1	2.382
		100.9	3.05	93.3	11.6	0.95	12.5	3.93	1.81	——	48.0	——	——	140.0	——	5.89	0.02	9.38
SA4		5.60	0.35	1.26	366.0	6.68	133.0	0.619	37.4	15.6	1.08	1.49	——	977.0	——	3.4	10.3	2.541
		64.7	2.69	91.2	5.8	0.82	12.8	3.51	0.96	——	28.1	——	——	102.1	——	3.55	0.01	16.41
SA5		5.87	0.39	2.46	556.0	3.52	132.1	1.170	38.3	12.4	1.02	0.69	——	459.0	——	——	12.4	2.128
		68.1	2.77	105.9	7.1	0.80	12.6	3.52	1.08	——	20.0	——	——	96.2	——	5.20	——	8.81
SA6		5.61	0.36	1.78	347	8.05	147.9	0.789	36.6	13.8	1.09	0.71	——	516.0	——	1.7	10.7	2.280
		66.7	2.54	115.9	6.1	0.58	13.3	3.74	1.10	——	25.8	——	——	110.9	——	4.09	——	11.40
SA7		5.19	0.29	2.28	233.0	6.22	125.0	0.979	32.7	12.7	1.00	0.62	——	459.0	——	——	9.2	2.317
		56.8	2.13	109.9	8.0	0.83	12.1	3.49	0.95	——	20.9	——	——	94.8	——	3.91	——	12.00
SA8		5.32	0.43	2.47	161.0	9.4	141.9	0.857	34.9	13.5	1.01	1.01	——	318.0	——	9.5	10.5	2.673
		60.1	2.59	103.0	6.6	0.59	13.4	3.81	1.05	——	11.4	——	——	92.0	——	3.58	0.01	10.30
SA9		6.64	0.48	1.61	209.0	6.71	129.1	0.632	42.8	21.7	1.33	0.98	——	107.0	——	0.5	12.0	1.991
		75.9	3.07	133.0	6.6	0.85	16.6	4.61	1.36	——	22.4	——	——	136.1	——	5.14	0.01	7.10
SA10		5.21	0.37	1.23	330	10.79	136.1	0.600	34.4	14.0	1.01	0.99	——	575.0	——	2.60	9.8	2.178
		59.2	2.62	109.9	6.5	0.71	13.7	4.03	1.12	——	25.4	——	——	106.9	——	3.70	0.01	10.69
SA11		5.41	0.42	1.40	282.0	5.18	160.0	0.561	36.4	13.6	1.01	1.12	——	427.0	——	1.4	10.4	2.291
		61.1	2.36	111.9	6.8	0.76	14.0	3.91	0.99	——	29.0	——	——	107.9	——	3.71	——	72.50
SA12		6.27	0.46	1.48	366	8.83	201.8	0.601	41.2	14.2	1.21	0.85	——	375.0	——	4.00	11.7	2.168
		70.1	2.78	119.9	8.5	0.85	15.3	4.31	1.11	——	24.5	——	——	119.9	——	4.00	——	8.83

