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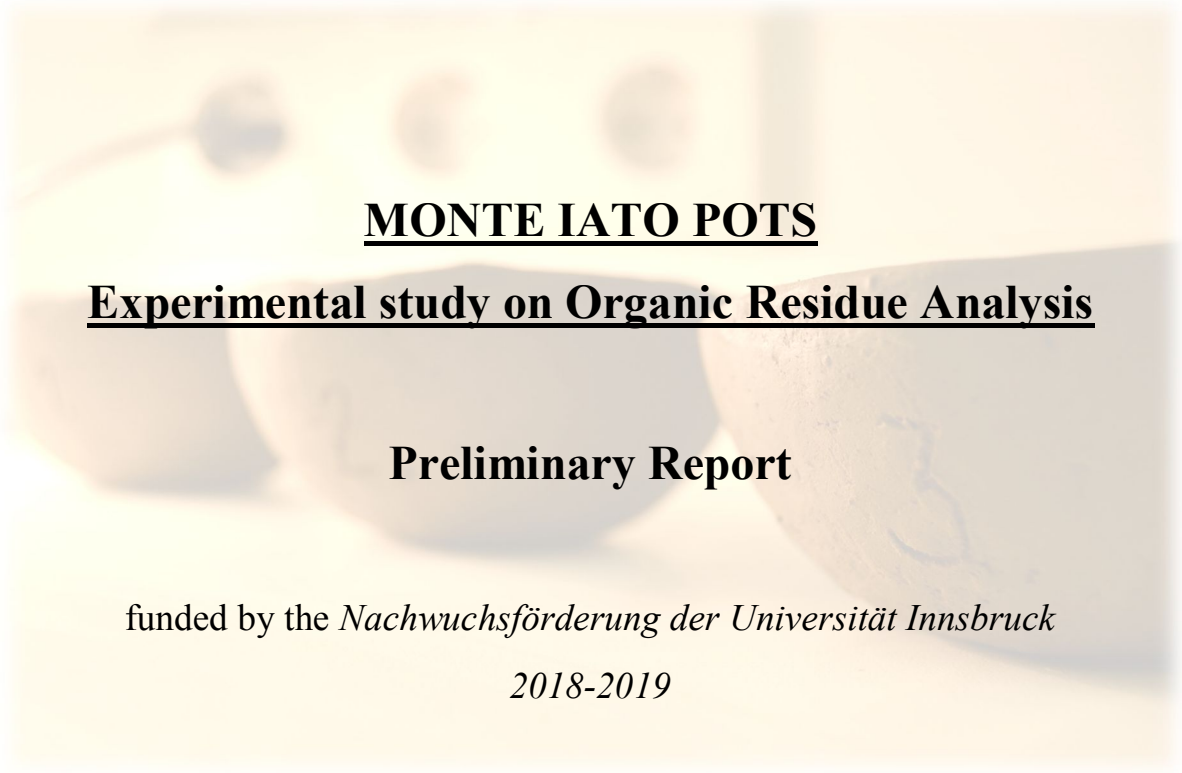
Forschungszentrum Ancient Worlds Studies and Archaeologies (AWOSA)



MONTE IATO POTS

Experimental study on Organic Residue Analysis

Preliminary Report

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Content

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1. Clay

The clay was collected in Sicily in the direct vicinity of the Monte Iato by Birgit Öhlinger und Ulrike Töchterle. All together the clay weighted approximately 13 kg.
To the pulverised clay we added ¼ demonetised water.

2. Making of the vessels

The clay was formed in a gypsum form. Afterwards it was smoothed and air-dried.

3. Documentation of the vessels

Colour

The colour before the burning was ochre but changed during the burning due to the high content of iron oxide to a more reddish colour.

Dimensions

Upper wall thickness max. 8,91 mm
Upper wall thickness min 5,24 mm
Outer diameter 9,191 cm - 9,3 cm
Hight 4,4 cm – 4,7 cm
One vessel can contain approximately 100 ml of water.

