



Programme Area: Bioenergy

Project: Characterisation of Feedstocks

Title: D6 Final Report (Phase 1) Appendix 1

Abstract:

The primary objective of this 2015/16/17 Project was to provide an understanding of UK produced biomass properties, how these vary and what causes this variability.

This document is one of the appendices to the Final Report from the first Phase (2015/16) of the Characterisation of Feedstocks (CofF) project, Deliverable D6. D6 is provided in a number of parts consisting of the main body text plus 13 Appendices, provided in 17 files. These 13 appendices are provided in 12 pdf files plus 46 data files in Microsoft Excel format. The purpose of this report plus its related parts is to report the variability in feedstock properties of UK produced energy biomass, the causes of these variations and the relationship between the feedstock properties and the provenance data collected. Five feedstocks were studied: Miscanthus, willow short rotation coppice (SRC), poplar SRC, poplar grown as short rotation forests (SRF), and spruce SRF, with poplar and Sitka spruce selected to represent broadleaved and coniferous biomass crops respectively. Provenance data include site properties (such as general climate zone and soil chemistry), the conditions at the time of sample collection, and past management of the site and crop with soil samples also collected for analysis. The feedstock samples were analysed in UKAS accredited laboratories.

Context:

The Characterisation of Feedstocks project provides an understanding of UK produced 2nd generation energy biomass properties, how these vary and what causes this variability. In this project, several types of UK-grown biomass, produced under varying conditions, were sampled. The biomass sampled included Miscanthus, Short Rotation Forestry (SRF) and Short Rotation Coppice (SRC) Willow. The samples were tested to an agreed schedule in an accredited laboratory. The results were analysed against the planting, growing, harvesting and storage conditions (i.e. the provenance) to understand what impacts different production and storage methods have on the biomass properties. The main outcome of this project is a better understanding of the key characteristics of UK biomass feedstocks (focusing on second generation) relevant in downstream energy conversion applications, and how these characteristics vary by provenance.

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Appendix 1: D6 Scope and Acceptance Criteria

Deliverable No:	D6		
Deliverable Name:	Final report		
Work Package(s)	2,5,6	Deliverable lead	Forest Research (FR)
Deliverable description / scope / content:	<ol style="list-style-type: none"> 1. Provision of a comprehensive final report which analyses the laboratory results obtained and draws together the results such that the variabilities in feedstock properties are correlated with the gathered provenance data. Variabilities to be at least included are "in plant" effects, "within-field" effects, "between site" effects and temporal effects. This deliverable will be an update of the intermediate report, updated with newly obtained (post deliverable D5 report) data, which will at least include the analysis of stored biomass samples and SRC leaf samples. The Executive Summary, Discussions, Conclusions, and other sections as appropriate, will be updated by being integrated with the new insights obtained. 2. Provision of the End of Project Review presentation to the ETI (and its advisers) at the date agreed with the ETI to set out the learning of the Project, as set out in clause 5 of schedule 5. 		
Deliverable Purpose(s):	<p>The purpose of this deliverable is to inform the ETI on the variabilities of UK produced energy biomass types covering freshly produced energy biomass (as per deliverable D5), stored energy biomass and leaves from SRC, what causes these variations and relating these to the provenance data collected. The outcomes will be used in combination with the two partner projects (Techno-economic assessment of biomass pre-processing technologies and Refining Estimates of Land for Biomass) to understand options for future ETI demonstration activities and investments.</p>		
Deliverable Objective:	<p>A full Project report drawing together the findings of the whole Project and which:</p> <ol style="list-style-type: none"> 1. Identifies the uncertainty ranges for a representative range of UK produced energy crop qualities (including freshly produced energy biomass, stored biomass and leaves from SRC). 2. Relates the quality variations obtained back to provenance data collected. The relationships discussed shall link geographical data (e.g. soil type, weather), crop management and practices including temporal considerations on biomass properties and their variabilities. 3. Identifies farm gate poplar SRF prices and production costs (where possible) for use by the Techno-economic assessment of biomass pre-treatment project. 		
Dependent on:	<p>Deliverable D5.</p> <p>Completion of the collection and analysis of stored samples and samples of SRC leaves.</p> <p>Requires co-operation from energy crops management companies, storage sites and growers and suitable weather conditions.</p>		
Prerequisite to:	Deliverable D7		
Acceptance Criteria:	<ul style="list-style-type: none"> • Satisfies the Deliverable Description, Deliverable Purpose(s) and Deliverable Objective, as described above. 		

	<ul style="list-style-type: none">• Formal Deliverable prepared in accordance with the Generic Acceptance Criteria.• Comprises (at least): An extension to the intermediate report (D5) to additionally include findings from tasks assessing stored biomass property variations and leaves of Short Rotation Coppice (SRC) - the updated report shall build on the findings presented in the D5 report. The report shall be clearly written and include an executive summary, contents page, methodology (including details of statistical approach), results, discussion and conclusions. Figures and tables shall be presented in a consistent format, and located as closely as possible to the first point of reference. References, if applicable, to be listed and referenced from within the text using a consistent methodology. The discussion section and conclusions must link laboratory results to provenance data collected, providing insights and commentary as to reasons behind property variations and uncertainties. The discussion will at least consider within field differences, between site differences and, where agreed, within plant differences. It will also include an assessment of the quality of all the data (field, laboratory and management data) in terms of confidence in its quality . The discussion will also provide a ranked list of influencing factors on biomass property variability.• A comparison of this Project's findings with other key public biomass quality data sets (e.g. Phyllis database)• In relation to the End of Project Review presentation, meet the requirements set out in clause 5 of schedule 5.
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