Table S1: Physical and chemical parameters of integrated poultry and aquaculture wastewater treated with *Phragmites karka* and *Typha latifola* in a sub-surface constructed wetland at 7, 14- and 21- days retention periods during November 2021 to January 2022 season

Days		7		14		21	
Water Treatment	RWW	PT	TT	PT	TT	PT	TT
Temperature	26.90^{a}	27.04^{a}	26.93^{a}	26.57^{b}	26.40^{b}	26.37^{b}	26.10^{c}
Colour (HU)	11.0^{a}	9.16^{b}	9.11^{b}	7.57^{b}	7.60^{b}	6.90^{b}	7.08^{b}
Turbidity (NTU)	10.24^{a}	8.49^{b}	8.29^{b}	6.62^{b}	6.93^{b}	5.10^{b}	5.41^{b}
pH	8.31^{a}	7.82^{b}	7.95^{b}	7.56^{b}	7.69^{b}	7.30^{b}	7.37^{b}
DO (mg/L)	0.10^{b}	2.23^{a}	2.18^{a}	3.22^{a}	3.21^{a}	4.49^{b}	4.73^{a}
Acidity	131.0^{a}	94.67^{b}	95.11^{b}	79.56^{b}	72.78^{c}	64.33^{b}	64.00^{b}
TA	197.0^{a}	142.67^{b}	138.67^{b}	11.22^{b}	105.67^{c}	73.89^{b}	67.11^{c}
TH	76.50^{a}	61.42^{b}	61.03^{b}	54.74^{b}	54.99^{b}	47.03^{b}	48.11^{b}
Cl- (mg/L)	48.50^{a}	29.92^{b}	30.56^{b}	25.58^{b}	25.16^{b}	18.04^{b}	18.47^{b}
NO_3^- (mg/L)	39.70^{a}	30.83^{b}	29.57^{b}	21.56^{b}	21.07^{b}	10.53^{b}	9.73^{b}
NO_2^- (mg/L)	0.30^{a}	0.093^{b}	0.092^{b}	ND	ND	ND	ND
SO_4^{2-} (mg/L)	115.3^{a}	79.77^{b}	80.08^{b}	63.89^{b}	62.63^{b}	33.40^{b}	33.84^{b}
BOD (mg/L)	28.50^{a}	18.37^{b}	19.07^{b}	9.73^{b}	9.36^{b}	3.29^{b}	2.48^{b}
COD (mg/L)	54.80^{a}	31.58^{b}	29.96^{b}	19.02^{b}	1.39^{b}	5.98^{b}	4.66^{b}
Na (mg/L)	77.56^{a}	64.02^{b}	63.00^{b}	44.33^{b}	43.03^{b}	26.87^{b}	23.92^{c}
K (mg/L)	81.86^{a}	70.35^{b}	69.90^{b}	49.81^{b}	45.42^{b}	31.44^{b}	26.22^{c}
Ca (mg/L)	42.74^{a}	35.45^{b}	33.48^{c}	25.06^{b}	23.76^{b}	17.04^{b}	16.41^{b}
Mg (mg/L)	45.90^{a}	35.68^{b}	35.60^{b}	25.42^{b}	26.90^{b}	17.32^{b}	17.01^{b}

Note: Means that do not share a letter are significantly different; RWW means Raw Wastewater; PT stands for *Phragmites karka;* and TT stands for *Typha latifola;* ND means not detected

Table S2: Physical and chemical parameters of integrated poultry and aquaculture wastewater treated with *Phragmites karka* and *Typha latifola* in a sub-surface constructed wetland at 7, 14- and 21- days retention periods during March – May 2022 season.

