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Characterisation, Extraction of Secondary Metabolite from Perilla frutescens for Therapeutic Additives: A Phytogenic Approach

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Abstract : Though there are several methods of synthesizing silver nano particles, Green synthesis always has its own dignity. Ranging from the cost-effectiveness to the ease of synthesis, the process is simplified in the best possible way and is one of the most explored topics. This study of extracting secondary metabolites from Perilla frutescens and using them for therapeutic additives has its own significance. Unlike the other researches that have been done so far, this study aims to synthesize Silver nano particles from Perilla frutescens using three available forms of the plant: leaves, seed, and commercial leaf extract powder. Perilla frutescens, commonly known as 'Beefsteak Plant', is a perennial plant and belongs to the mint family. The plant has two varieties classed within itself. They are frutescens crispa and frutescens frutescens. The species, frutescens crispa (commonly known as 'Shisho' in Japanese), is generally used for edible purposes. Its leaves occur in two forms, varying on the colors. It is found in two different colors of red with purple streaks and green with crinkly pattern on it. This species is aromatic due to the presence of two major compounds: polyphenols and perillaldehyde. The red (purple streak) variety of this plant is due to the presence of a pigment, Perilla anthocyanin. The species, frutescens frutescens (commonly known as 'Egoma' in Japanese), is the main source for perilla oil. This species is also aromatic, but in this case, the major compound which gives the aroma is Perilla ketone or egoma ketone. Shisho grows short as compared with Wild Sesame and both produce seeds. The seeds of Wild Sesame are large and soft whereas that of Shisho is small and hard. The seeds have a large proportion of lipids, ranging about 38-45 percent. Excluding those, the seeds have a large quantity of Omega-3 fatty acids, linoleic acid, and an Omega-6 fatty acid. Other than these, Perilla leaf extract has gold and silver nano particles in it. The yield comparison in all the cases have been done, and the process' optimal conditions were modified, keeping in mind the efficiencies. The characterization of secondary metabolites includes GC-MS and FTIR which can be used to identify the components of purpose that actually helps in synthesizing silver nano particles. The analysis of silver was done through a series of characterization tests that include XRD, UV-Vis, EDAX, and SEM. After the synthesis, for being used as therapeutic additives, the toxin analysis was done, and the results were tabulated. The synthesis of silver nano particles was done in a series of multiple cycles of extraction from leaves, seeds and commercially purchased leaf extract. The yield and efficiency comparison were done to bring out the best and the cheapest possible way of synthesizing silver nano particles using Perilla frutescens. The synthesized nano particles can be used in therapeutic drugs, which has a wide range of application from burn treatment to cancer treatment. This will, in turn, replace the traditional processes of synthesizing nano particles, as this method will prove effective in terms of cost and the environmental implications.

Keywords : nanoparticles, green synthesis, Perilla frutescens, characterisation, toxin analysis
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