Jouni Tummavuori[1], Riitta Kaikkonen[1]
& Timo Nyrönen[2]

ON THE ANALYSIS OF MAJOR NUTRIENTS OF FERTILIZED PEAT MOSS
PART I: THE ANALYSIS OF PEAT MOSS

LANNOITETUN KASVUTURPEEN RAVINNEANALYYSISTÄ
OSA I: PÄÄRAVINTEIDEN ANALYYSI

Sphagnum peat with a degree of humification of H 1—3 in von Post's scale has been recognized for years as a good growing medium.

An increasing interest is being shown by farmers and manufacturers to the growing qualities of peat and, more specifically, the analytical breakdown of its nutrient composition.

The practical methods of the analysis of nutrients are not complementary, but differ with respect to the following manipulations:
1. The physical state of peat. Peat can be either as received, moistened, air-dry or totally dry and further still, powdered or nonpowdered.
2. The amount of peat used in the analysis can be either volume based or weighed.
3. The methods of extraction differ by the selection of the extractant, the extract ratio and the extraction time.

These differences exist not only in Finland but also in many other countries where peat farming is excercised. In this respect alone, the Commission I of the International Peat Society has a huge amount of work in order to standardize the analytical methods practised on moss peat.

The subject matter of our study focuses around a comparison between two different extraction methods in the analysis of some major nutrients found in fertilized moss peat. The methods in question are the extraction with water and with 0.5 M ammonium acetate. Exchangeable cations are usually determined after ammonium acetate extraction whilst water extraction has gained increasing attention since it is water which is the natural medium of the nutrient transfer for the plants. We have used both 40 ml and 60 ml subsamples of peat as well as different extraction times to establish the differences between these two extraction methods. The samples were obtained from the Haukineva peat production site and consisted mainly of *Sphagnum fuscum* species with a degree of humification of H1-2 in von Post's scale (Puustjärvi 1970).

The dolomite limes added to the peat were commercially available domestic limes. The fertilizer was so-called "mixed" fertilizer designed for peat and produced by Kemira Oy. After receiving the sample, it was moistened manually to adjust the moisture to 80 percent weight (Puustjärvi 1969). Before the moisture determinations and other analyses the moisture of peat was allowed to reach equilibrium for at least 20 hours. The exact moisture content was determined from the weighed 20 g subsample by drying in the heat cabin at 102 °C to the constant weight. The final results are perhaps most noticeably affected by the sample taking and its repeatability. (Puustjärvi 1969 ja 1971). During this work we used equipment for the constant compression of the subsample. This device has been designed in the Horticultural Advisory Service, Guernsey (Hallas 1978). Both 40 ml and 60 ml subsamples were used, they were also weighed.

Authors' addresses — *Kirjoittajien osoitteet:*

[1]Department of Chemistry,
University of Jyväskylä
Kyllikinkatu 1—3, SF-40100 Jyväskylä 10

[2]The State Fuel Centre (VAPO)
Yrjönkatu 42, SF-40100 Jyväskylä 10

Table 1. The results of analysis of major nutrients from eleven different peat samples. The results are expressed as mg/litre moist peat.

Taulukko 1. Yhdentoista eri näytteen pääravinteiden analyysitulokset. Tulokset on ilmoitettu mg kostutettua turvelitraa kohti.

Sample Number	NO_3 NH₄Ac 60 ml	40 ml	H₂O 60 ml	60 ml	40 ml	P NH₄Ac 60 ml	40 ml	H₂O 60 ml	60 ml	40 ml	K NH₄Ac 60 ml	40 ml	H₂O 60 ml	60 ml	40 ml
1.	52	59	47	59	50	72	103	83	72	79	304	448	296	271	273
2.	66	65	70	71	88	104	136	113	113	134	413	461	380	344	459
3.	39	61	42	62	102	102	100	91	91	100	425	459	323	313	328
4.	42	57	46	46	46	57	87	81	78	80	246	372	193	190	97
5.	48	49	49	49	55	101	94	91	89	96	438	425	313	300	350
6.	50	43	35	34	52	79	81	89	87	83	284	315	233	230	268
7.	81	79	65	42	74	138	138	130	144	138	658	513	371	377	423
8.	62	59	88	88	50	109	101	106	113	112	513	406	356	365	350
9.	80	86	67	63	64	132	163	131	125	129	403	521	338	304	303
10.	37	39	29	29	31	128	134	113	120	124	284	348	265	289	344
11.	59	64	41	43	45	110	123	109	110	115	454	394	338	356	375
MEAN	56±15	60±14	53±18	53±17	60±21	110±37	123±40	109±29	110±33	115±33	402±120	424±65	310±59	304±58	325±95