4. Ingredients for sealing, cooking and pouring

Tallow

The tallow we used for sealing was homemade with cattle sued. The cattlefat was bought in Tyrol and heated up to 47°C. Afterwards it was stored for 2 months in a glasjar and heated up again to shape it in 5 ml portions.

Milk

The milk we used for sealing, cooking and pouring was bought by a Tyrolean farmer. The farmer milked the cow and filled the milk directly in glasbottles, therefore the milk did not go through a pasteurization process.

Wine

The four different wines we used were all bought and produced in Sicily.

Nero d`Avola, Frappato and two Sicilian made wines from the local cantina in San Cipirello (Monte Iato) (one red and one white).

Cattle meat and Porcine meat

The cattle and the porcine meat/fat were bought at a butcher in Innsbruck. Although the concrete butchery was not named the meat comes from Austria.

Fish

The fish was bought from a market in Innsbruck but was fished in the Mediterranean Sea.

Fish (in gram)	
Redfish	140
Sea bass	120
coalfish	135
Salmon	160
Overall:	555

Pine resin

The pine resin was collected in the woods of Tyrol. Afterwards it was roughly cleaned to get rid of the bark. We used several different methods to get the bark of the resin, all containing mild heat.

Olive oil

The oil was bought and produced in Sicily (local product from olive trees grown in San Cipirello (Monte Iato)).

Beer

To ensure that the beer was free of any modern supplements we decided to brew our own beer. This also ensured that there weren`t any traces of malt in it. Additionally we built our own Hydria to brew the beer in it.

Vegetable

The vegetables we used were bought from a Tyrolean farmer who produces organic food.

Veg	
Chad	164
Cabbage	860
Parsley	146
Yellow carrot	154
Black carrot	194
Overall	1518

5. Polishing of four vessels

We decided to polish four vessels with different fats to see if there is an effect after the burning.
We polished one vessel with olive oil, another one with beef tallow and two we polished without any additional fat.

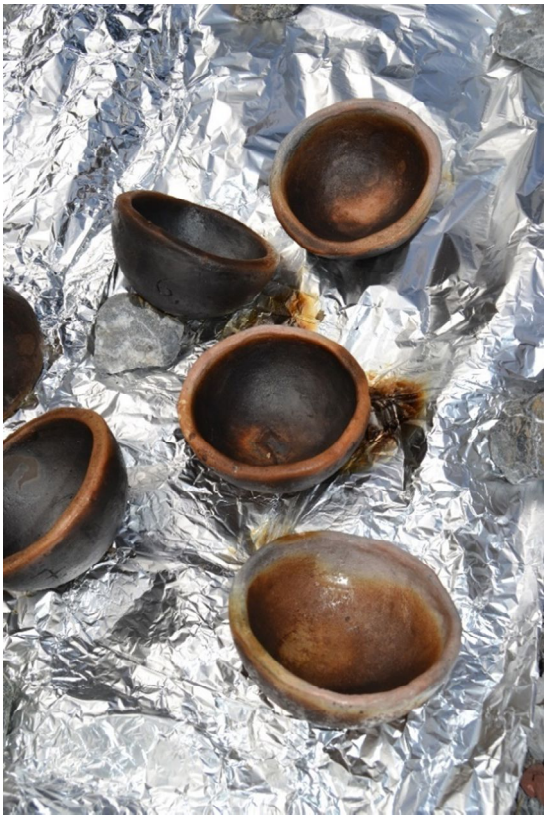
6. Burning and sealing of the vessels and the Hydria

All 50 vessels and the Hydria were put in an electro oven for 24 hours and were burned at 800°C.

As we wanted to seal 23 vessels with different fats we decided to do an additional field fire so the vessel could be pre-heated before sealing. A sealing of hot vessels is often documented in ethno archaeological research.

