IN-VITRO STUDY ON CHARACTERISTIC OF DIFFERENT HULLESS BARLEY CULTIVARS' FLAKES

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Barley (*Hordium vulgare* L.) is considered as an important food ingredient due to the presence of essential biochemical constituents such as β-glucans, proteins, resistant starch, phenolic compounds etc.

Hulless barley cultivars are more suitable to the human diet, because hulls can be easily removed, and minimal grain processing makes full benefit of the whole grain.

Hulless barley cultivars compared to hulled ones have increased nutritional value, especially the higher content of proteins (Ehrenbergerova *et al.,* 2003), β-glucans and soluble dietary fibre (Baik, Ullrich, 2008; Bleidere *et al*., 2013; Sterna *et al.,* 2017), which allow their use as an excellent raw material for functional food production. However, different cultivars have unique and specific chemical composition and physical properties.

Hulless barley is still less studied cereals in comparison with hulled barley and oats.

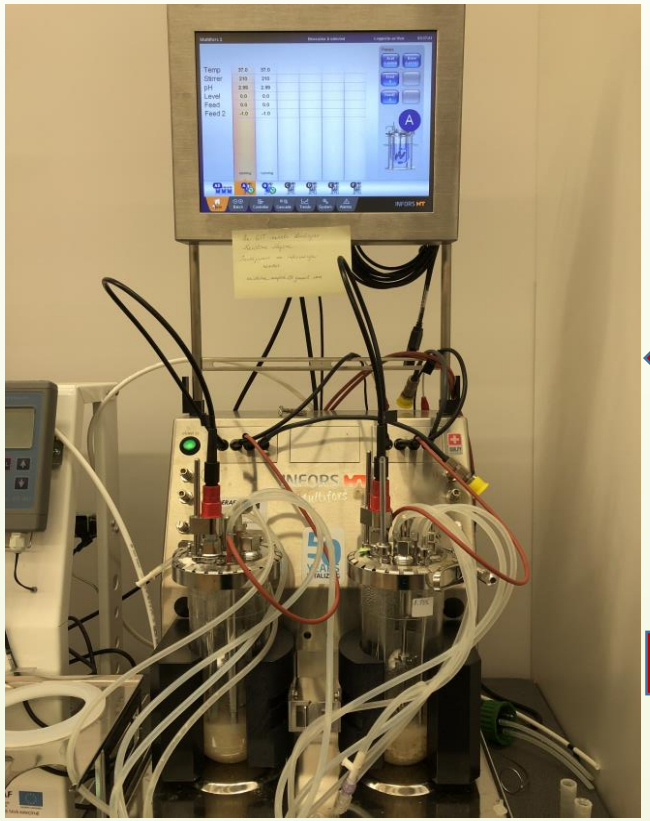
The aim of this study was to evaluate the fermentation characteristics for different barley cultivars' flakes in vitro and to detect the fermentation pattern on β-glucan, soluble dietary fibre and resistant starch.

Cultivars

- *'Pihl'*
- *'Gawrozs'*
- *'CDC Hilose'*
- *'CDC Ascent'*
- *'Kornelija'*
- *'Irbe'*

The chemical analyses of hulless barley flakes

- **Proteins/digested proteins** - Kjeldahl method (conversion factor 6.25)
- **Fats** - Soxhlet extraction method and gravimetrical determination.
- **β-glucans/digested glucans** - CC Standard Method No. 168 using Megazyme Assay Kits.
- **Starch -** LVS EN ISO 10520:2001 standard.
- **Resistant starch -**AOAC Official Method 2002.02 using K-RSTAR Megazyme Assay Kits.
- **Soluble** (SDF) and **insouble** (IDF) **dietary fibre** - AOAC 991.43:1994
- **Total sugars** – by PB-79/HPLC ed. V18.05.2017method.