Sample Number	Ca NH₄Ac 60 ml	40 ml	H₂O 60 ml	60 ml	40 ml	Mg NH₄Ac 60 ml	40 ml	H₂O 60 ml	60 ml	40 ml	Na NH₄Ac 60 ml	40 ml	H₂O 60 ml	60 ml	40 ml
1.	500	906	52	62	64	72	146	14	11	11	65	45	59	59	21
2.	467	888	65	60	71	76	133	15	13	17	46	96	36	29	55
3.	646	750	70	71	71	104	114	14	18	17	61	50	59	33	68
4.	521	688	38	37	44	79	95	9	9	8	17	33	35	35	8
5.	617	813	53	52	69	108	113	13	13	13	29	38	13	13	30
6.	500	688	44	43	44	95	95	8	8	8	20	77	18	18	64
7.	596	719	63	63	63	92	85	16	15	14	38	25	29	32	25
8.	500	825	55	60	64	65	75	11	1	10	40	54	23	20	34
9.	550	625	74	72	63	75	79	14	15	12	34	38	22	21	27
MEAN	544±62	767±97	57±11	58±11	61±10	85±15	104±24	13±3	12±3	12±3					
10.	1613	1700	55	56	57	210	221	14	15	11	48	71	40	40	61
11.	1175	1575	63	53	52	175	200	14	16	12	98	74	55	41	71
MEAN	1394±310	1516±233	59±6	55±2	55±4	193±25	211±15	14±0	16±0.7	12±0.7	45±23	55±22	35±17	31±13	42±22

The extraction procedure was as follows. The subsamples were transferred to the 250 ml Erlenmeyer flasks and either 90 ml of distilled water or 200 ml of 0.5 M ammonium acetate was added. The shaking was performed in a reciprocal shaking machine. The normal shaking time for the water extraction is 15 minutes and in the case of ammonium acetate, 2 hours. The solutions were then filtered using water jet vacuum and washed. The filter paper was Whatman 42. The filtration was a rather time consuming step and took almost 3 hours. After filtration, the acetate solutions were clear, but water solutions brownish. The color was removed with aid of 1—2 g of active carbon, which was then filtered out. The filtrates were diluted to 250 ml graduated flasks and further dilutions were made depending on the analytical conditions of the element to be determined.

Sodium and potassium were determined with flame photometer (EEL 712700). The standard solutions were prepared from the carbonates by dissolving with hydrochloric acid. (Kolthoff, Elving, 1961). The concentration range for potassium standard solutions (5 solutions) was from 1 to 10 ppm and for sodium (5 solutions) from 1 to 5 ppm.

Magnesium and calcium were determined with atomic absorption spectrophotometry. (Southern Analytical 3000). The standard

Table 2. The moisture contents of the samples and the weights of the moist and dried samples expressed as grams.

Taulukko 2. Tutkittujen näytteiden kosteudet sekä kosteiden näytteiden että kuivattujen näytteiden painot grammoina.

Sample Number	Moisture %	Weight of moistened sample					Dry weight of sample				
		NH$_4$		H$_2$O			NH$_4$Ac		H$_2$O		
		60 ml	40 ml	60 ml	60 ml	40 ml	60 ml	40 ml	60 ml	60 ml	40 ml
1.	86	40.8	31.2	44.2	42.8	28.9	5.71	4.37	6.19	5.99	4.05
2.	85	41.8	33.8	42.5	41.9	33.2	6.27	5.07	6.38	6.29	4.98
3.	83	40.8	31.2	42.8	44.2	28.9	6.94	5.30	7.28	7.51	4.91
4.	83	38.2	27.0	41.0	40.6	24.0	6.49	4.59	6.97	6.90	4.08
5.	84	44.8	27.0	39.2	39.0	29.2	7.17	4.32	6.27	6.24	4.67
6.	85	42.9	29.0	42.3	42.0	28.8	6.44	4.35	6.35	6.30	4.32
7.	85	44.2	27.8	42.1	44.2	27.8	6.85	4.31	6.53	6.85	4.31
8.	83	43.5	27.0	43.0	44.2	27.2	7.40	4.59	7.31	7.51	4.62
9.	82	43.2	28.8	41.2	41.2	28.1	7.78	5.18	7.42	7.42	5.06
10.	83	42.8	28.1	42.7	43.0	27.0	7.29	4.78	7.26	7.31	4.59
11.	85	43.0	27.9	43.2	42.8	28.0	6.45	4.19	6.48	6.42	4.20
MEAN	84±2	42±1.9	29±2.2	42±1.3	42±1.6	28.3±2.2	6.80±0.6	4.64±0.4	6.77±0.5	6.79±0.6	4.53±0.4