Days		7		14		21	
Water treatment	RWW	PT	TT	PT	TT	PT	TT
Temperature	25.90^{b}	26.14^{a}	26.12^{a}	26.72^{a}	26.18^{b}	26.12^{a}	26.03^{a}
Colour (HU)	12.80^{a}	8.36^{b}	8.42^{b}	7.7^{b}	7.8^{b}	5.70^{b}	5.70^{b}
Turbidity	12.50^{a}	8.17^{b}	8.18^{b}	6.91^{b}	6.86^{b}	4.54^{b}	4.42^{b}
pH	8.25^{a}	7.79^{b}	7.70^{b}	7.51^{b}	7.44^{b}	7.26^{b}	7.21^{b}
DO (mg/L)	0.18^{b}	2.12^{a}	2.17^{a}	3.36^{a}	3.47^{a}	4.88^{a}	4.94^{a}
Acidity	125.0^{a}	89.78^{b}	91.11^{b}	78.0^{b}	74.1^{c}	60.1^{b}	60.3^{b}
TA	187.0^{a}	127.33^{c}	130.89^{b}	100.2^{c}	108.3^{b}	8.33^{b}	79.89^{b}
TH	78.0^{a}	59.8^{b}	59.3^{b}	52.5^{b}	54.1^{b}	46.41^{b}	46.60^{b}
Cl- (mg/L)	52.0^{a}	34.7^{b}	33.7^{b}	27.5^{b}	27.1^{b}	20.01^{b}	18.20^{b}
NO_3^- (mg/L)	42.1^{a}	28.8^{b}	27.7^{b}	19.97^{b}	19.39^{b}	10.17^{b}	9.97^{b}
SO_4^{2-} (mg/L)	120.1^{a}	81.57^{b}	78.94^{c}	64.98^{b}	63.49^{b}	36.96^{b}	38.13^{b}
BOD (mg/L)	32.1^{a}	17.4^{b}	16.3^{b}	9.14^{b}	9.16^{b}	3.47^{b}	4.56^{b}
COD (mg/L)	61.5^{a}	32.3^{b}	30.6^{b}	17.6^{b}	17.5^{b}	6.69^{b}	5.96^{b}
Na (mg/L)	67.8^{a}	45.1^{b}	43.9^{b}	35.96^{b}	34.78^{b}	23.57^{b}	23.51^{b}
K (mg/L)	56.73^{a}	45.87^{b}	46.44^{b}	40.31^{b}	39.37^{b}	28.81^{b}	24.80^{c}
Ca (mg/L)	34.0^{a}	24.27^{b}	25.99^{b}	20.61^{b}	21.58^{b}	15.6^{b}	16.6^{b}
Mg (mg/L)	43.60^{a}	33.33^{b}	30.95^{b}	26.19^{b}	25.18^{b}	17.3^{b}	16.3^{b}

Note: Means that do not share a letter are significantly different; RWW means Raw Wastewater; PT stands for *Phragmites karka;* and TT stands for *Typha latifola;* ND means not detected

Table S3: Physical and chemical parameters of integrated poultry and aquaculture wastewater treated with *Phragmites karka* and *Typha latifola* in a sub-surface constructed wetland at 7, 14- and 21- days retention periods during July – September 2022 season.

Days		7		14		21	
Water treatment	RWW	PT	TT	PT	TT	PT	TT
Temperature	26.3^{a}	26.1^{a}	26.1^{a}	26.99^{a}	26.99^{a}	25.99^{b}	26.04^{b}
Colour (HU)	11.50^{a}	7.96^{b}	7.86^{b}	6.36^{b}	6.43^{b}	5.9^{b}	6.08^{b}
Turbidity (NTU)	12^{a}	7.6^{b}	7.5^{b}	5.77^{b}	6.03^{b}	4.14^{b}	4.3^{b}
pH	8.1^{a}	7.5^{b}	7.75^{b}	7.28^{b}	7.21^{b}	7.17^{b}	7.12^{b}
DO (mg/L)	0.23^{b}	2.18^{a}	2.29^{a}	3.73^{a}	3.72^{a}	4.89^{a}	4.73^{a}
Acidity	115.0^{a}	94.22^{b}	92.89^{b}	73.33^{b}	72.78^{b}	58.11^{b}	58.67^{b}
TH	70^{a}	57.56^{b}	57.33^{b}	52.44^{b}	51.56^{b}	45^{b}	45.33^{b}
Cl- (mg/L)	60.5^{a}	36.90^{b}	36.10^{b}	25.97^{c}	28.49^{b}	17.88^{b}	18.50^{b}
NO_3^- (mg/L)	38.70^{a}	27.36^{b}	29.04^{b}	18.46^{b}	18.41^{b}	9.94^{b}	8.81^{b}
SO_4^{2-} (mg/L)	118^{a}	74.68^{b}	73.84^{b}	42.53^{b}	41.25^{b}	29.37^{b}	30.42^{b}
BOD (mg/L)	27.90^{a}	17.18^{b}	16.51^{b}	8.9^{b}	8.73^{b}	2.5^{b}	2.33^{b}
COD (mg/L)	53.70^{a}	31.32^{b}	30.91^{b}	16.69^{b}	16.49^{b}	4.69^{b}	4.29^{b}
Na (mg/L)	65.90^{a}	49.02^{b}	48.24^{b}	34.04^{b}	33.7^{b}	22.22^{b}	24.41^{b}
K (mg/L)	81.50^{a}	57.04^{b}	54.59^{b}	41.59^{b}	39.68^{b}	26.64^{b}	24.93^{b}
Ca (mg/L)	29.50^{a}	21.82^{b}	22.43^{b}	17.43^{b}	17.73^{b}	10.92^{b}	11.42^{b}
Mg (mg/L)	38.90^{a}	27.10^{b}	25.40^{c}	17.41^{a}	15.92^{ab}	9.68^{b}	8.26^{b}