Table 2m - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Salemo

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
GE1		5.4389	0.3459	3.1312	353.53	10.415	168.59	0.6821	30.240	13.589	1.1548	1.1034	0.6854	1464.0	0.6965	1.8145	10.950	
		69.185	2.4341	189.26	9.6360	0.9613	14.578	3.9258	1.0734	58.266	18.748	1.6708	0.0056	132.19	1.3124	4.3872		
GE2		4.9650	0.3659	2.8016	413.30	15.308	141.58	0.6393	25.942	14.665	1.0586	1.1222	0.6467	1331.8	0.6572	2.4130	9.6329	
		59.286	2.8032	150.71	7.6278	1.0933	12.612	3.4558	0.8434	44.997	16.343	1.6711	0.0203	138.68	0.8935	4.1950		
GE7		4.2997	0.2796	3.0335	324.99	9.4176	100.58	0.4109	23.152	15.218	0.8621	3.2128	0.6992	1259.0	0.7042	3.7963	8.7832	
		53.981	2.1301	109.77	6.5957	0.6729	11.545	3.2259	0.8731	55.689	22.152	1.7945	0.0054	162.69	1.3231	3.6399		
GE8		7.0061	0.4143	3.2776	400.38	9.9327	148.20	0.8697	35.105	20.645	1.4357	1.3612	0.8147	671.46	0.7991	2.9605	10.054	
		81.717	3.1232	319.77	7.4679	1.3007	16.682	4.6667	0.8895	113.99	35.602	1.7820	0.074	134.66	1.5082	5.7701		
GS8		5.2585	0.6002	1.8566	272.50	10.435	110.00	0.8918	27.633	24.947	1.0301	1.3406	5.1245	441.32	0.8149	1.9746	7.4281	
		44.350	1.9396	307.82	5.5474	0.5779	14.755	3.8338	0.9569	133.53	22.460	1.4628	0.0061	102.07	1.7208	3.2231		
GS9		6.1266	0.4427	3.5550	454.47	6.7916	165.88	0.7368	34.701	21.487	1.1559	1.3574	6.0390	1078.8	1.0876	2.8163	12.708	
		74.124	3.3677	225.26	8.9239	0.9594	15.541	4.3725	1.3424	81.563	37.392	2.5173	0.0046	179.99	1.6046	4.2063		
GS10		6.6740	0.8536	2.8863	538.37	8.7069	135.83	1.0470	37.514	23.601	1.3438	0.5723	5.7494	149.39	0.8892	2.1075	11.250	
		68.052	2.3899	127.36	6.1202	1.2486	15.487	3.7374	1.3843	74.914	24.822	1.5087	0.0072	159.27	4.5647	4.5235		
GS11		4.7906	0.3223	3.0383	256.76	13.737	78.105	0.6565	24.927	12.708	0.9493	0.8919	5.1971	825.46	0.9525	2.6672	9.4019	
		55.184	2.2053	158.49	3.6676	0.8178	11.515	3.1617	0.8620	49.135	24.417	2.2098	0.0068	87.498	2.2167	4.1259		
GS12		6.4394	0.4439	2.6283	375.71	10.679	53.645	0.9310	31.702	23.011	0.5093	1.1287	7.0028	786.75	1.1909	2.0393	10.102	
		66.830	3.3305	413.99	4.0666	1.8057	17.913	4.8696	0.9438	148.78	28.532	2.7813	0.0057	62.135	1.3150	3.9102		
GS13		7.4125	0.5168	3.5375	469.63	9.3782	105.63	1.1274	40.842	23.599	1.4126	2.2678	6.6200	219.60	1.1476	4.3210	13.379	
		84.283	4.0647	320.49	6.8538	1.4487	18.010	4.6538	1.0152	112.02	31.191	2.3811	0.0080	59.478	1.4254	6.9876		
GS14		5.2078	0.3758	3.5888	368.99	10.972	105.70	0.9628	27.305	17.972	0.9807	3.2554	5.7065	358.18	1.0308	1.8279	0.1075	
		58.852	3.1447	297.05	4.9443	0.9205	14.127	4.2594	0.8245	122.34	24.413	2.2811	0.0073	52.816	1.6920	4.5301		

