

POTENTIAL USE OF FABA BEAN (*VICIA FABA* L.) IN CREATION OF PLANT BASED SPREADS

Dubravka ŠKROBOT^{1*}, Milica POJIĆ¹, Jelena TOMIĆ¹, Predrag IKONIĆ¹, Miloš ŽUPANJAC¹, Vojislav BANJAC¹, Mladenka PESTORIĆ¹

¹University of Novi Sad, Institute of Food Technology, Bulevar cara Lazara 1, 21000 Novi Sad, Serbia

*contact: dubravka.skrobot@fins.uns.ac.rs

INTRODUCTION

According to FAOSTAT, faba bean production amounted to more than 1.5 million tons in 2019, making faba bean the third most produced legume in Europe, behind soybean and pea. As a source of fibre, vitamins and minerals, faba bean has multiple health benefits. A high protein-to-carbohydrate ratio in comparison to other legumes and a beneficial composition of essential amino acids allowing their dietary intake in appropriate quantities to fulfill the daily requirement when combined with cereals.

Despite faba bean widespread use in earlier times, it is currently a rather marginal underutilized crop that represents a niche retail product. The current popularity of meat alternatives offers its growth potential.

The objective of this study was to formulate, produce and characterize the functional spreads processed out of faba bean seeds, as an alternative to classical meat/liver pâté.

MOTIVATION AND GOALS of CROP DIVA project

Putting six underused arable crops back in the fields: oats, hull-less barley for human consumption, triticale, buckwheat, faba beans and lupins.

These crops have major ecological benefits

All selected crops have a broad genetic background that can be used to cross in important characteristics relating to factors such as resilience to stress and an improved nutritional value.

This will lead to highly resilient agroecosystems with greater adaptability to climate change, a better use of genetic resources, and greater food diversity.

MATERIAL AND METHODS

➤ Samples

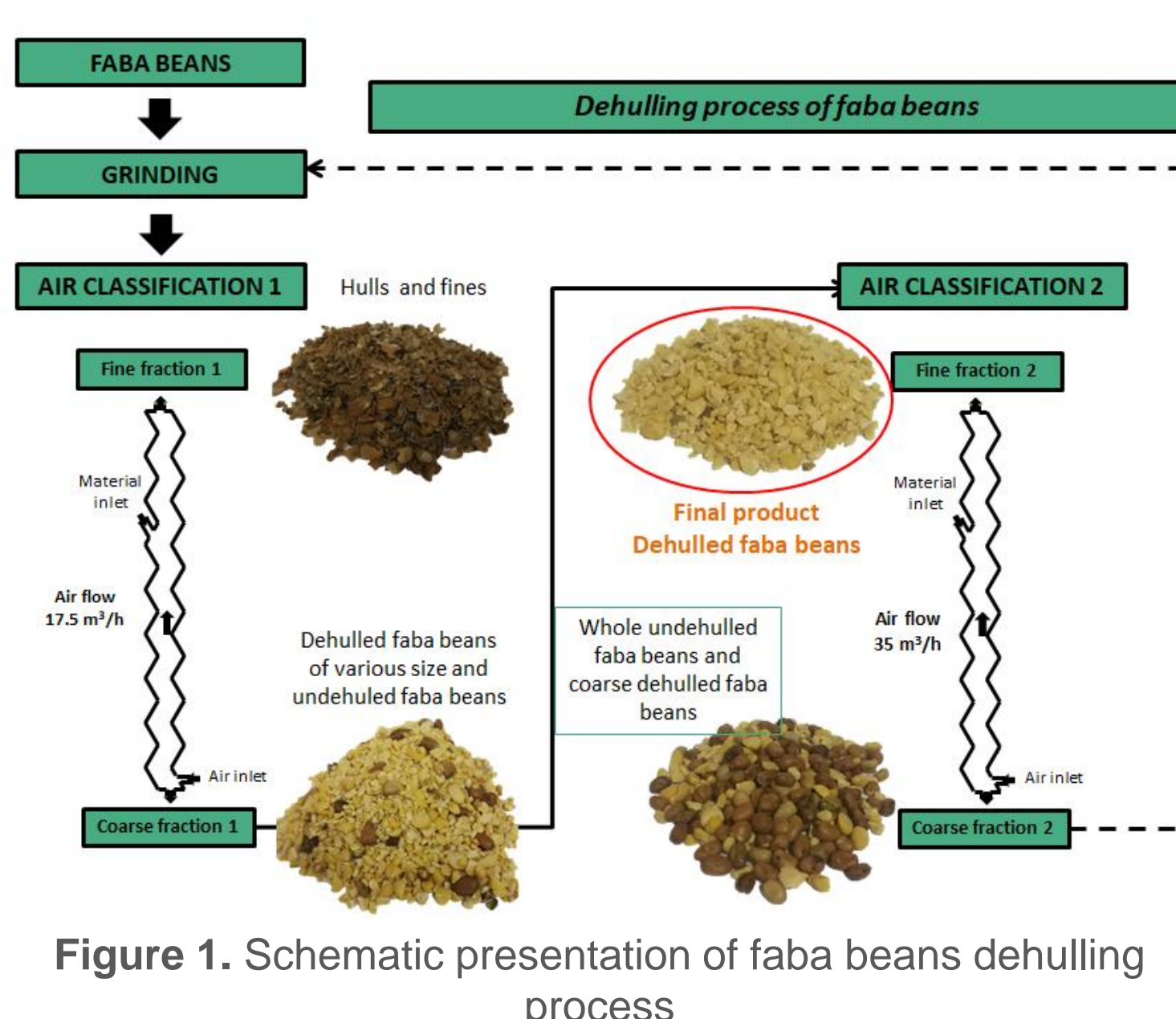
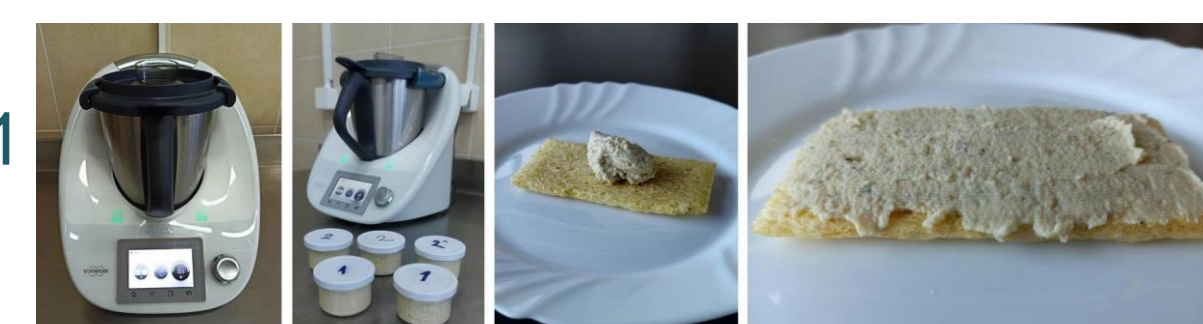


