POTENTIAL OF REED CANARY GRASS AS AN ENERGY CROP IN LATVIAN CONDITIONS

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Element analyzer ***Vario MACRO***

PARR 1341 Plain Oxygen Bomb

Pelletized Reed Canary Grass

Introduction. The usage of renewable energy sources is very important for reducing carbon dioxide emissions that creates greenhouse effect. The European Union has committed to reduce greenhouse gases by at least 20 per cent compared to the 1990 level by 2020. Therefore the areas occupied by energy crops (willow, poplar, miscanthus, reed canary grass (RCG), and hemp) increases every year. Latvia has a target to achieve share of renewable energy sources in total energy consumption up to 42% by 2020.

Scandinavian research and experience have shown that perennial rhizomatous reed canary grass (*Phalaris arundinacea* L.) is the most productive grass at Northern latitude in terms of stable biomass yield. Specific commercial species of RCG were bred for energy needs. This species differ by less foliage and stronger stems.

The aim of the present work is evaluation of the productivity of RCG variety Bamse in Latvian conditions and characterization of biomass obtained in terms of its energy value.

Materials and methods. The test field is located in Skriveri Research Institute of Agriculture. The experiment is arranged in the medium podzolic loamy sand soil with topsoil 25 cm, organic matter content 23 g kg^{-1}, pH_{KCl} 6.3, plant available potassium content K_2O 129 mg kg^{-1} and P_2O_5 112 mg kg^{-1}. Mineral fertilizer was applied each year with the rate 60 kg ha^{-1} N. The experiment was comprised of randomized complete block design with 3 replications, seed rate was 12 kg ha^{-1}. RCG samples were harvested in the end of October, 2011.

The ash content, elemental analysis and calorific value of RCG was determined in accordance to CEN/TS standards. The elemental analysis was determined on ELEMENTAR Vario Macro CHNS. Detection range: C: 0.002% - 100%; H: 0.015% - 100%; N: 0.004% - 100%; S: 0.004% - 100%. The work was conducted and recorded in the computerized mode. Software VARIOEL V5.16.10 was used. The results are represented as a percentage. There were 3 replicates of each sample.

Calorific value was determined on PARR 1341 Plain Oxygen Bomb Calorimeter.

Results. RCG yields were rather stable and achieved 7-8 t ha^{-1} DM despite drought at summer time during the first and second year of vegetation. Carbon content of RCG biomass was relatively high (≈44%) although it is about 5% less than for spruce sawdust (≈49%). Nitrogen content was nearly threefold higher than for spruce sawdust (0.62% and 0.18% respectively). The latter will promote NO_x emission during combustion. Ash content was 3.4% (Figure 1). Judging by our experience fuel biomass with such nitrogen and ash content will meet the requirements for fuel biomass for industrial needs (prEN 14961-6 standard). RCG in comparison with such fuel biomass as wheat straw contain much lower nitrogen and ash. Mixing of RCG with wood biomass could lead to further improvement of these indices.

The characteristic of pelletized RCG correspond to the demand of EU standard CEN/TC 335. The advantage of RCG pellets obtained is its density, which is higher than for wood pellets. The higher heating value of obtained pellets was close to spruce wood pellets (18.3 and 19.8 MJ/kg respectively).

The result obtained show that RCG is prospective energy crop in Latvian conditions.

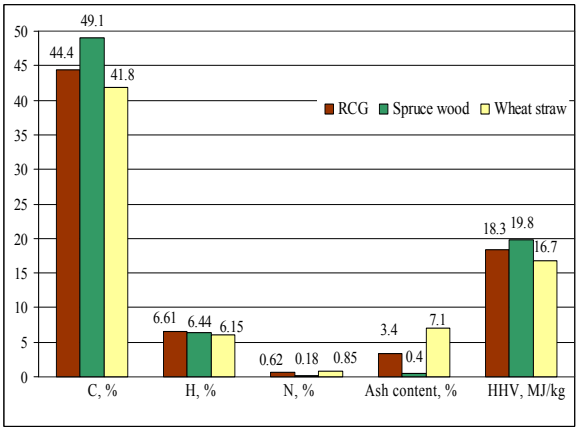

Figure 1. **Biomass quality indicators for various materials**

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