

Electronic Supplementary Information (ESI)

Arsenic Removal from Peruvian Drinking Water by Milk Protein Nanofibril-Carbon Filters: A Field Study

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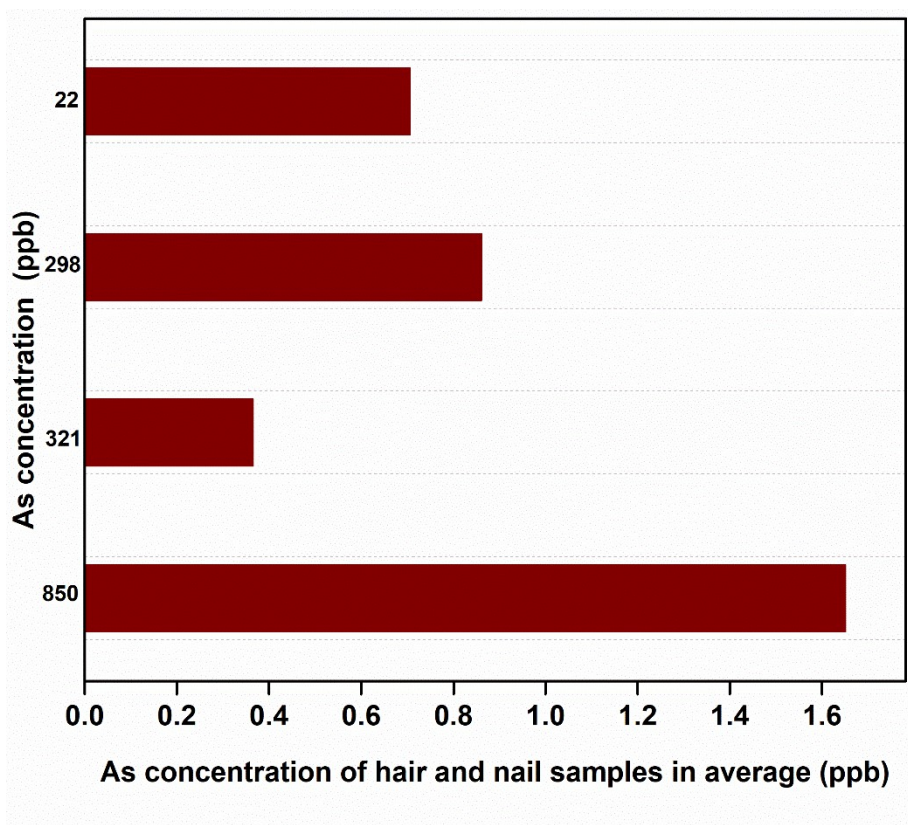


Fig. S1. Average of arsenic concentration in the hair and nails samples for the regions with different As concentrations.