Note: Means that do not share a letter are significantly different; RWW means Raw Wastewater; PT stands for *Phragmites karka;* and TT stands for *Typha latifola;* ND

Table S4: Mean separation for physico-chemical removal efficiency in a constructed wetland as a function of seasonal variations, retention time, and treatment plants

	NDJ						MAM						JAS					
Parameters	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Na	17.5a	18.8a	42.8a	44.5a	65.4a	69.2a	33.5a	35.3a	47.0a	48.7a	65.2a	65.3a	25.6a	26.8a	48.3a	48.9a	66.3a	63.0a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
K	14.1a	14.6a	39.2a	44.5a	61.6a	68.0a	19.1a	18.1a	28.9a	30.6a	49.2a	56.3a	30.0a	33.0a	49.0a	51.3a	67.3a	69.4a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Ca	17.1a	21.7a	41.4a	44.4a	60.1a	61.6a	28.6a	23.6a	39.4a	36.5a	54.1a	51.2a	26.0a	24.0a	40.9a	39.9a	63.0a	61.3a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Mg	22.3a	22.4a	44.6a	41.4a	62.3a	62.9a	23.6a	29.0a	39.9a	42.2a	60.3a	62.6a	30.3a	34.7a	55.2a	59.1a	75.1a	78.8a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
As	24.0a	26.0a	59.0b	69.0a	100.0a	100.0a	21.7b	30a	58.3b	72.5a	100.0a	100.0a	42.5a	46.7a	100.0a	100.0a	100.0a	100.0a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Cd	33.9a	34.4a	96.0a	66.1b	100.0a	100.0a	28.9a	25.9a	67.4a	57.0b	100.0a	100.0a	19.1a	25.5a	100.0a	100.0a	100.0a	100.0a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT

Cu	24.1a	23.0a	47.1a	48.2a	85.9a	88.5a	35.2a	37.1a	53.5a	60.4a	88.7a	88.1a	45.7a	44.6a	75.0a	78.3a	88.0a	91.3a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Cr	39.3a	28.6b	67.1a	69.6a	100.0a	100.0a	29.2b	37.5a	58.8a	62.5a	100.0a	100.0a	38.1b	47.6a	71.9a	74.8a	100.0a	100.0a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Co	40.0a	44.7a	61.8a	61.8a	100.0a	100.0a	31.3a	34.4a	54.4b	63.8a	100.0a	100.0a	51.0a	50.0a	72.5a	80.0a	100.0a	100.0a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Fe	37.4a	37.3a	69.1a	70.4a	84.0a	88.0a	58.5a	51.0b	76.6a	72.3a	85.1a	81.9a	55.8b	63.6a	75.3a	75.3a	83.1a	80.5a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Pb	38.1a	33.3a	60.5a	60.5a	100.0a	100.0a	36.8b	47.4a	60.5b	70.5a	100.0a	100.0a	39.1a	39.1a	76.1a	70.0a	100.0a	100.0a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Mn	32.1a	29.4a	56.1a	62.0a	100.0a	100.0a	25.0b	31.3a	51.9a	49.4a	100.0a	100.0a	25.0a	25.0a	57.0b	65.5a	100.0a	100.0a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Zn	21.1a	22.4a	29.9a	32.3a	52.7a	58.5a	23.9a	23.9a	35.5a	39.0a	55.8a	52.6a	24.5a	27.3a	36.7a	38.1a	54.0a	57.3a
				NDJ						MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Ni	36.4a	33.0a	72.6a	76.9a	100.0a	100.0a	34.6a	30.8a	64.6a	61.9a	100.0a	100.0a	34.8a	30.4a	100.0a	100.0a	100.0a	100.0a