solutions were prepared from their corresponding chlorides. The measuring range for calcium was from 1 to 4 ppm and for magnesium from 0.1 to 1 ppm (Lindsjö, Riekkola 1976, Elmell, Gidley 1966). To improve the accuracy, the solutions were made $2.3 \cdot 10^{-6}$M with respect to strontium using strontium chloride (David 1960). The measured sensitivities were in agreement with the values presented in the literature (Kirksbright, Sargent 1974).

Phosphorus was determined colorimetrically using Pye Unicam SP-600 spectrophotometer. The yellow coloured complex compound of phosphorus was prepared using ammonium molybdometavanadate solution. The standards were made from potassium diphosphate. The measuring range was from 1 to 5 ppm. The wavelength was 420 nm. (Halmann 1972).

The content of nitrate was determined potentiometrically using ion-selective electrode. (Orion nitrate electrode 93-07 and Orion 90-02-00 double junction reference electrode and Radiometer type pHM 64 Research pH/mV-meter). The standard solutions were prepared from sodium nitrate ranging from 1 to 50 ppm. (Milham, Awad, Paull and Bull 1970).

All reagents used were products of A. E. Merck AG and pro analysi grade. In the first place we investigated the differences arising from sample sizes and from different extractants. The investigations were carried out with eleven samples taken from the production line and having the same lime and fertilizer addition. Two simultaneous extractions were performed with 60 ml subsamples. The results are collected in Table 1 and 2. The figures show that an accuracy of ±2 % (w/w) can be achieved in manual moistening. The deviation in weights with 40 ml subsamples was 7.5 % and with 60 ml samples 4.5 %. The deviation of dry material weights was 8—9 % due to the unevenly distributed water while moistening the samples.

The sample sizes and extractants used have no influence on the contents of phosphate and nitrate within the limits of standard deviation. The same holds for sodium, too. Sodium, however, showed the largest standard deviation of the ions experienced, in the worst case it was nearly 50 %. The sample size does not affect the content of potassium, but 0.5 M ammonium acetate extracts about 30 % more potassium than water.

The extraction of calcium with ammonium acetate is about 12—15 times more effective than water and in the case of magnesium, ammonium acetate is about 10 times more powerful than water.

Samples 10 and 11 show exceptionally high calcium and magnesium concentrations after ammonium acetate extraction if compared with other samples. This

Table 3. The results of analysis of two limes, the nutriens in various levels and these combinations. Also, the results of unfertilized peat and the peat with lime added only are presented. The figure are mg/litre moist peat.

Taulukko 3. Kahden kalkkilaadun ja eri lannoitustasojen sekä näiden eri yhdistelmien että lannoittamattoman turpeen ja kalkkien seoksen analysointitulokset. Määrät on laskettu g/m³ turvetta kohti.