Table 2n - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Savona

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm Ce	Lu Yb	U Cr	Ba Cs	As Tb	Rb Sc	Na Fe	La Ta	Co Ni	Eu Nd	Sb Se	Cd Au	Sr Zn	Hg Ag	Br Hf	Th Zr	K Ca
GS1		7.4664 78.303	0.9999 2.8407	2.5758 284.42	418.24 3.9457	7.6279 1.0699	106.11 16.522	1.3466 4.2108	39.246 1.4492	27.15 201.58	1.4579 39.136	0.8534 1.5371	5.5936 0.0073	188.42 120.36	0.9081 1.6729	2.9247 6.6236	12.214	
GS2		3.4207 45.661	0.2400 2.0505	2.2498 189.98	204.93 4.9703	2.4332 0.9666	68.177 9.0889	0.3255 2.8435	21.182 0.6903	9.2986 54.301	0.2600 17.216	0.5202 1.4620	4.4701 0.4445	195.27 39.833	0.8080 1.1953	3.6900 3.0950	7.6935	
GS3		5.3742 72.711	0.3535 2.6561	3.6934 226.07	303.85 9.2122	2.5347 0.9896	132.62 13.115	0.5760 4.3586	35.601 1.2621	7.7351 47.243	0.7034 31.270	0.6729 2.0991	5.6702 0.0088	655.66 49.507	1.0100 1.2097	5.1598 5.0582	13.648	
GS4		7.6250 60.644	0.9922 2.9266	1.5462 304.70	412.29 6.6293	5.5308 2.4570	130.81 17.748	1.2997 4.6512	39.946 1.0539	26.790 149.00	1.5485 34.460	1.4913 2.0236	5.3659 0.0075	148.83 125.63	0.9354 1.7147	5.3101 4.2575	9.8104	
GS5		5.9872 58.047	0.7637 0.3938	3.5030 152.43	448.77 6.2588	3.6021 1.1476	116.18 18.247	0.5490 3.9775	36.692 1.2774	14.696 80.805	1.1835 37.249	2.7142 1.5564	5.2423 0.0074	177.30 127.96	0.9194 1.2526	8.7098 3.3163	11.208	
GS6		7.3895 88.279	0.4430 3.5678	5.8321 131.52	445.48 6.2522	17.456 1.2900	126.53 19.145	0.8029 4.6869	39.995 1.2223	28.275 56.744	1.4187 44.992	0.9623 2.2652	9.0080 0.0149	195.76 59.766	1.1577 1.5091	4.7577 6.5920	13.294	
GS7		6.2140 70.797	0.3687 2.8509	4.5649 175.00	469.00 9.2366	1.3459 0.7580	131.31 15.383	0.6041 3.9362	37.616 1.1621	12.620 60.876	1.0972 19.028	0.5869 2.2283	6.4604 0.0059	317.89 54.898	1.0662 1.6179	4.0842 4.3584	12.740	
BG		9.8815 18.63	0.6179 4.2932	2.8190 103.41	486.26 10.062	7.4129 0.6051	194.61 23.900	0.1545 9.5189	55.438 1.4137	26.759 41.896	1.8212 44.619	1.2918 2.9899	7.4699 0.0069	316.73 73.415	1.3445 2.0713	2.4185 4.9792	14.857	