Figure 1. Schematic presentation of faba beans dehulling process

➤ Spreads preparation

Thermomix TM5-1 device



➤ Proximate composition

- Moisture, protein, fat, total insoluble and soluble dietary fiber content and available carbohydrate

➤ Color measurements

- Lightness (L^*), greenness/redness (a^*), blueness/yellowness (b^*)

➤ Textural measurements

- firmness and work of shear of samples - texture analyser TA.XT Plus, 30 kg load cell and TTC Spreadability Rig

➤ Descriptive sensory analysis

- Trained sensory assessors (5 woman and 3 man, aged between 30 and 55 years)

➤ Statistical analysis

- One way ANOVA followed by Tukey's HSD test (0.05) by using software XLSTAT 2018.7. (Addinsoft, New York, USA)

RESULTS

Nutritional properties of spreads

(g/100 g)	Comm1	Comm2	FBS1	FBS2	FBS3
Moisture	n.p.	n.p.	68.2±0.02 ^a	56.7±0.09 ^c	59.9±0.09 ^b
Crude protein	5.50	8.16	9.04±0.15 ^b	9.35±0.07 ^a	8.84±0.08 ^c
Crude Fat	19.0 ^b	22.6 ^a	9.48±0.14 ^d	16.8±0.09 ^c	16.4±0.12 ^c
Carbohydrate	6.70 ^d	18.7 ^a	7.7±0.38 ^c	12.4±0.20 ^b	7.3±0.20 ^c
Soluble fiber	n.p.	n.p.	3.97±0.06 ^b	3.1±0.10 ^c	6.11±0.08 ^a
Insoluble fiber	n.p.	n.p.	0.8±0.08 ^b	0.95±0.03 ^a	0.6±0.02 ^c
Fiber	n.p.	5.65	4.76±0.06 ^b	4.06±0.05 ^c	6.71±0.09 ^a
Energy value (kcal)	285	310	162	246	226