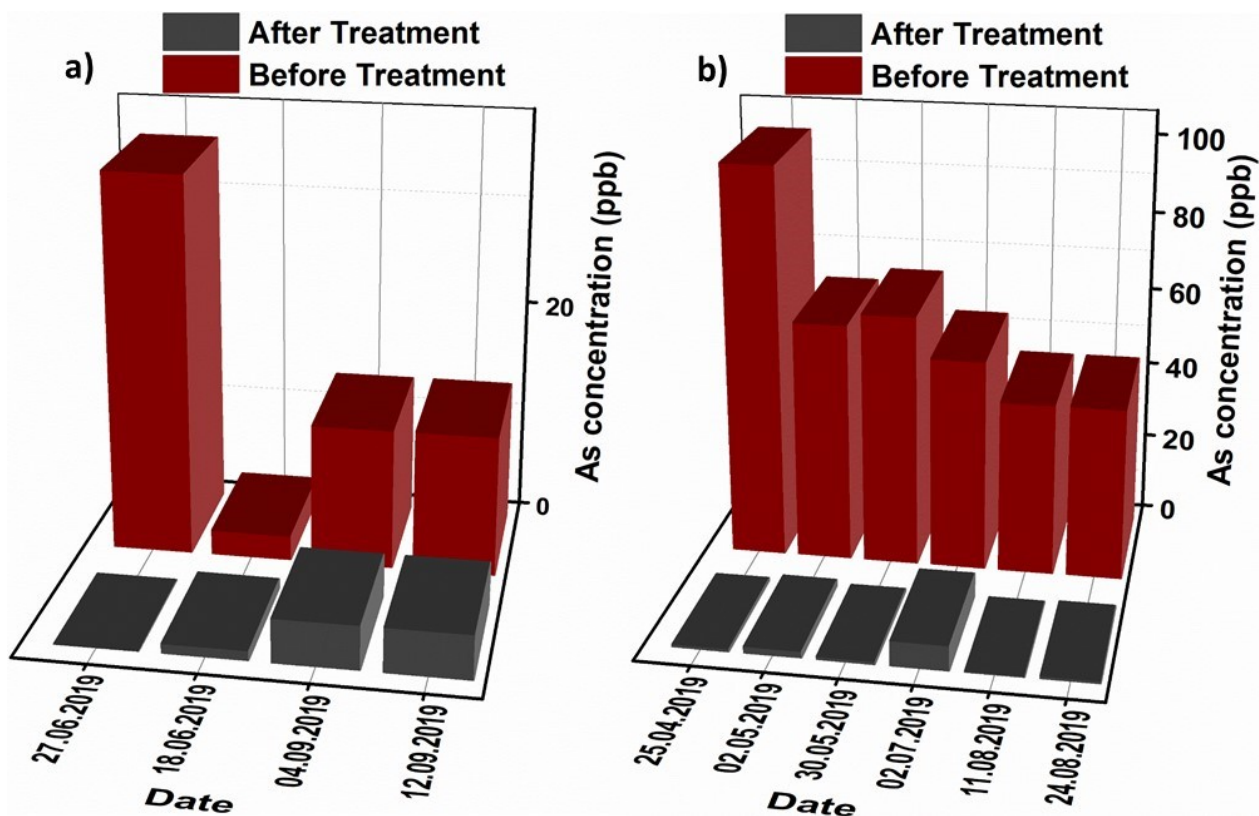


Fig. S2. Arsenic concentration before and after filtration through the Type I setup in a) Moguega (H24) and b) Chicalayo (H19). The performance was acceptable thought the entire study without the need of unit replacement.

Table S1. Houses with filter unit installation type and number of people using the unit for removing arsenic from tap drinking water.

Code	Place	Filtration unit type	Number of people
H 1	Tacna	Type II	3
H 2	Tacna	Type I	5
H 3	Tacna	Type I	3
H 5	Tacna	Type II	4
H 6	Ticapampa	Type I	3
H 7	Ticapampa	Type I	3
H 9	Ticapampa	Type II	5
H 10	Ticapampa	Type I	5
H 11	Inclan	Type II	8
H 12	Inclan	Type I	4
H 13	Inclan	Type I	7
H 14	Inclan	Type I	6
H16	Chiclayo	Type II	10
H17	Chiclayo	Type II	7
H18	Chiclayo	Type II	4
H19	Chiclayo	Type I	4
H20	Chiclayo	Type II	6
EPS	TACNA	Type III	6
H21	MOQUEGUA	Type I	7
H22	MOQUEGUA	Type II	9
H23	MOQUEGUA	Type I	5
H24	MOQUEGUA	Type II	6
H25	Cero De Pasco	Type II	4
H26	Cero De Pasco	Type II	6
H27	Cero De Pasco	Type I	6
H28	Cero De Pasco	Type I	4
R1	Inclan	Type III	community
R2	Torato	Type III	community

Table 2:

The physio-chemical parameters of the water before and after filtration is provided below

Parameters measured in the field with portable equipment Household filters

FIELD PARAMETERS MEASURED WITH PORTABLE EQUIPMENT									
USER H30									
Location: Ticapampa Town Center: East = 336,513, North = 8067064, Altitude = 1109 TYPE IV home filter DATE: 05/11									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER (before)	0.23	9.55	25.7	-142.5	2.03	24.8			
FILTERED (after)	0	9.5	25.4	-139.1	2.04	24.4		0.019 Lt / sec	
DATE: 12/17									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.17	8.99	23.4	-105.5	2.05	24.3	0.3		
FILTERED	0.02	9.05	2.3	-111.7	2.07	23.7	0	0.019 Lt / sec	
USER H31									
Location: Poquera Inclán Town Center: East = 339.331, North = 828637, Altitude = 448 TYPE IV home filter DATE: 02/10									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.95	8.15	21.4 °	-62.5	2.41	20.6 °	0		
FILTERED	0.88	7.87	21.4 °	-46.3	2.4	20.9 °	0	0.047 Lt / sec	
DATE: 05/11									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.65	10.86	24.6	-215.1	2.43	24.2	0		
FILTERED	0	10.41	24.6	-194	2.44	25.3	0	0.047 Lt / sec	
DATE: 12/16									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	

