

# TECHNOLOGICAL POTENTIAL TO ENHANCE THE NUTRITIONAL AND FUNCTIONAL VALUE OF LENTILS AS A SOURCE OF VALUABLE ANIMAL FEED

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The EU protein strategy encourages domestic protein-rich crop production, such as lentils, as the strategy for combating the problems associated with dependence on importing plant-based protein products [1]. While the nutrient absorption of lentils is mitigated due to existing antinutritional factors, the effect can be reduced using various food processing methods which include fermentation [2]. The aim of the study was to evaluate differences in the composition of various biomolecules (free amino acids (FAA), biogenic amines (BA), volatile organic compounds (VOC) and fatty acid composition (FA)) of non-treated and fermented (via submerged (SMF) and solid state (SSF) fermentation, 1:5 and 1:1 lentil/water weight ratio, respectively, at  $30 \pm 2^\circ\text{C}$  for 24 h and 48 h with *Pediococcus acidilactici* strain) lentil (variety 'Danaja', *Lens culinaris* Medik.) samples, grown using different technologies. FAA were analysed according to Hua-Lin Cai et al. [3] with modifications. BAs were analysed using the methods described in Ben-Gigirey [4]. FA and VOCs were analysed using the methods, described in detail by Mockus et al. [5]. Fermented samples were found to contain significantly higher amounts of FAA concentrations (except arginine, asparagine, and glutamine), in comparison with the respective control samples. Type of the fermentation showed to be an important factor for all FAA concentrations. Moreover, lentil growing conditions \* type of fermentation \* fermentation duration interaction was significant for arginine, glutamine, GABA, and tyrosine concentrations in lentils. The BAs detected in all samples were putrescine, spermidine and spermine. Growing conditions \* type of fermentation interaction was significant for all detected BAs. The fermentation duration was not significant for C18:0, C18:1 and C18:2 FAs, while an interaction of all the analysed factors was significant for all FAs in lentils. SSF lentils contained a more complex VOC profile (28–39 VOCs in SSF samples) in comparison with respective SMF samples (12–27 VOCs in SMF samples). Finally, it can be stated that the increase of FAAs can result in improved nutrient absorption, while the increase of BAs should be taken into consideration.

**Keywords:** lentils, amino acids, fatty acid composition, fermentation, volatolomics.

## References

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