

## RESULTS OF BALNEOLOGICAL PEAT RESEARCHES OF SOME ESTONIAN, SOUTH KOREAN AND NORTHERN IRISH MIRES AND PEAT TYPES

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### SUMMARY

The balneological Peat Researches were made in Estonia, in the Republic of Korea and in the North Ireland in 2005 and 2008. Altogether 8 mires were investigated for the balneological purpose and 22 peat samples were tested in the laboratory. In the field the balneological peat researches concentrated in the mire site types, peat types, degree of the decomposition of peat, thickness of the peat deposits, subsoil types and hydrological conditions. The peat samples were taken by the peat corer for more detailed analyses. The variation of the pH-value, ash content, sulphur content and water content were typical for the natural peat types. The variation of the amounts of humic acids and fulvic acids were quite large compared with the results of the Finnish peat researches. The results of the researches certified, that properties of well decomposed peat are quite similar in these countries. The physical and chemical properties of the peat samples were in the same level as in Finnish peat types. The heat retention capacity was very good of the all tested peat samples. According to the results of these researches there were some peat deposits not suitable for the balneological purpose.

**KEYWORDS:** peat, balneology, mire, decomposition, humic acids, fulvic acids

### INTRODUCTION

The balneological peat researches were made in Estonia, in Republic of Korea and in North Ireland in 2005 and 2008. Altogether 9 mires were investigated for the balneological purpose and 22 peat samples were tested in the laboratories of the Geological Survey of Finland, Labtium Company and CRS-Biotech Ltd laboratory in Finland.

### METHODS AND MATERIALS

The balneological peat researches began in the field, where the studies concentrated on the mire site types, peat types, degree of the decomposition of peat, thickness of the peat deposits, subsoil types and hydrological conditions. The peat samples for more detailed analyses were taken by the peat corer. In the laboratory the samples were tested to establish pH-value, ash content, sulphur content and water content. The heat retention capacity was tested with a mixture of peat and water warmed on the temperature of a peat bath (+42 C°). The cooling of this mixture was monitored for one hour and compared with the cooling of water at the same time. By the chemical characterization the concentration of humic and fulvic acids, pectins, cellulose and hemicellulose were established in the laboratory. The amount of humines was calculated value of non-hydrolysable matter of peat, which contains also other non-hydrolysable particles, e.g. Lignin. Amounts of 34 inorganic cations were determined of the peat samples with the plasma-emission spectrometer. The peat samples were tested in the laboratory of the Geological Survey of Finland and the Labtium Company. The chemical characterization was made in the laboratory of the CRS-Biotech Ltd.

## RESULTS

The variation of the pH-value was 3.8 to 4.8, ash content 1.9 to 18.3 % by the dry weight, the sulphur content 0.1 to 3.5 by the dry weight and the water content 84.6 to 90.9 % by the wet weight. The variation of the content of humic acids was 8.4 to 32.7, fulvic acids 17.4 to 28.7, cellulose 6.6 to 25.3, hemicellulose 1.0 to 8.9 and pectin 0.4 to 1.3 percent by dry weight. The amounts of the inorganic cations depends on the ash content of the peat, there were two samples with a high ash content and high content of aluminium (Al) barium (Ba), sulphur (S), magnesium (Mg), calcium (Ca) and arsenium (As).

## CONCLUSIONS

The results of the investigation certified, that properties of the well decomposed peat are quite similar in these countries. The physical properties of the peat samples were in the same level as in Finnish peat types (Korhonen, 1997, 2008). The exception were two samples with high amounts of ash content, they had higher content of inorganic cations than the others. The reason could be that the peat has contaminated with the bottom soil. The heat retention capacity of the every tested peat samples was very good. The temperature of the peat-water mixture decreased less than 1° Celsius in 20 minutes when the water cooled by an average of 3° Celsius at the same time. This time is the usual treatment period in the peat therapy (Korhonen & Lüttig, 1996). The variation of amount of the humic and fulvic acids was exceptional large compared with the results of the Finnish peat researches (Korhonen, 1997,2008). According to the results of the investigation there were some peat deposits not suitable for the balneological purpose.

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