	NDJ						MAM						JAS					
Parameters	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Turbidity	17.1a	19.0a	35.4a	32.3a	50.2a	47.2a	34.6a	34.6a	44.7a	45.1a	63.7a	64.6a	36.7a	37.5a	52.0a	49.8a	65.5a	64.2a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Acidity	27.7a	27.4a	39.3a	44.4a	50.9a	51.1a	28.2a	27.1a	37.6a	40.7a	51.9a	51.8a	18.1a	19.2a	36.2a	36.7a	49.5a	48.9a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
TA	27.6a	29.6a	40.3a	46.4a	62.5a	65.9a	31.9a	30.0a	46.4a	42.1a	55.5a	57.3a	29.0a	29.1a	49.2a	48.5a	49.2a	48.5a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
TH	19.7a	20.2a	28.4a	28.1a	38.5a	37.1a	23.3a	24.0a	32.7a	30.6a	40.5a	40.3a	17.8a	18.1a	25.1a	26.3a	35.7a	35.9a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
Cl-	38.3a	37.0a	47.3a	48.1a	62.8a	61.9a	33.3a	35.2a	47.1a	47.9a	61.5a	65.0a	39.0a	40.3a	57.1a	52.9a	70.4a	69.4a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
NO_3^-	22.3a	25.5a	45.7a	46.9a	73.5a	75.5a	31.6a	34.2a	52.6a	53.9a	75.8a	76.3a	29.3a	25.0a	52.3a	52.4a	74.3a	77.2a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
SO_4^{2-}	30.8a	30.5a	44.6a	45.7a	71.0a	70.7a	32.1a	34.3a	45.9a	47.1a	69.2a	68.3a	36.7a	37.4a	64.0a	65.0a	75.1a	74.2a
	NDJ						MAM						JAS					
	7		14		21		7		14		21		7		14		21	

	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
BOD_5	35.5a	33.1a	65.9a	67.2a	88.5a	91.3a	45.8a	49.2a	71.5a	71.5a	89.2a	85.8a	38.4a	40.8a	68.1a	68.7a	91.0a	91.7a
			NDJ							MAM						JAS		
	7		14		21		7		14		21		7		14		21	
	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT	PT	TT
COD	42.4a	45.3a	65.3a	97.5a	89.1a	91.5a	47.5a	50.2a	71.4a	71.5a	89.1a	90.3a	41.7a	42.4a	68.9a	69.3a	91.3a	92.1a

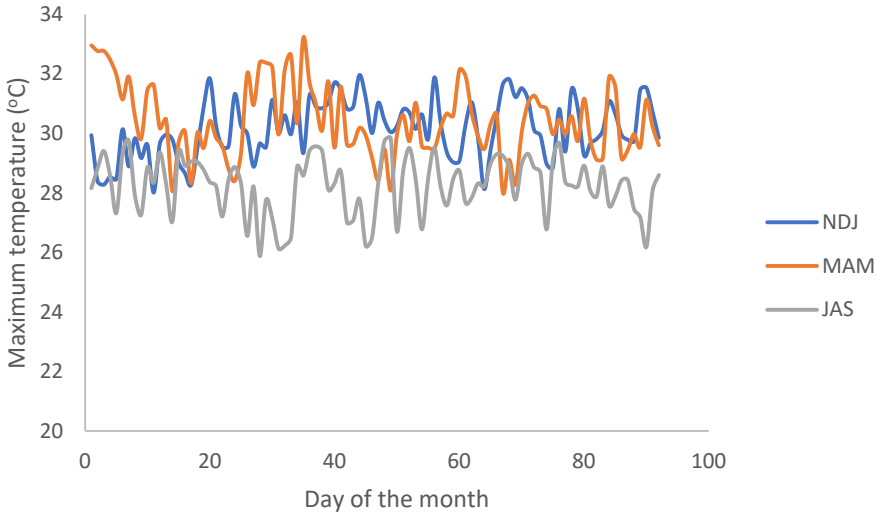


Figure S1: Maximum air temperature trend of the study location during the experiment

