Hungary: raw material quality as a crucial factor

Dr. Zsolt János Viharos
Senior research fellow
Institute for Computer Science and Control (SZTAKI)
Hungarian Academy of Sciences (MTA), Budapest, Hungary;
John von Neumann University, Faculty of Economics and Business, Kecskemét, Hungary

Krisztina Konrád
Ph.D. student
University of Sopron, Simonyi Károly Faculty of Engineering, Wood Sciences and Applied Arts, Sopron, Hungary;
University of Pannonia, Faculty of Engineering, Institute of Mechatronics Instruction and Research, Zalaegerszeg, Hungary

Supported by the ÚNKP-17-3-III New National Excellence Program Of The Ministry Of Human Capacities

Marc 1, 2018
MTA SZTAKI – Introduction

- Established in 1964
- EU Centre of Excellence in IT, Computer Science and Control
- Basic and applied research
- Contract-based R&D&I activity mainly on complex systems, turnkey realizations
- Transferring up-to-date results to industry and universities

- **Basic research**
  - Computer science
  - Systems- and control theory
  - Engineering and business intelligence
  - Machine perception and human-computer interaction

- **Applied research and innovation**
  - Vehicles and transportation systems
  - Production informatics and logistics
  - Energy and sustainable development
  - Security and surveillance
  - Networking systems and services, distributed computing

**Key figures**

- **Budget**
  - 11 MEuros/year
  - ~30% basic funding

- **Staff**
  - ~220 (FTE)
  - ~100 with scientific degree
  - 7 members of the Hungarian Academy of Sciences
  - 15 with DSc degree
  - 70+ with PhD degree
  - ~15 members in Hungarian Academy of Engineering
Energy situation and trends in Hungary

Significant deficit between production and consumption

Strong energy dependence

Hungary energy consumption is ~1.3% of Europe consumption

Hungary energy production is ~1.0% of Europe production

RES are increasing large-scale in total energy production

Biomass pivotal in RES

Number of small and medium capacity plants are growing steadily

Total pellet production is 0.7% of Europe production

Wood pellets for export, agripellets for local use
Influencing factors of the Hungarian pellet market

- From 2013 the Hungarian government introduced financial support for the utility rate
  - In 2013, regulated prices for household consumers in the gas and electricity sector were cut by 20%
  - and further decreases were announced for 2014 (electricity by 5.7% and gas by 6.5%).
  ➔ The relative cost advantage of pellet was eliminated

+ Pellet based heating requires higher investment than others, e.g. gas
  ➔ Resulted decreasing pellet production and usage

- The production of agripellets is slightly increasing
  - To get raw material is becoming more and more difficult
    - Recycling inside agriculture
    - Typically, companies active in agriculture establish pellet production as a side-activity near their main business
  - Mainly for the own use
  - The control of such pellet production is much more difficult
The pelletability and combustion properties are influenced by the raw material features, too. **Knowledge on these parameters is crucial** for the regulation of the entire production process, furthermore, it may define also the quality of finished product.
Evaluation and ranking of the measurement methods of pellet’s raw material

Evaluation and ranking with a new measurement applicability index.

Three evaluation coefficients for evaluation
- The device requirement;
- The time requirement;
- The degree of complexity.

The multiplication of these three values result the final score of the individual solutions.

Applicability index can be between 1 and 1000.
- The best index is 1,
- and the least favourable is 1000.
Proposal for ISO 17225 standard extension

Part 1: General requirements
- Foreword
- Introduction
- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Symbols and abbreviated terms
- 5 Principle
- 6 Classification of origin and sources of biofuels
  - 6.1 General
  - 6.2 Woody biomass
  - 6.3 Herbaceous biomass
  - 6.4 Fruit biomass
  - 6.5 Aquatic biomass
  - 6.6 Biomass blends and mixtures
- 7 Specification of solid biofuels based on traded form and properties
  - 7.1 Traded form of solid biofuels
  - 7.2 Specification of properties of solid biofuels
- Annexes
- Bibliography

Part 2: Graded wood pellets
Part 3: Graded wood briquettes
Part 4: Graded wood chips
Part 5: Graded firewood
Part 6: Graded non-woody pellets
Part 7: Graded non-woody briquettes

Instead of raw material classification based on origin and source, classification based on elementary and chemistry composition

Pellet qualification based just properties
Selected publications


Thank you for your attention!

Contact
Dr. Zsolt János Viharos

viharos.zsolt@sztaki.mta.hu
www.sztaki.hu/~viharos

+36 1 279 6 195