Preparation of porridge

30 g flakes and 120 ml water were boiled 10 minutes

In-vitro fermentation

30 g of each porrige was analysed in Labfors 5, INFORS HT (Botmingen, Swtzerland) equipment by Minekus et al. (2014)

Analysis of digested porridge compounds

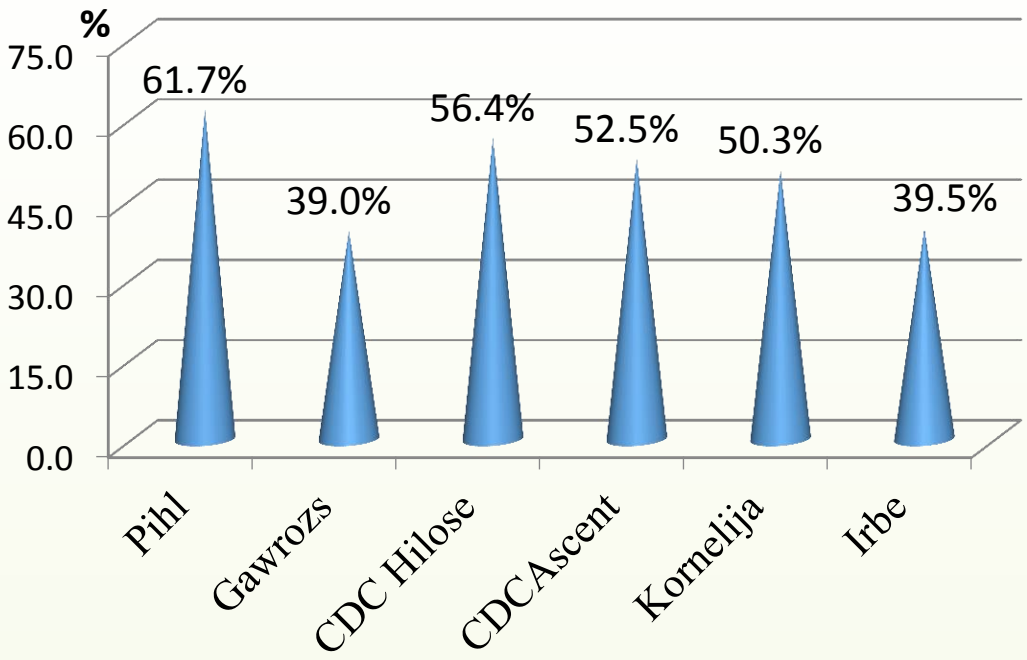
proteins, β-glucans

RESULTS

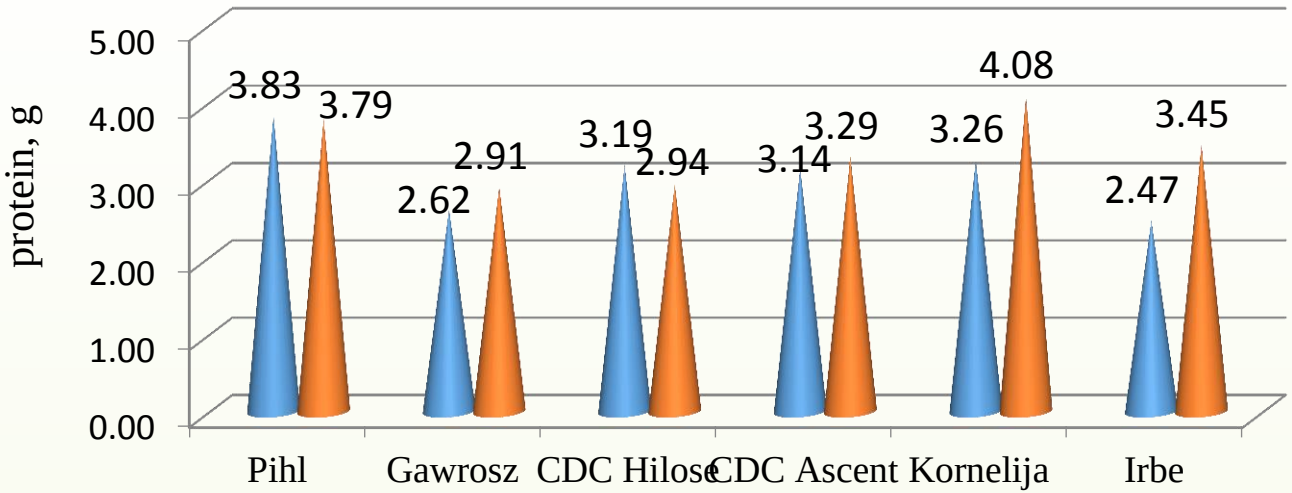
Chemical composition of different hulless barley cultivars