FIELD PARAMETERS MEASURED WITH PORTABLE EQUIPMENT

WITHOUT FILTER	1.15	9.83	26.2	-171.5	2.41	26.2	0		
FILTERED	0.03	9.82	26.4	-149.5	2.4	26.3	0	0.047 lt / sec	

USER H32

Location: Inclán Town Center:
East = 342,674, North = 8031991, Altitude = 512
TYPE IV home filter

DATE: 02/10

WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	14.25	8.48	19.9 °	-80.4	2.38	19.7 °	0		
FILTERED	2.02	8.48	20 °	-79.9	2.4	20 °	0	0.02 lt / sec	

DATE: 11/10

WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	3.02	8.48	21.1	-81.1	2.4	21.7			
FILTERED	0.55	7.85	21.9	-43.6	2.38	2.38		0.02 lt / sec	

DATE: 05/11

WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	12.37	10.9	23.7	-220.7	2.35	23.6	0		
FILTERED	0.17	10.84	23.4	-215.2	2.35	23.6	0	0.02 lt / sec	

DATE: 11/18

WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	13.7	9.22	22.1	-121.8	2.39	22	0		
FILTERED	1.23	9.4	22.2	-131.7	2.42	21.9	0	0.02 lt / sec	

DATE: 12/17

WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	2.18	9.12	25.9	-119.5	2.45	25.7	0		
FILTERED	0.5	9.99	25.5	-135.2	2.4	24.2	0	0.02 lt / sec	

USER H33

Location: City of Tacna:
East = 372,630, North = 8009618, Altitude = 687

FIELD PARAMETERS MEASURED WITH PORTABLE EQUIPMENT									
TYPE IV home filter									
DATE: 02/10									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	1.27	7.07	18.3 °	-4.7	0.77	19.8 °	0.9		
FILTERED	0.93	7.13	19 °	-3.9	0.61	19.4 °	0	0.015 lt / sec	
DATE: 11/18									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.9	8.37	26.9	-75.2	0.7	26.2	1.3		
FILTERED	0.2	8.57	26.2	-87.8	0.83	27.4	0	0.015 lt / sec	
DATE: 12/18									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.38	9.1	23.6	-113.6	0.69	32	0.5		
FILTERED	0.02	9.04	26.8	-112.9	0.75	29.5	0	0.015 lt / sec	

Comment: The measurements show flow rates that varied between 0.015 lt / sec and 0.04 lt / sec, which were the average operating flow rates of the first generations of filters. Subsequently, the researchers at the end of the validation and based on the efficiency results obtained in the laboratory, recommended a flow rate of 0.006 lt / sec, to obtain the maximum efficiency in the treatment.

USER R1									
Location: Collective filter in Poquera Inclán Tacna:									
East = 339,288, North = 8028545, Altitude = 456									
DATE: 11/10									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.71	8.12	22.2	-62.1	2.43	23.8	0		
FILTERED	0.01	8.19	20.1	-63.6	2.12	20.8	0	0.05 lt / sec	
DATE: 05/11									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	0.59	11.2	24.48	-236.2	2.44	25	0		
FILTERED	0	11.11	21.4	-228.6	2.44	21.7	0	0.05 lt / sec	
DATE: 12/16									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER	1.27	9.88	2.3	-166.3	2.43	26.2	0		

FIELD PARAMETERS MEASURED WITH PORTABLE EQUIPMENT									
FILTERED	0.04	8.97	23.1	-109.6	2.39	22.5	0	0.05 lt / sec	
USER R2									
Location: Treatment Plant in Torata Moquegua: East = 304,232, North = 8111220, Altitude = 2264									
DATE: 11/10									
WATER	TURBIDITY	PH	TEMP.	MV	CONDUCTIV.	TEMP.	CHLORINE	FLOW	
WITHOUT FILTER		7.76	25.7	-40	0.67	26.3	0		
FILTERED		7.72	22.7	-37.3	0.67	23.6	0.8	0.1 lt / sec	
Chlorinate the water after being filtered									

Note: There are two temperature records because they have been measured with different instruments.