Sample	NO₃ NH₄AC 60 ml	NO₃ H₂O 60 ml	P NH₄AC 60 ml	P H₂O 60 ml	K NH₄AC 60 ml	K H₂O 60 ml	Ca NH₄AC 60 ml	Ca H₂O 60 ml	Mg NH₄AC 60 ml	Mg H₂O 60 ml	Na NH₄AC 60 ml	Na H₂O 60 ml
Lime 1 8 kg/m³	—	—	—	2.8	4.8	3.8	1580	14.5	702	5.4	2.4	—
Lime 2 8 kg/m³	—	—	—	2.9	2.3	2.2	3070	16.3	427	5.5	4.0	—
Mild. fert. 0.8 kg/m³	25	20	101	112	381	340	7	5	1	1	23	20
Medium fert. 1.2 kg/m³	34	30	174	149	576	620	9	6	1	1	30	29
Strong fert. 1.2 kg/m³	55	51	154	214	885	735	20	10	2	2	34	37
Lime 1 + mild. fert.	25	26	100	102	579	573	2125	13	124	3	71	92
Lime 2 + mild fert.	27	27	92	92	620	577	490	20	106	7	92	57
Lime 1 + medium fert.	29	34	130	116	544	620	433	12	200	4	36	25
Lime 2 + medium fert.	32	33	126	144	625	616	2060	12	119	6	40	24
Lime 1 + strong fert.	57	53	227	221	1088	1025	420	14	175	3	92	96
Lime 2 + strong fert.	25	55	209	235	1022	1028	1980	17	86	5	101	91
Unfert. peat + lime 1	11	9	17	11	53	23	1188	10	537	7	12	7
Unfert. peat + lime 2	8	8	16	7	49	24	1583	17	320	6	12	9

difference can be attributed to the particle size of the limes used. The water extraction does not distinguish the difference between the limes as well as ammonium acetate extraction.

The influence of various components on the results was the next topic. We analyzed lime and fertilizer without peat. We used two different limes and the amount of lime in the experiments corresponds to the amount which is added to one cubic meter of peat, i.e. 8 kg/m³. The amount of fertilizer in the analyses matched the amount in the peat after addition of the nutrients in three different levels, viz 0.8 kg/m³, 1.2 kg/m³ and 1.8 kg/m³ (Mutka 1979).

The sample volume in the analysis of peat with lime added was only 60 ml. The shaking time in all experiments was 2 hours. The results are collected in Table 3.

The figures support the previous results since the extracts have no effect on the amounts of nitrate, phosphorus and sodium, but the differences in magnesium and calcium are appreciable. In relation to the various amounts of fertilizer added

the results correspond well to the levels mentioned.

The results from the peat with lime added only show that some nutrients are slightly dissolved from peat.

Since the extraction times vary considerably we investigated the influence of the extraction time on the results. The experiments were performed with four parallel samples having the same level of fertilizers. Five different shaking times were used. The mean results with standard deviations are presented in Table 4. It can be seen that the shaking time has a surprisingly small effect on the results. The standard deviations are slightly larger with 15 minutes shaking time than with other times, but this difference has no practical value. The amounts of nutrients with different extractants and sample sizes agree well with the results in Table 1. The moisture of the samples was 81.6 ± 2.0 % (w/w) and Table 5 presents the weights of the samples. The volume/weight ratio of the samples is well established since the samples represent the same amount of peat. Each volume is given by the mean of twenty determinations.

Table 4. The effect of the shaking time on the results. The same amount of peat divided into subsamples was used. Each figure is the mean of four parallel experiments. The results are expressed as mg/litre moist peat.

Taulukko 4. Eri ravisteluajoilla saadut analyysitulokset. Tutkimuksessa on käytetty samaa turvemäärää ja kukin tulos on neljän rinnakkaisen kokeen keskiarvo. Tulokset ovat mg:na kostutettua turvelitraa kohti.

Shaking time	NO_3				P				K			
	NH4Ac		H2O		NH4Ac		H2O		NH4Ac		H2O	
h	60 ml	40 ml	60 ml	40 ml	60 ml	40 ml	60 ml	40 ml	60 ml	40 ml	60 ml	40 ml
0.25	43±18	43±12	34±18	32± 9	139±37	127±37	120±37	102±32	443± 78	481± 71	295±69	298± 68
0.5	39±11	40± 7	31± 9	36± 8	128±35	108±30	118±26	109±28	402±46	474± 72	298±57	349±157
1	45±16	46±15	32± 9	28± 9	128±25	121±25	115±20	111±38	461±117	513±125	306±59	285± 68
2	43±14	41± 4	30± 8	33±12	125±59	131±19	122±27	115±38	507±123	454± 25	284±77	324± 67
5	39±14	43± 8	29± 9	31± 5	120±39	140±30	110±24	113±30	463±162	505±105	260±72	315±46
MEAN	42±13	42± 9	31±10	32± 8	128±37	125±28	117±25	110±30	455±106	487± 81	288±62	314± 83