Cultivars	Moisture	Proteins	Fats	β-glucans	Starch	Resistant starch	SDF	IDF	Total sugars
	%	g 100 g^{-1}							
Pihl	12.03 ±0.42	18.19±0.30^{a}	2.13±0.38	4.98±0.25^{b}	58.76±0.22	0.80±0.12 ^{c}	24.1±4.8^{b}	2.4±1.0 ^{c}	1.1±0.1
Gawrozs	11.21 ± 0.42	14.42±0.25^{b}	2.56±0.38	6.11±0.37^{a}	58.51±0.31	0.39±0.10 ^{d}	32.0±6.4^{a}	0.7±0.3 ^{d}	0.8±0.1
CDC Hilose	9.71 ± 0.42	14.60±0.31^{b}	3.22±0.39	6.19±0.51^{a}	49.15±0.22	10.65±3.33^{a}	28.3±5.7^{a}	2.3±0.9 ^{c}	1.3±0.2
CDCAscent	9.82 ± 0.43	14.59±0.26^{b}	2.97±0.38	6.59±0.27^{a}	64.06±0.27	0.74±0.43^{c}	18.1±3.6^{c}	4.2±1.3 ^{a}	1.1±0.2
Kornelija	12.05 ± 0.42	17.76±0.26^{a}	2.40±0.38	5.61±0.40^{b}	57.84±0.46	0.88±0.30^{c}	23.3±4.7^{b}	3.2±0.8 ^{b}	1.0±0.2
Irbe	11.77 ±0.42	14.87±0.25^{b}	2.32±0.38	4.17±0.29^{c}	60.25±0.40	2.62±0.53^{b}	21.1±4.2^{b}	2.8±0.7 ^{c}	1.0±0.2

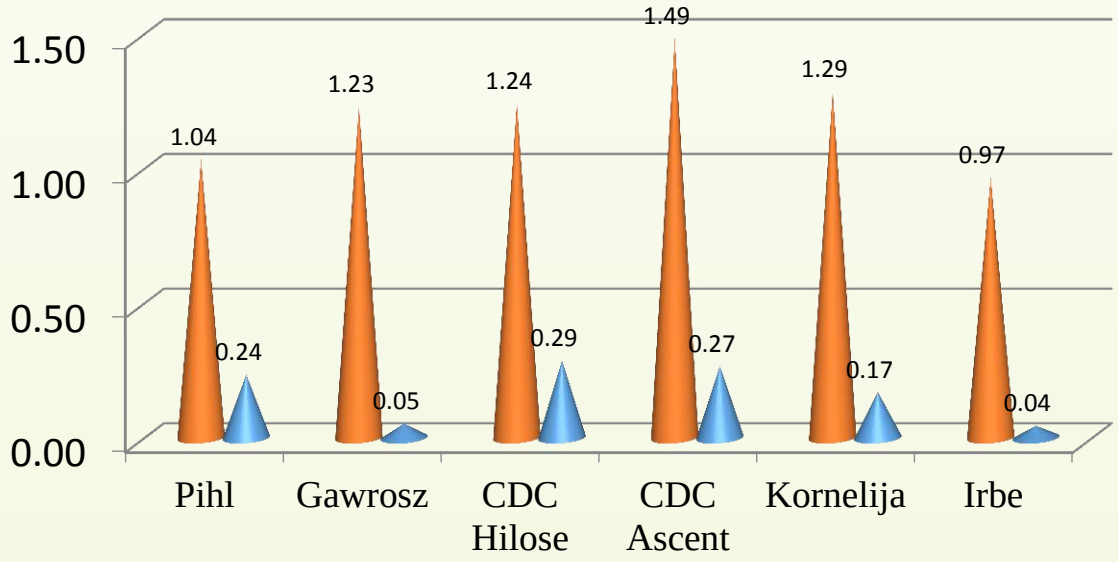
The amount of undigested flakes solids



The amount of protein before and after fermentation



The amount of β-glucans before and after fermentation



Correlation between fermented flakes solids and

β-glucans	0.142
RS	0.252
IDF	0.268
SDF	0.340
Protein	0.299

CONCLUSIONS

- The content of protein, β-glucans, resistant starch, soluble and insoluble dietary fibre significantly differed among hulless barley cultivars.
- The content of undigested residue varied among samples of different hulless barley cultivars 39-61,7%.
- There was calculated weak correlation (0.340) between soluble dietary fibre and undigested residue.