6.1. Sealing with milk

The sealing with milk was in general unproblematic. The vessels were put for approximately 13-15 minutes into the flames and were subsequently dipped into the milk for three times (as ethnoarchaeological reports from rakutechniques report).
We dipped the vessels at different temperatures into the milk to see what an impact this could have on the milk and the sealing. Generally we tried to dip them into the milk at 300-500°C. We could observe that when dipped in at a lower temperature the ceramic turned white as opposed to higher temperature the vessel turned brown/blackish.



6.2. Sealing with beef tallow

The sealing with beef tallow turned out to be more complicated than with milk. We also burned the vessels for approximately 12-15 minutes and put a 5 ml tallow portion into the vessel. The first vessel had about 500°C and after putting the tallow in it immediately caught fire. Therefore we reduced the temperature for the other vessels.

6.3. Sealing with pine resin

The sealing with pine resin turned out to be the rather difficult, as the resin was still stuck to some Bork; although we tried to clean it beforehand. We could collect about 50 ml clean resin which we enriched with a bit beef tallow to make it easier to apply.
We sealed one vessel with the hot mixture without pre-heating the jar itself. We put the other seven vessels in the flames for about 10 minutes. We tried to apply the resin with a brush but this turned out to be problematic as the brush caught fire.

7. Cooking

For the first cooking we bought 10 l of charcoal. We prepared the charcoal for about 2 hours before cooking for an additional 4 ½ hours
for the first cooking day we used all of the 10 l.

RAF = rudiment adipose fat
NRAF = Non-rudiment adipose fat
Veg = Vegetables

Veg

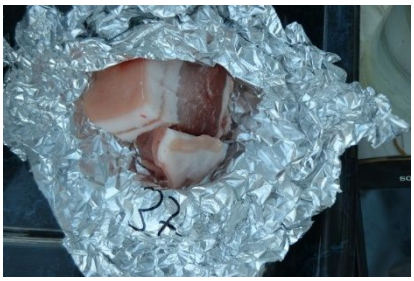
1st cooking day (Gramm)	
Parsley	24
Chard	26
Yellow carrots	24
Black carrots	20
cabbage	136
Used for one vessel	230

RAF

For the first cooking day we used about 320 g (incl. Bone) of cattle belly fat for two vessels.

NRAF

Porcine probably was the most used meat of non-rudiment animals. Therefore we bought about 950 g porcine belly fat for four vessels for two cooking days.



Fish

Fish (in gram)	
Redfish	70
Sea bass	60
coalfish	67,5
Salmon	80
Overall:	280

For every vessel we put together a package of 70 g of fish for the first cooking day.

Milk

For the first cooking day we used about a litre milk for three vessels.

We started cooking at about12:30 pm and ended the cooking at about 04:00 pm. The approximately temperature inside the vessels was at 80-100°C, whereas the outer temperature showed about 120-150°C.

8. Second Cooking day

The second cooking day started at about 11 a.m. and ended at 04:15 p.m.

Veg:

As we did not use all the vegetables from the first cooking day we used it for the second. All in all for vessel nr. 23 72g, for nr. 39 58g and for nr. 5 88g left. We added another 128g of vegetables to every vessel.

Veg	
Chard	16
Cabbage	33
Parsley	19
Yellow carrot	22
Black carrot	38
Overall:	128

At the end of the day we again had vegetables left:

Nr. 5 = 82g
Nr. 39 = 74g
Nr. 23 = 52g

From the cabbage we had another 310 g left.
Counting both cooking days together we used for nr. 5 276 g, nr. 23 306 g and for nr. 39 284 g of vegetables.

	Day 1	Day 2	Overall
Vessel 5	142	134	276
Vessel 23	158	148	306
Vessel 39	172	112	284

RAF
For the second day of cooking we used 100 g leg meat per vessel.

NRAF

This time we used 140 g per vessel of the same meat as the day before.

Fish

In addition to the same fish we added 15 g per vessel of a pasta di acciughe bought in Sicily. All in all the content of the vessels was 82 g of fish.

Milk

Again we used about 1 litre milk for three vessels.

