



Biomass Characterization of *Buddleja davidii*: Potential Feedstock for Biofuel Production

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INTRODUCTION

Buddleja davidii is a shrub originated in China, but can be naturalized in different parts of the world, including the U.S.



Basic characteristics of *Buddleja*

- Exhibits a very wide range of growth habit
- Well adapted to poor conditions
- 1.8 – 3.7 m tall
- Spread of 1.2 – 4.6 m
- Duration is perennial



Vigorous growth in open and poor soil Growth in very poor sites Growth in no soil at all

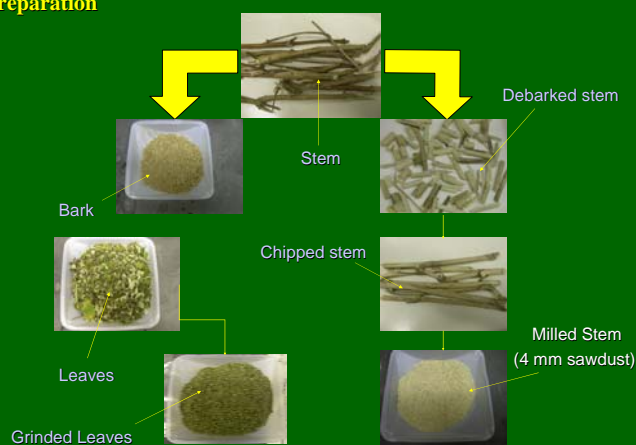
RESEARCH OBJECTIVES

- Biomass Characterization of *Buddleja*
 - Ash Analysis
 - Inorganic Analysis
 - Heat of Combustion
 - Extractive Analysis
 - Lignin Analysis
 - Carbohydrate Analysis
 - Cellulose Analysis
 - Hemicellulose Analysis

PROCEDURE

The plant was divided into three samples: leaves, bark, and stem.

Sample Preparation



Analysis

- Ash Analysis
 - Burning the samples in the furnace
 - Measuring % Ash
- Inorganic Analysis
 - ICP analysis for the detection of trace metals
- Extractive Analysis
 - Extracting the samples with DCM
 - Measuring % Extractives
 - GC-MS analysis for characterizing extractives
- Lignin and Carbohydrate Analysis
 - Treating wood with H_2SO_4
 - Measuring % Klason Lignin
 - Measuring % Soluble lignin using UV spectroscopy
 - Measuring % carbohydrates using HPLC
- Cellulose and Hemicellulose Analysis
 - Holocellulose Pulping on wood
 - Measuring % Holocellulose
 - Treating Holocellulose with HCl
 - Measuring % Cellulose and Hemicellulose

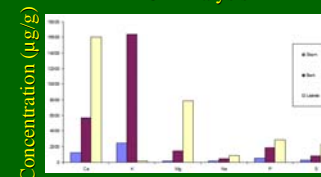
RESEARCH RESULTS

	% Moisture	% Ash	% Extractives	Heat of Combustion (BTU/LB)
Stem	5.49	0.73	0.30	8729
Bark	4.57	4.75	2.83	9155
Leaves	4.34	6.30	3.22	8492

	% Arabinose	% Galactose	% Glucose	% Xylose	% Mannose	Total %
Stem	1.40	1.93	25.90	66.12	4.65	100.00

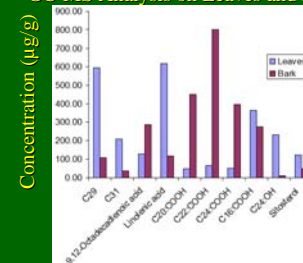
	% Lignin	% Cellulose	% Hemicellulose
Stem	31	27	37

ICP Analysis



*Note: No significant extractives concentrations were found in the stem

GC-MS Analysis on Leaves and Bark



Conclusion

Buddleja davidii is a potential feedstock for the production of biofuel because:

- It can grow under different environments and conditions.
- It has no food or fiber value.
- It is a perennial plant.
- It has small growth dimensions

Future Work

- Structural Analysis of Lignin and Cellulose

