

Peptides and Amino Acids from Plant Leaves: Sustainable Nutrients and Bioactive Compounds

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Plant leaves are rich in proteins, vitamins, minerals and other bioactive compounds such as phenolic compounds. Therefore, they are good sources of proteins or amino acids. Especially, the leaf residue obtained after the extraction of other bioactive compounds is very rich in proteins.

Protein-amino acids or peptides (parts of life resources) are essential for human life. So, their supply must always be equal to/or higher than their demand. Some peptides can also have other bioactive activities, for example the protein hydrolysate from stevia leaves was reported to have the function of inhibiting angiotensin-converting enzyme activities [1]. Furthermore, it has been argued that plant leaf protein products are capable of providing the nutritional benefits similar to that of animal proteins and the plant proteins based products have the advantages of avoiding the health harms of animal proteins (e.g. cholesterol) [2,3].

There are two types of plant leaves, i.e. annual and perennial. Presently, our dietary proteins are still produced by planting annual crops. Unfortunately, about 90% US annual cropland (capable of producing annual plant leaves) lost soil 13 times higher than the sustainable rate of 1 t/ha/y [4] though the soil erosion rate (ER) of Europe and USA was the lowest in the world. Later, > 12 t/ha/y ER of conventional agriculture was reported [5] while those of sod and forests (capable of producing perennial plant leaves) were < 0.1 and 0.004 - 0.05 [4], respectively. Forests and sod (capable of producing perennial plant leaves) could therefore be feasible and sustainable to simultaneously produce protein resources and protect soil from erosion by producing large amount of leaves.

Therefore, production of peptides or amino acids by using plant leaves as raw materials, especially perennial leaves should have a prosperous future [6-8]. This means that studies on the nutritional quality, bioactive activities or potential yield of peptides or amino acids produced by using plant leaves and their utilization should be further promoted worldwide. Some reports on the extraction of bioactive compounds, production of leaf protein concentrates (suitable for producing bioactive peptides, etc.) can be found in literature [1,9]. Ethanol extraction could recover beneficiary components and remove unpleasant grassy flavor and toxins, which is green and edible. The protein in the ethanol-extracted residue can be hydrolyzed into bioactive peptides or amino acids when proper enzymes are selected.

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