After the cooking the vessels were kept in the oven over night. The next day in the morning we roughly cleaned and rinsed them from leftovers. Since then they are stored in aluminium foil.

Ceramic list for cooking			
Nr.	Cooking	Field fire in °C	Sealing
2	RAF	494	Milk
3	NRAF	300	Milk
4	Fish	444	Milk
5	Veg	477	Milk
9	Milk	200	Beef tallow
10	NRAF	400	Beef tallow
11	Fish	300	Beef tallow
12	Veg	490	Beef tallow
18	Milk	250	Resin
19	NRAF	290	Resin
20	Fish	290	Resin
35	Milk	-	-
36	RAF	-	-
37	NRAF	-	-
38	Fish	-	-
39	Veg	-	-

Content	Number
Milk (4)	9
	18
	35
RAF (2)	2
	36
NRAF (4)	3
	10
	19
	37
Fish (4)	4
	11
	20
	38
Veg (3)	5
	23
	39
Overall	16 Vessels

9. Pouring

We filled 14 vessels with different liquids and put them into the oven at 70°C. We warmed them up for 2 weeks. We regularly checked them to see if they need refilling.

We filled five vessels with the self-made beer and put them as well as the Hydria in the oven.

Five vessels are filled with different wine types.
In addition we filled 3 vessels with olive oil from Sicily and one vessel with milk from a Tyrolean farmer.

Ceramic list for pouring			
Nr.	pouring	Field fire in °C	Sealing
6	Wine	484	Milk
7	Beer	497	Milk
13	Wine	270	Beef tallow
14	Beer	450	Beef tallow
15	Oil	360	Beef tallow
21	Wein	220	Resin
22	Beer	240	Resin
23	Oil	330	Resin
33	Wine	-	-
34	Beer	-	-
40	Wine	-	-
41	Beer	-	-
42	Oil	-	-
43	Milk	-	-

Content	Number
Wine	6
	13
	21
	33
	40
Beer	7
	14
	2
	34
	41
Oil	15
	23
	42
Milk	43
All together	14

10. Ceramic list

Ceramic list						
Nr.	Cooking	Pouring	Polished	Field fire °C	Sealing	Additional
1	-	-	-	460	Milk	
2	RAF	-	-	494	Milk	
3	NRAF	-	-	300	Milk	
4	Fish	-	-	444	Milk	
5	Veg	-	-	477	Milk	
6	-	Wine	-	484	Milk	Red wine
7	-	Beer	-	497	Milk	
8	-	-	-	350	Beef tallow	
9	Milk	-	-	200	Beef tallow	
10	NRAF	-	-	400	Beef tallow	
11	Fish	-	-	300	Beef tallow	
12	Veg	-	-	490	Beef tallow	
13	-	Wine	-	270	Beef tallow	Frappato wine
14	-	Beer	-	450	Beef tallow	
15	-	Oil	-	360	Beef tallow	
16	-	-	-	250	Resin	
17	-	-	-	-	Nur Feuerbrand	
18	Milk	-	-	250	Resin	
19	NRAF	-	-	290	Resin	
20	Fish	-	-	290	Resin	
21	-	Wine	-	220	Resin	Nero red wine
22	-	Beer	-	240	Resin	
23	-	Oil	-	330	Resin	
31	-	-	Beef tallow	-	-	
32	-	-	Oil	-	-	
33	-	Wine	Poliert	-	-	Nero red wine
34	-	Beer	Poliert	-	-	
35	Milk	-	-	-	-	
36	RAF	-	-	-	-	
37	NRAF	-	-	-	-	
38	Fish	-	-	-	-	
39	Veg	-	-	-	-	
40	-	Wine	-	-	-	White wine
41	-	Beer	-	-	-	
42	-	Öl	-	-	-	-
43	-	Milk	-	-	-	

11. ORA-Analysis

Breaking of the vessels and packing for transfer to York

The analysis will be conducted at the University of York within the Sicily in Transition – Project (http://www.sicilyintransition.org/). We are expecting the results in spring 2019.