Table 2p - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Genova

Sample Code	Attribution of Provenience	CONTENT OF THE REPORTED ELEMENTS IN p.p.m. (except the Fe, Na, K and Ca in %)																
		Sm	Lu	U	Ba	As	Rb	Na	La	Co	Eu	Sb	Cd	Sr	Hg	Br	Th	K
		Ce	Yb	Cr	Cs	Tb	Sc	Fe	Ta	Ni	Nd	Se	Au	Zn	Ag	Hf	Zr	Ca
ML2		7.11	0.512	2.29	546.0	6.08	148.9	0.506	45.6	25.9	1.43	5.83	———	583.0	———	3.11	12.11	2.16
		73.3	3.30	156.0	7.50	1.151	17.1	4.45	1.380	———	30.4	———	———	133.0	———	4.11	———	11.8
ML3		6.49	0.445	2.23	630/0	5.89	136.1	0.467	40.4	25.3	1.30	1.93	———	452.0	———	1.26	11.40	1.95
		69.5	2.82	149.0	6/62	0.962	15.8	4.33	1.191	———	27.7	———	———	110.0	———	3.78	———	12.7
ML4		4.4329	0.2786	1.7914	391.20	4.5898	60.830	0.2081	25.024	13.920	0.8660	2.3702	4.9830	796.81	0.8711	4.1615	7.0044	1.0615
		46.459	2.3251	67.614	2.7134	0.5681	9.1381	2.4451	0.6227	54.885	19.475	1.7942	0.0045	47.254	2.3653	2.4240	———	27.94
ML5		5.18	0.377	1.64	472.0	5.55	105.9	0.318	33.3	17.6	1.01	1.02	———	796.0	———	1.64	8.38	1.17
		51.1	2.35	113.0	5.37	0.607	11.9	3.13	0.916	———	26.0	———	———	102.0	———	2.92	———	20.8
ML6		5.2332	0.3189	2.2595	448.59	5.2051	93.404	0.2064	30.216	16.097	1.0291	24621	5.3632	651.06	0.9353	2.0946	8.2644	1.1750
		54.379	2.6030	97.026	5.3670	0.8361	11.044	3.0027	0.7434	46.888	30.164	1.8349	0.0043	51.740	1.4162	2.7102	———	24.10
ML7		4.72	0.353	2.12	350.0	4.42	75.3	0.215	30.5	16.0	0.94	5.57	———	869.0	———	1.47	7.50	1.10
		45.9	2.09	97.0	4.03	0.649	10.6	2.82	0.832	———	19.4	———	———	87.0	———	2.59	———	24.5
ML9		6.56	0.411	2.70	598.0	11.40	69.2	0.344	43.2	24.5	1.33	3.90	———	1259.0	———	12.91	10.30	0.94
		64.6	3.00	142.0	3.30	0.940	15.2	3.92	1.291	———	28.4	———	———	138.0	———	3.31	———	23.0
ML10		5.2254	0.3514	2.4247	381.98	10.354	101.02	0.2705	30.329	16.560	1.0619	4.7008	5.3081	679.86	0.8875	1.3574	8.2898	1.1345
		55.679	2.5897	99.114	6.1815	0.8875	11.377	3.2082	0.8487	28.211	21.705	1.9685	0.0071	49.473	1.3391	2.6922	———	23.89
ML11		4.60	0.348	———	288.0	8.77	90.2	0.318	31.1	15.8	0.93	2.65	———	830.0	———	1.00	7.46	1.21
		46.6	2.00	97/0	4.71	0.545	11.0	2.64	0.750	———	18.10	———	———	90.0	———	2.40	———	24.5
ML12		6.05	0.448	2.02	428.0	6.27	107.9	0.522	40.1	21.3	1.21	6.04	———	1059.0	———	14.49	9.93	1.44
		60.5	2.58	130.0	5.68	0.953	14.2	3.61	1.059	———	19.5	———	———	134.0	———	3.02	———	17.7
ML13		4.61	0.326	0.90	474.0	6.19	68.7	0.343	30.8	15.6	0.96	1.50	———	828.0	———	1.68	7.43	1.11
		46.5	2.06	99.0	3.16	0.667	10.8	2.82	0.849	———	24.8	———	———	87.0	———	2.44	———	26.7
ML14		5.77	0.372	1.38	406.0	8.24	99.3	0.481	38.5	20.1	1.19	5.73	———	948.0	———	3.34	9.31	1.19
		57.3	2.41	117.0	5.04	0.839	13.5	3.51	1.089	———	28.4	———	———	123.0	———	2.96	———	21.2
ML16		4.97	0.357	1.44	331.0	12.79	105.0	0.220	33.7	17.3	1.01	3.66	———	798.0	———	1.64	7.91	7.38
		50.2	2.43	107.0	6.19	0.733	11.7	2.91	0.968	———	19.8	———	———	97.0	———	2.44	———	23.8
ML17		4.94	0.332	1.50	351.0	5.50	74.0	0.428	31.7	16.6	0.97	2.42	———	759.0	———	5.41	8.15	1.28
		51.1	2.15	104.0	3.26	0.706	11.6	3.03	0.914	———	20.1	———	———	98.0	———	2.90	———	21.0
ML18		6.14	0.478	1.43	448.0	7.91	118.0	0.560	39.6	24.5	1.19	3.03	———	619.0	———	4.50	10.69	1.90
		64.3	2.96	127.0	5.74	0.968	15.0	3.98	1.211	———	23.8	———	———	109.0	———	3.73	———	14.1
ML19		4.94	0.352	1.16	369.0	4.26	95.1	2.245	33.0	16.9	0.98	0.93	———	873.0	———	0.49	8.02	1.18
		49.8	2.19	108.0	5.74	0.773	11.5	2.89	0.887									
ML21		5.13	0.377	1.41	361.0	7.96	97.3	2.282	34.0	18.4	1.03	3.54	———	684.0	———	1.49	8.73	1.28
		55.1	2.228	111.0	5.41	———	12.3	3.34	0.908	———	23.5	———	———	100.0	———	2.82	———	20.5
ML22		5.08	0.344	1.50	381.0	9.71	75.0	0.315	33.5	18.2	1.04	1.23	———	824.0	———	1.13	8.36	1.38
		51.8	2.31	110.0	3.11	0.682	11.8	3.04	0.857	———	22.0	———	———	96.0	———	2.96	———	21.2

