

Abstract

In Silico Approach toward Analysing the Bioactive Effects of Spent Brewery Yeast Proteins [†]

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Saccharomyces cerevisiae, a yeast widely used in food and beverage production, was observed to provide a valuable source of different nutrients, the most important being the bioactive peptides which can become a major supporter in pharmaceutical therapies [1]. In this paper, the main aim was to predict in silico the health effects of bioactive peptides sourced from spent brewery yeast proteins, with a focus on their antihypertensive and antioxidant effects. To identify the bioactive peptides of interest, we employed an integrative approach which can be observed in Figure 1. We used the following tools and databases: UniProtKB, ExPASyProtParam, BIOPEP, Peptide Ranker, PepCalc and ToxinPred, and we assessed the potential of the spent brewery yeast protein and observed the presence of bioactive peptides with different effects on health [2]. The analysis of the spent brewery yeast residues of amino acids showed an increased presence of alanine, leucine, threonine, glycine and valine. Bioactive peptides were released by all three of the analysed enzymes, with the most found in the case of pepsin, followed by papain and subtilisin. All of them showed high antihypertensive activity. Using the Peptide Ranker and PepCalc tools, we managed to point out that papain and pepsin aid in the release of significant sequences such as DF, SDF, RP and RWA, which showed high scores of bioactivity and had good physico-chemical properties. In this paper, we showed that the spent brewery yeast proteins are an invaluable source of health compounds such as bioactive peptides with potential antihypertensive and antioxidant effects. The modern bioinformatics approach used in this study provided us with an efficient base for further experimental studies and offered a less costly process using databases that can simulate processes for gastrointestinal digestion.

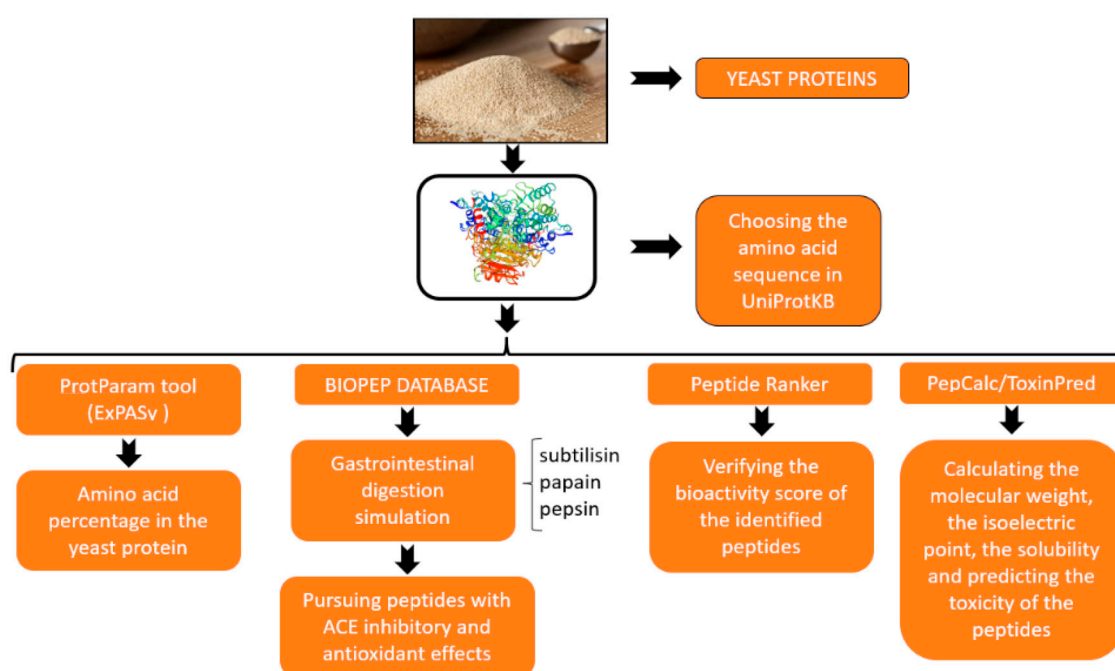


Figure 1. The workflow used for the identification of bioactive peptides from yeast proteins.

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