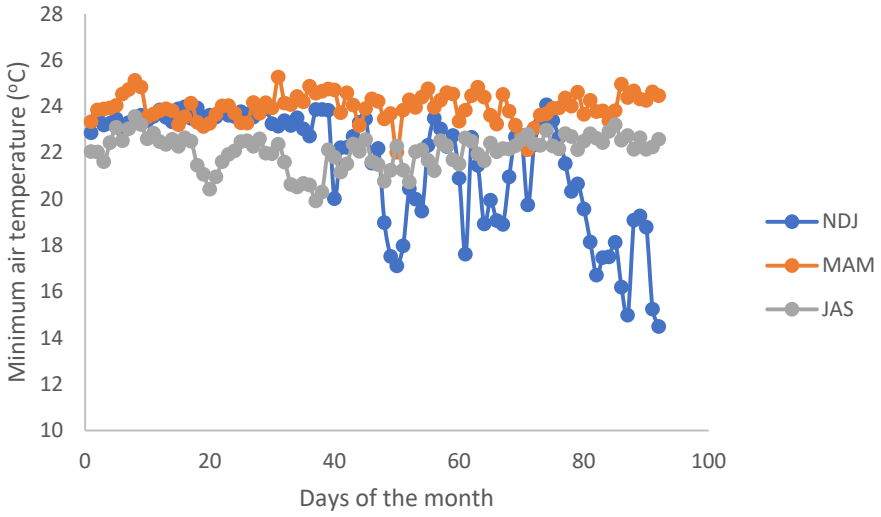


Figure S2: Minimum air temperature trend of the study location during the experiment

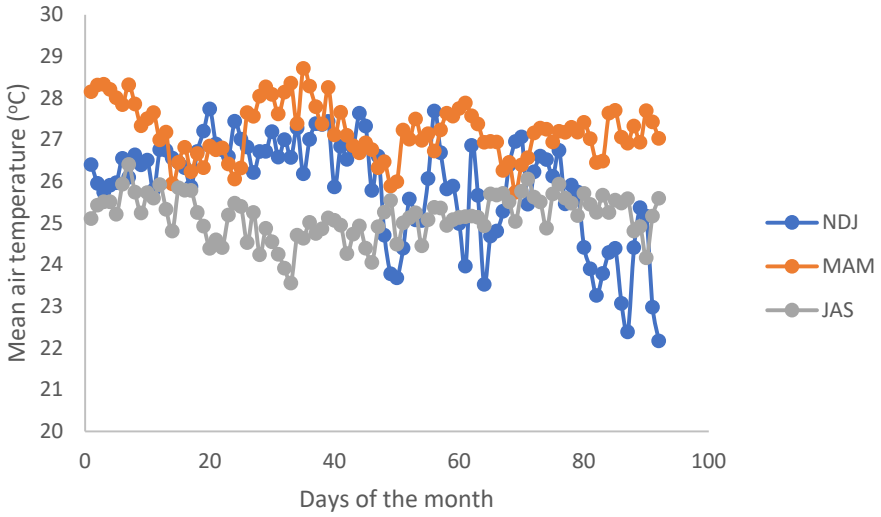


Figure S3: Mean air temperature trend of the study location during the experiment