	Ca				Mg				Na			
0.25	1374±215	1417±311	56±10	50± 9	200±38	196±38	15± 2	12± 2	43± 16	52± 16	35±11	34± 15
0.5	1355± 62	1431±169	48±10	52± 8	208±30	230±37	14± 2	12± 2	42± 17	47±14	34±17	48± 23
1	1387± 68	1600±220	62± 5	60±10	255±38	236±33	15± 2	17± 8	40±12	42±19	28± 10	39± 21
2	1413±202	1600±227	54± 9	54±13	217±49	270±50	15± 3	12± 2	40± 12	41± 11	28± 11	35± 15
5	1341±243	1674±167	49± 6	54± 3	251±71	286±80	15± 3	13± 1	37±14	47 ±13	29± 7	35±17
MEAN	1374±158	1544±226	54± 9	54± 9	226± 48	244±55	15± 2	13± 4	40± 13	46± 14	31± 11	38± 17

Table 5. The moist and dry weights of the samples (40 ml and 60 ml) used in the shaking time experiments.

Taulukko 5. Ravisteluaikatutkimuksissa käytettyjen kosteiden ja kuivattujen näytteiden 40 ml ja 60 ml painot.

Shaking time	Weight of moistened sample				Dry weight of sample			
	NH4AC		H2O		NH4AC		H2O	
h	60 ml	40 ml	60 ml	40 ml	60 ml	40 ml	60 ml	40 ml
0.25	42.8±1.0	27.6±1.0	43.0±0.4	27.0±1.1	7.87±0.8	5.06±0.4	7.91±0.8	4.95±0.2
0.50	43.3±0.3	27.8±0.8	42.9±0.7	28.3±0.6	7.96±0.8	5.17±0.7	7.88±0.7	5.21±0.6
1	42.9±0.3	27.5±1.2	42.6±1.1	27.2±0.9	7.89±0.7	5.06±0.6	8.20±0.6	5.00±0.5
2	42.2±1.3	26.1±1.3	41.4±1.5	25.6±2.0	7.75±0.8	4.80±0.5	7.58±0.4	4.72±0.7
5	42.3±1.1	27.4±0.8	42.4±0.8	27.6±0.8	7.78±0.8	5.05±0.6	7.78±0.6	5.08±0.6
MEAN	42.7±0.9	27.3±1.1	42.5±1.3	27.1±1.4	7.58±0.7	5.03±0.5	7.87±0.6	4.99±0.5

SUMMARY

The experienced operator can easily achieve an accuracy of ±1.5 % in the moistening, which is satisfactory in the routine analysis.

The use of constant volume can thus be replaced with weighing after the determination of dry volume weight of the material. The sample weighings can be performed immediately prior to the shaking bottle, thus speeding up the analysis. In these experiments a 60 ml subsample could be replaced with 42 g of peat and 40 ml with 28 g 80 % moist peat whilst still within the limits of accuracy required.

The lowest limit for the shaking time is really 15 minutes. We could choose 30 minutes since this further eliminates the small errors in timing. Ammonium acetate shows 30 % more extraction power than water with potassium, 10 times more with magnesium and 12 to 15 times more with calcium. These differences are due to the lower pH-value of ammonium acetate solution and its capability to form complexes with calcium and magnesium (Sillén, Martell, 1964, 1971). The water extractions give almost similar results with different limes which is more in line with the practical conditions rather than the high figures given by ammonium acetate extractions. It was also noted that the calcium and magnesium values after

14

ammonium acetate extraction depend on the particle size of the limes. To discard the ammonium acetate is further supported by the fact that it may cause harmful ezcema to some persons. The waste water release from the laboratorium is also diminished

with water extraction as well as the lower costs of the reagents. Finally, the considerably shorter shaking time (30 min) in water extraction speeds up the analysis as opposed to the shaking time (2 h) in ammonium acetate extraction.

REFERENCES

David, D. J. 1960 — The Determination of Exchangeable Sodium, Potassium, Calcium and Magnesium in Soils by Atomic-Absorption Spectrophotometry, — Analyst 85, 495—503

Elwell, W. T. and Gidley, J. A. F. 1966 — Atomic-Absorption Spectrophotometry — second edition, Tiptree Essex, 110,84

Hallas, D. G. 1978 — Analysis of Peat Substrates for Advisory Purposes, — Horticultural Advisory Service, Guernsey

Halmann, M. 1972 — Analytical Chemistry of Phosphorus Compounds, Wiley Interscience, John Wiley and Sons, Inc, New York