Table 2q - Concentration value of the trace elements achieved by neutrons activation analysis of the samples coming from Montelupo

Element	Average instrumental % Standard deviation (absolute % counting error)	Orientative limit value of the threshold of sensitivity. (p.p.m.)	%Number of times below the threshold of sensitivity.	Mean % standard deviation of the whole method of the samples treatment.	
Sm	0.38	-	0.	11.76	
Lu	10.00	-	0.	55.62	o +
U	7.44	-	0.8	31.73	o
Cd	27.42	6.50	67.7	>100	o x +
Au	19.75	0.0006	58.3	>100	o x +
Ba	9.37	151.	1.6	30.50	o
Nd	23.03	15.	25.	>100	o x +
As	6.04	-	0.8	6.90	
Br	16.11	2.	46.5	65.80	o x +
Na	0.92	-	0.	5.97	
La	0.60	-	0.	4.90	
Ce	1.13	-	0.	14.15	
Yb	5.78	-	0.8	19.08	
Se	6.80	2.	99.2	12.58	x
Hg	15.00	1.	96.1	20.78	o x
Th	1.64	-	0.	9.86	
Cr	1.30	-	0.8	16.62	
Hf	3.37	-	0.8	19.90	
Sr	13.53	200.	3.8	35.53	o
Ag	17.92	1.	75.4	>100	o x +
Cs	2.29	-	0.	10.64	
Ni	18.46	40.	20.8	20.22	o x
Tb	10.38	0.25	2.3	92.95	o x +
Sc	0.25	-	0.	9.33	
Rb	7.28	-	0.	16.80	
Fe	0.50	-	0.	6.00	
Zn	2.49	60.	36.9	26.50	x
Ta	5.39	-	0.8	17.95	
Co	1.03	-	0.8	20.75	
Eu	2.97	-	0.8	16.29	
Sb	17.32	0.7	4.6	99.99	o x +
Ca	-	-	0.	2.02	
K	-	-	0.	23.25	

TABLE 3 - A summarized picture of the % error of the concentration value of the different reported elements. The first column gives the average % error only for the counting device (e.g. coming from the only counting error of the Y impulses. The second column represents the orientative limit values of concentration under wich the measure could not be reliable (sensibility thresold). The third column reports the number of times in wich the measures felt beyond such sensibility thresold. The fourth column reports the average error calculuted on different specimens (3-6) taken from the same samples (25) on wich parallel tests by various operators in different days were carried out. It gives so the measure of the % error of the overall process of analysis for every elements. The fifth column would like to demonstrate that in the most cases, at high errors of overall method (+) it corresponds a combination of high instrumental error (o) with an high number of cases in wich the thresold sensibility is overjapped (x). This permits to evidentiate that the overall % error is comming from the operating in the neighbouring of the sensitivity thresold for some elements, while for other elements it depends from other reasons (chemical treatments, radiation times, sample granulometry, and so on).