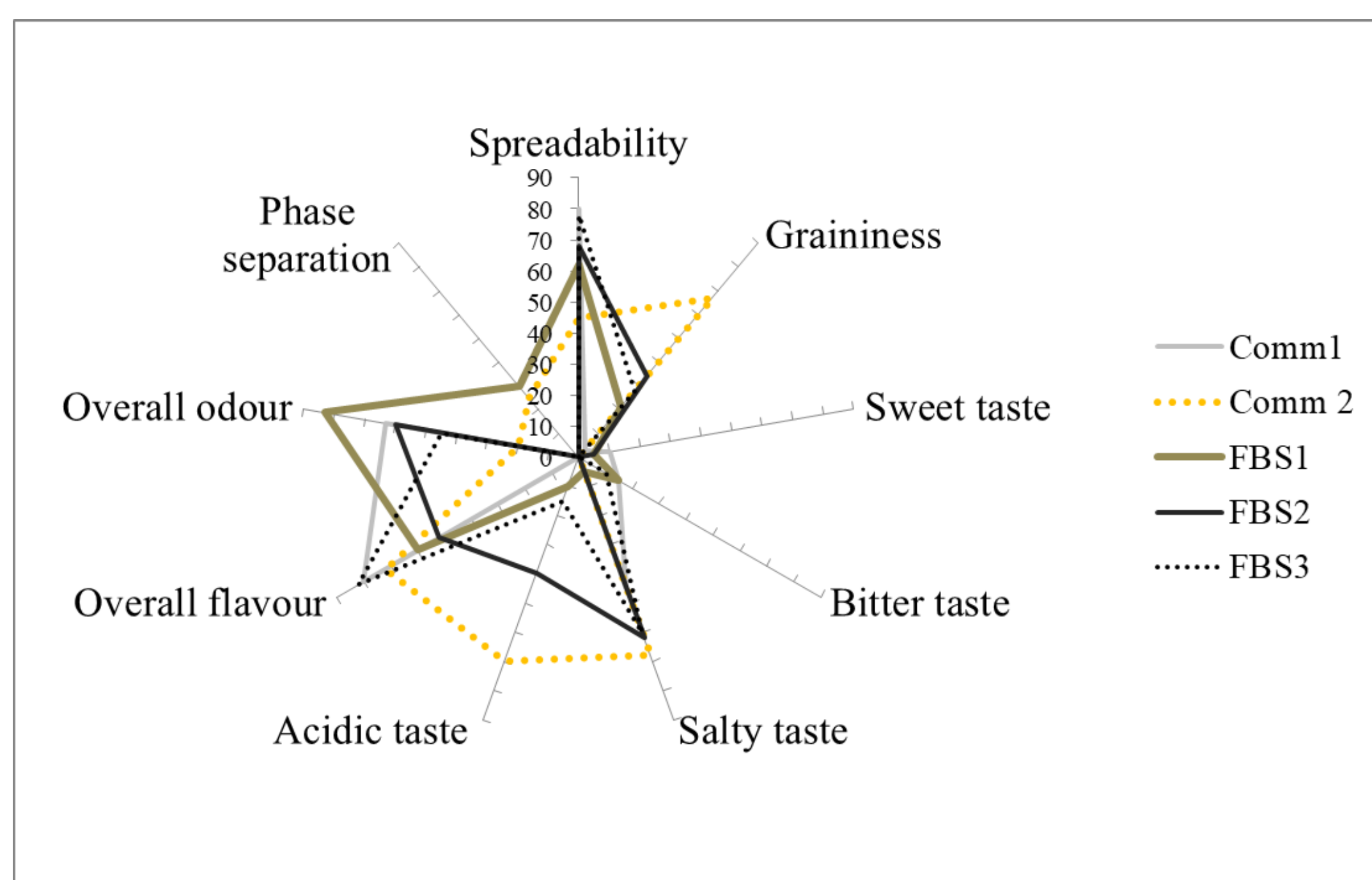
Colour and textural properties of spreads

	Comm1	Comm2	FBS1	FBS2	FBS3
Color properties					
L^*	81.58±1.16 ^a	56.33±1.00 ^c	77.5±1.48 ^b	75.9±1.58 ^b	76.7±0.40 ^b
a^*	-1.22±0.08 ^b	2.92±0.14 ^a	-1.50±0.21 ^b	-1.20±0.18 ^b	-1.20±0.20 ^b
b^*	21.33±1.04 ^b	26.76±0.48 ^a	18.3±1.11 ^c	19.8±0.52 ^{bc}	20.0±0.37 ^b
ΔE_1	-	-	5.10±1.80 ^a	5.88±1.51 ^a	5.12±0.48 ^a
ΔE_2	-	-	23.2±1.05 ^a	21.2±1.48 ^a	21.8±0.26 ^a
Textural properties					
Firmness (g)	1454.9±20.2 ^b	1943.9±100.3 ^a	589.9±9.9 ^d	876.74±8.5 ^c	656.67±50.4 ^e
Work of shear (gsec)	1055.6±21.4 ^b	1640.3±56.9 ^a	517.9±13.4 ^e	788.46±34.5 ^c	589.29±38.1 ^d

FBS1 – faba bean spread without acidity regulator; FBS2 – faba bean spread with lemon juice addition; FBS3 – faba bean spread with citric acid addition;

L^* - lightness, a^* - redness/greenness, b^* - yellowness/blueness, Comm 1 and Comm 2 refers to the commercially available samples; ΔE_1 – total color difference of produced faba bean spreads and commercial sample 1; ΔE_2 – total color difference of produced faba bean spreads and commercial sample 2; n.p. – not provided

Sensory profiles of spreads



CONCLUSIONS

➤ Newly developed faba bean spreads show higher protein and lower fat content and energy value when compared to two commercially available plant based spread-like products that are chosen for analysis based on the popularity in the Serbian market.

➤ The produced faba bean spreads were less firm and more spreadable in comparison to the both commercial samples.

➤ The usage of faba bean together with the developed technology for bean spread preparation is promising strategy to obtain products with high quality and with appealing sensory properties.