Kirkbright, G. F. and Sargent, M. 1974 — Atomic Absorption and fluoroscence Spectroscopy, — Academic Press Inc. (London) LTD, New York

Kolthoff, I. M. and Elving, Philip J. 1961 — Treatise on Analytical Chemistry — Part V Analytical

Chemistry of the Elements Vol. 3. New York

Lindsjö, O. and Riekkola, M. 1976 — Atomiabsorptiospektrometria — Teknillisten tieteiden akatemia, Vammala

Milham, P. J., Awad, A. S., Paull, R. E. and Bull, I. E. 1970 — Analysis of Plants, Soils and Waters for Nitrate by Using an Ionselective Electrode — Analyst 95, 751—757

Mutka, K. 1979 Personal Communication

Puustjärvi, V. 1969 — Water-Air Relationships of Peat in Peat Culture, — Peat & Plant News, 4, 43—55

Puustjärvi, V. 1969 — Fixing Peat Standards — Peat & Plant News 1, 3—9

Puustjärvi, V. 1971 — Methods of Analysing Peat in Peat Culture — Peat and Plant Yearbook

Puustjärvi, V. 1970 — Degree of Decomposition — Peat & Plant News 3, 49—53

YHTEENVETO:

LANNOITETUN KASVUTURPEEN RAVINNEANALYYSISTÄ
OSA I: PÄÄRAVINTEIDEN ANALYYSI

Kasvuturpeen ravinteiden analysoimisella on suuri merkitys sekä sen valmistajille että käyttäjille. Ravinneaineiden analysoiminen sinänsä ei ole kovinkaan vaikea tehtävä. Vaikeudet ovat näytteen otossa ja sen esikäsittelyssä analyysiä varten. Tässä työvaiheessa syntyvät suurimmat virhemahdollisuudet ja erot eri analyysimenetelmien välillä. Suurimmat erot aiheutuvat seuraavista seikoista:

1. Eri menetelmissä analyysiin käytettävän turvenäytteen fysikaalinen tila voi poiketa huomattavasti, sillä käytetään ilmakuivaa, kuivattua sekä kostutettua turvetta ja lisäksi näytteet voivat olla joko sellaisenaan tai hienoksi jauhettua.

2. Analyysiin käytetty turvemäärä voi olla joko paino- tai tilavuusyksikköön perustuva.

3. Ravinteiden uutossa käytetään eri uuttoliuoksia, erilaisia uuttoliuosten ja turvemäärän suhteita ja erilaisia uuttoaikoja.

Tässä työssä olemme selvittäneet kahden ehkä yleisimmin käytössä olevan menetelmän väliset erot ja vaikutukset pääravinteiden analysoinnissa. Nämä menetelmät eroavat toisistaan käytetyn uuttoliuoksen (90 ml vettä tai 200 ml 0.5 M ammoniumasetaattia), turvenäytemäärän (40 ml tai 60

ml) ja uuttoajan osalta (0.25 h tai 2 h).

Osoittautui, että fosfaatin, nitraatin ja natriumin osalta ei menetelmällä ollut vaikutusta. Ammoniumasetaatti oli noin 30 % tehokkaampi kuin vesi uuttoliuoksena kaliumille ja 12—15 kertaa tehokkaampi kalsiumille ja 10 kertaa tehokkaampi magnesiumille.

Kokeissa pyrittiin käyttämään turvetta, jonka kosteusprosentti oli 80 %. Silmämääräisessä kostutuksessa päästiin ±1.5 %:n tarkkuuteen.

Lyhimmäksi riittävästi uuttavaksi uuttoajaksi osoittautui 15 min., mutta suosittelemme 30 min. uuttoaikaa, jolloin eliminoituvat ajanottovirheet.

Jos jatkuvasti analysoidaan tasalaatuista turvetta, jonka tiheys on vakio, niin tilavuusmitta voidaan korvata painomitalla analyysin tarkkuuden kärsimättä. Tämä nopeuttaa työskentelyä.

Suosittelemme, että ammoniumasetaattiuutosta siirrytään vesiuuttoon, jolloin saavutetaan useita etuja: voidaan hyvin käyttää 30 min. uuttoaikaa, laboratorio reagenssikustannukset ja jätevesikuormitus pienenevät sekä vältytään ihottumalta, jota ammoniumasetaatti aiheuttaa joillekin henkilöille.