CHAPTER-6

SUMMARY AND CONCLUSION

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Traditional knowledge of medicinal plants guides the quest for new therapeutic compounds using current drug discovery and screening approaches. Goalpara, a tribally dominated territory, contains a richness of medicinal plants and traditional folk medicines that can be used to develop new drugs. They mostly rely on edible plant resources found in the wild. The chief reasons mentioned for consuming these wild plants are that they are traditional foodstuff, they have good flavors and that they are freely available food resources. These traditional edible herbal plants are nature's gift to humanity, serving as nutritious supplements by contributing a balanced diet in times of food scarcity as an alternative to staple foods. In addition to providing a well-balanced diet, these plants serve as a foundation for traditional medicine in treating a variety of ailments. Medicinal plants are a rich source of bioactive constituents with pharmacological activity and sometimes a source for discovering new compounds that aid in the preparation of new drugs. It is necessary to conduct scientific research on plants that are used in traditional medicine to know their therapeutic action.

The taxonomic authentication of unexplored medicinal plant species by plant taxonomist followed by confirmation by molecular identification of medicinal is the first step of advanced research that includes the usage and potential uses of medicinal plants. From an ethnobotanical perspective, Goalpara is still poorly studied despite having a high floristic diversity. As a result, three plant species were selected to investigate their potential for usage as both food and medicine. Based on a thorough investigation of ethnomedicinal practices by diverse populations in Goalpara, it was learnt that traditional medical systems make use of plant rhizomes, roots, stems, bark, and leaves of which the leaves were mostly used. Given these characteristics, the leaves of three ethnomedicinal plant species have been the subject of scientific confirmation due to their widespread use by Goalpara's traditional healers for the treatment of a variety of illnesses, including diabetes, hypertension, jaundice and stomach problems. These plants have a promising

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nutritional content, a variety of biologically active compounds, antioxidant activity and anticancer activities which is also attributed by the presence of different functional groups. Nuclear DNA (ITS) and plastid DNA (rbcL gene) are commonly used as markers in the molecular identification of plant species. The present study's found the ITS and rbcL barcode loci yielded positive results for species identification and phylogenetic relationship reconstruction. Important phytochemicals such as phenols, flavonoids, terpenoids, alkaloids, glycosides, saponins and tannins are present in all plants, according to a qualitative phytochemical evaluation of the extracts. Quantitative phytochemical investigation revealed that the extracts have substantial levels of flavonoids and phenols. Three distinct in-vitro assays used to validate the antioxidant activity of the various extracts including the DPPH assay, the H_2O_2 assay and the ferric reducing power assay proved that the plant extracts extracted by polar solvent contain maximum number of phytoconstituents and antioxidant activity.

Chromatography is extensively used in pharmaceutical research to identify bioactive compounds in addition to quantitative studies. To know the ability of a new drug it is scientifically crucial to isolate and characterize a particular bioactive component. Analytical Gas Chromatography Mass Spectroscopy, in particular is a useful technique for identifying particular bioactive chemicals. Therefore, GC-MS was chosen for this study in order to demonstrate the bioactive potential of less targeted medicinal plants with scientific proof. The majority of the bioactive substances found in this investigation have been shown to have anticancer activity as per the literature research. MTT assay was used to examine the plant extracts' cytotoxic potential against the two distinct human cancer cell lines, MCF-7 and HeLa cell lines. The cytotoxicity of plant extracts showed increase in cell death with an increase in concentration of plant extracts on both cell lines. The AO/EB staining revealed apoptotic cells with orange-red fluorescence in extract-treated cells which increased in a dose-dependent manner whereas control cells showed green fluorescence. Apoptotic cells were detected using flow cytometry and annexin V/PI analyses in a time-dependent manner. That *B. lanceolaria* extracts could more

efficiently cause apoptosis at a concentration IC_{50} and $2xIC_{50}$ in HeLa cells was prominent by AO/EB staining and flow cytometry. Whereas in *Z. oxyphyllum* and *R. serrata*, the observations were not so prominent in both HeLA and MCF7 cell lines but apoptotic activities were seen. The distribution of MCF-7 and HeLa cells revealed the capability of all plant extracts to cause cell death in MCF-7 cells at early stage of apoptosis and in HeLa cells at late stage of apoptosis in all the plant species.

In addition to their therapeutic qualities, the examined plants have sufficient amounts of the micronutrients, minerals, amino acids and fatty acids needed for human nutrition and health. Variable quantities of anti-nutritional components, such as tannin, oxalate and alkaloids were identified and assessed. These variations may be attributed to varying plant species, regions and environmental circumstances. Anti-nutritional chemicals do, however, also exhibit a number of therapeutic qualities. It also raises the prospect of utilizing the researched plant material in the contemporary healthcare system by offering helpful details for additional plant applications. To the best of knowledge, this is the first research from Goalpara that looks into the usage of ethnobotany, identification by DNA barcodes, identification of functional groups and bioactive substances, nutritional value and antioxidant and anticancer potential. Additional research on these plant species may provide fresh insights for the pharmaceutical and nutraceutical sectors looking to create innovative health-promoting products. As predicted, the current study made use of three historically utilized plants with possible anti-cancer properties that are found in Northeastern India. To corroborate the results, additional in vivo research and models of anticancer activity investigations are needed.

The results of the study emphasizes on the importance of natural resource use with respect to medicinal plants in marginalised communities of North East India. In summary, this research provides scientific support to the traditional medicine applications of *Z. oxyphyllum, R. serrata* and *B. lanceolaria* leaves in treating a range of ailments. The findings of the current study have shed light on the

nutritional qualities and phytoconstituents of ethnomedicinal plants, that offers a solid scientific foundation for advocating for their use, especially in Goalpara. The ethnomedicinal plant resource of the Goalpara area is presently important to the majority of residents and still has the prospective to subsidize to food security and medical aid on a larger scale. The value of these reserved resources is however reliant on preserving the resource itself as well as on holding and escalating the body of knowledge that occurs around the use of ethnomedicinal plants their gathering, preparation and management.