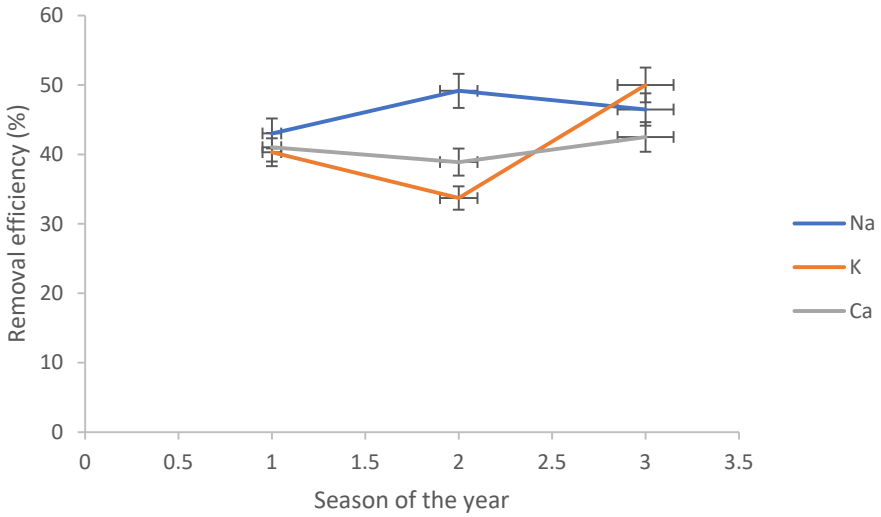


Figure S4: Relationship between the season of the year and Na, K and Ca removal from the aquaculture wastewater
Note: 1 in the horizontal axis represent NDJ, 2 represent MAM and 3 represent JAS

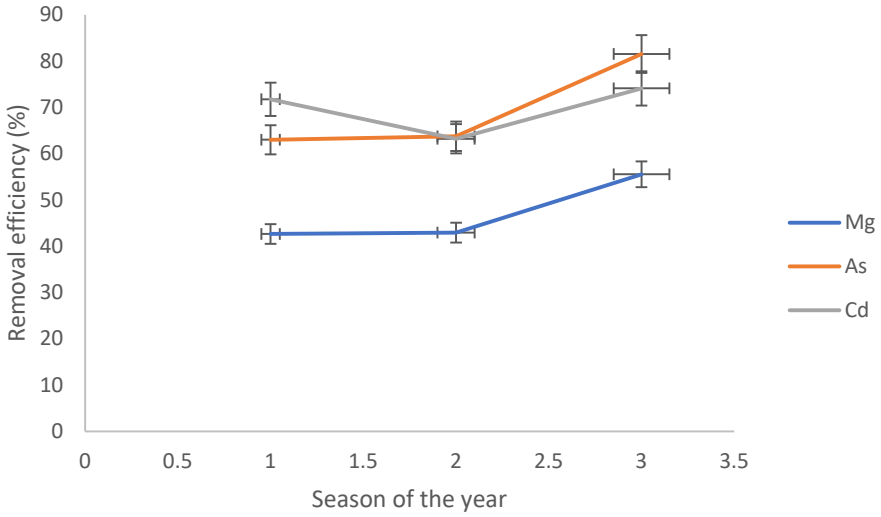


Figure S5: Relationship between the season of the year and Mg, As and Cd removal from the aquaculture wastewater

Note: 1 in the horizontal axis represent NDJ, 2 represent MAM and 3 represent JAS

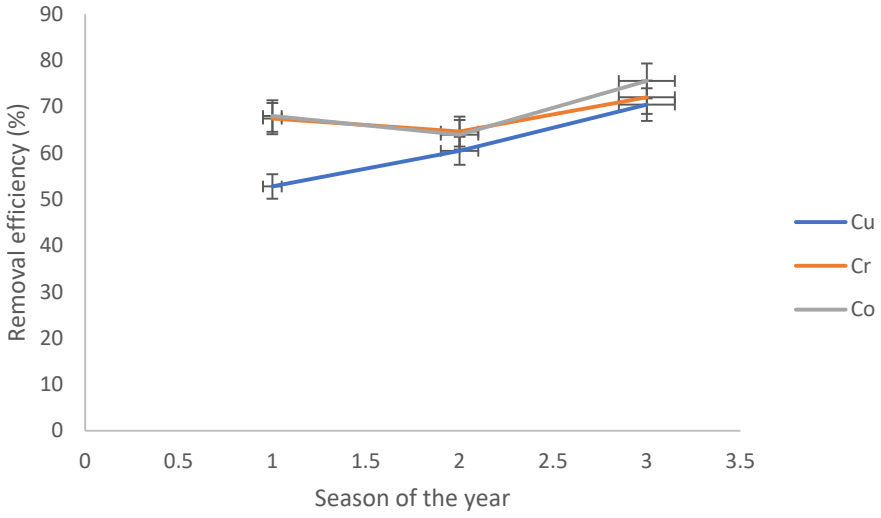


Figure S6: Relationship between the season of the year and Cu, Cr and Co removal from the aquaculture wastewater

Note: 1 in the horizontal axis represent NDJ, 2 represent MAM and 3 represent JAS

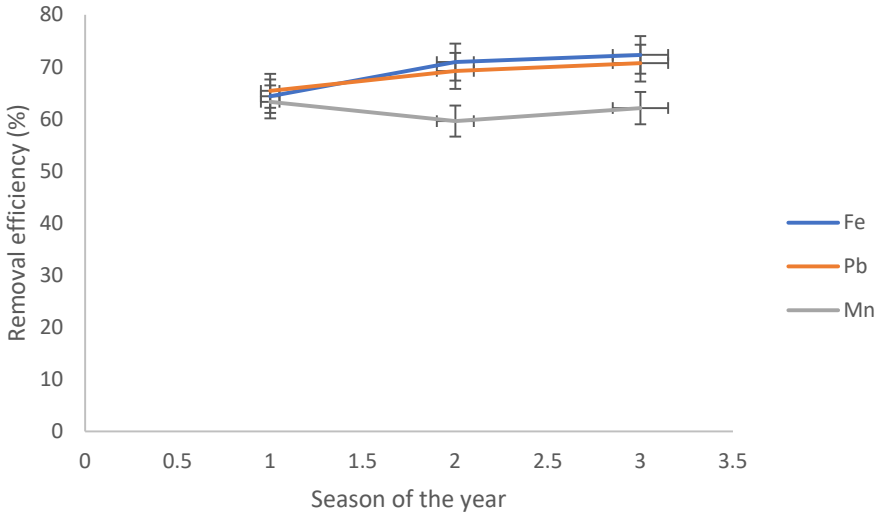


Figure S7: Relationship between the season of the year and Fe, Pb and Mn removal from the aquaculture wastewater

Note: 1 in the horizontal axis represent NDJ, 2 represent MAM and 3 represent JAS

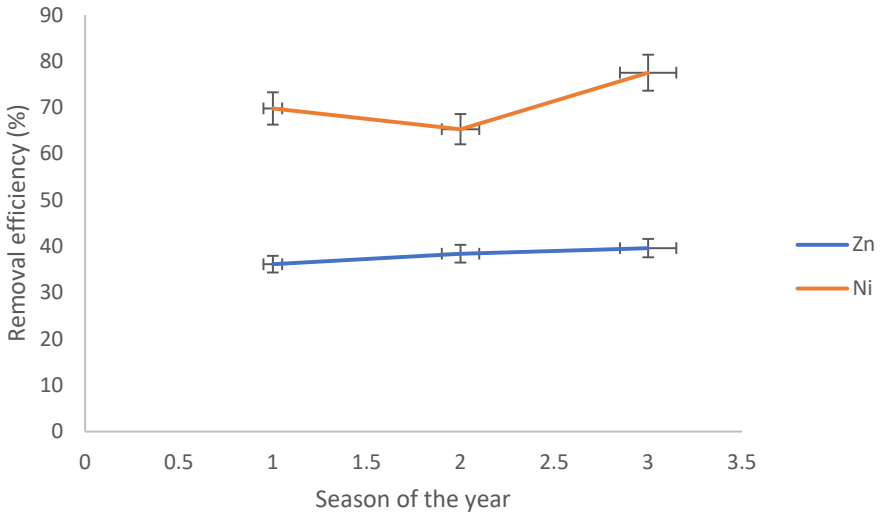


Figure S8: Relationship between the season of the year and Zn and Ni removal from the aquaculture wastewater

Note: 1 in the horizontal axis represent NDJ, 2 represent MAM and 3 represent JAS