CONCLUSIONS

The wild edible plants growing in the natural habitats are being used as the food sources to fulfil the daily requirements of important nutrients by the rural people and these plants are considered as one of the cheapest sources of energy for human consumption. The wild edible vegetables are essentially important in the biochemical and nutritional aspects as they are the rich sources of minerals, proteins, amino acids, carbohydrates, fibres, vitamins and other bioactive compounds especially the antioxidant compounds which on consumption contribute several health benefits against various diseases.

The objective of present study was to determine the nutritional contents, phytochemical constituents, antioxidant activity, antimicrobial activity, amino acid profiles and anti-nutritional contents in selected wild edible plants consumed by the Bodos of Assam, North East India.

In this study, all the selected wild plants were found to contain varying proximate compositions. *C. sinensis* was found to contain the highest calorific value (67.42 ± 1.82 kcal/100 g FW) due to higher contents of carbohydrate (12.48± 0.45 g/100 g FW), fat (0.64 ± 0.00 g/100 g FW) and protein (2.92 ± 0.00 g/100 g FW). *M. perpusilla, P. perfoliatum, N. herpeticum* and *L. javanica* were also found to contain higher amounts calorific values as 67.03 ± 5.23, 57.38 ± 1.29, 54.72 ± 9.61, and 50.64 ± 5.63 kcal/100 g FW, respectively.

The present study reveals that the wild edible vegetables consumed by the Bodos of Assam contain adequate levels of minerals. Potassium was the most abundant element found in these plants which ranged from 1155.28 ± 0.21 mg/100 g DW in *P. chinensis* (lowest) to 11784.13 ± 0.11 mg/100 g DW in *D. cordata* (highest). Among the selected plants, *E. fluctuans, B. lanceolaria,* and *S. media* were found to contain good sources of iron which were 15.10 ± 0.02, 13.90 ± 0.02 and 13.42 ± 0.02 mg/100 g of DW, respectively. The plant species are also good sources of selenium which is an important element for human health. The wild edible plants selected are found to be free from cadmium and arsenic contamination. Therefore, these vegetables can be served as the rich sources of energy and minerals which can fulfil malnutrition problems on regular consumption and thereby can prevent several human diseases.

The study of methanol extracts of wild edible plants indicated the presence of numerous biologically active compounds which are considered to have several medicinal properties such as anthelmintic, antioxidant, antimicrobial, and other biological properties. The study of

in vitro antioxidant capacities in methanol extracts showed increasing scavenging activities with increasing concentration. In DPPH assay, *M. perpusilla* showed the best antioxidant activity with an IC_{50} value 134.96 ± 0.35 µg/mL followed by *L. javanica* (IC_{50} 135.0 ± 1.49 µg/mL) whereas in ABTS method, *T. angustifolium* exhibited the highest antioxidant activity with IC_{50} value 74.3 ± 0.29 µg/mL followed by *P. perfoliatum* (IC_{50} 81.67 ± 0.28 µg/mL) and *L. javanica* (IC_{50} 86.99 ± 0.27 µg/mL). However, the highest antioxidant capacity indicated by the H_2O_2 assay was the methanol extract of *B. lanceolaria* with IC_{50} value of 20.37 ± 0.01 µg/mL. The FRAP value was found the highest in *M. perpusilla* (855.23 ± 10.91 µM TE/g DE) followed by *L. javanica* (799.28 ± 7.14 µM TE/g DE), *P. perfoliatum* (621.90 ± 7.43 µM TE/g DE) and *T. angustifolium* (581.42 ± 10.7 µM TE/g DE). Higher amounts of TPC were found in *E. fluctuans* (269.49 ± 2.96 mg GAE/g DE), *P. perfoliatum* (265.95 ± 4.76 mg GAE/g DE) and *M. perpusilla* (239.62 ± 5.4 mg GAE/g DE). *P. perfoliatum* showed the highest TFC of 4.34 ± 1.03 mg QE/g DE. In this study, the vitamin C content was found the highest in *N. herpeticum* (85.71 ± 5.71 mg/100 g FW) followed by *T. angustifolium* (79.06 ± 0.02 mg/100 g FW), *P. perfoliatum* (57.74 ± 4.3 mg/100 g FW), and *M. perpusilla* (57.07 ± 1.59 mg/100 g FW). Thus, it can be concluded that these wild plants *viz. M. perpusilla, L. javanica, P. perfoliatum, T. angustifolium, B. lanceolaria, N. herpeticum,* and *E. fluctuans* have strong antioxidant capacity and can be considered as the good sources of natural antioxidants.

This study reveals that all the selected plant species showed different antimicrobial activities with the highest zone of inhibition (16 mm) in the methanol extracts of *S. media* against *E. coli* with MIC value of 7.5 mg/mL and MBC value of 15 mg/mL and in the methanol extracts of *O. javanica* against *P. vulgaris* with MIC and MBC values of <30 mg/mL. However, the methanol extract of *C. sinensis* showed the highest zone (15 mm) against *S. aureus* with MIC and MBC values of <15 mg/mL. Also the methanol extract of *M. perpusilla* showed the highest zone (15 mm) against *B. cereus* with MIC value of 7.5 mg/mL and MBC value of <15 mg/mL. In aqueous extract, the highest zone of inhibition (13 mm) was observed in *S. zeylanica, C. hirsuta*, and *S. media* at 30 mg/mL concentration against *E. coli*. The aqueous extract of *T. angustifolium* showed the highest zone of inhibition (13 mm) against *S. aureus*. However, no zone of inhibition was observed in the aqueous extracts of plants against *P. vulgaris.* Thus, the methanol extracts of all the selected plants are showing more effective antimicrobial activities in comparison to the aqueous extracts and this may be due to the microbial active compounds which are more soluble in methanol than water. Finally, consumption of these wild plants could be suggested for prevention of several diseases.

In this study, a total of sixteen essential and non-essential amino acids were detected in *S. zeylanica* and *S. peguensis* plant species. The total NEAA contents varied from 0.07 mg/g dry weight in *L. javanica* to 6.40 mg/g dry weight in *S. zeylanica*. A total of eight NEAA such as aspartic acid, glutamic acid, serine, glycine, asparagine, alanine, proline, and arginine were detected in *S. zeylanica* and *C. sinensis.* All these eight NEAA were also detected in *S. peguensis* except arginine. Among the amino acids, aspartic acid and glutamic acid were detected in all the selected plant species of this study. In this study, the highest concentration of EAA was detected in *S. zeylanica* (6.77 mg/g) followed by *C. hirsuta* (1.72 mg/g) and the lowest EAA content was found in *P. perfoliatum* (0.12 mg/g). Besides EAA and NEAA, some other amino acids (non-protein amino acids) were also detected in this study. The total amino acid content was found to be the highest in *S. zeylanica* (42.87 mg/g) followed by *S. peguensis* (32.65 mg/g) and the lowest amino acid content was detected in *L. javanica* (0.62 mg/g). Therefore, the consumption of these wild plants may fulfil the amino acid requirements in the diet and can prevent diseases caused by amino acid deficiencies.

In this study, anti-nutritional contents such as oxalate, tannin, phytate, saponin and alkaloids were evaluated and variable amounts of anti-nutritional contents were observed which may be due different plant species, locations and environmental conditions. Very high levels of anti-nutritional contents were not found in the current study except in some plant species such as *D. cordata* which exhibited the highest level of oxalate content (39.96 ± 0.23 mg/g DW) and *M. perpusilla* which showed the highest saponin content (14.40 ± 0.30 mg/g DW). However, presence of anti-nutritional compounds also shows several medicinal properties including antioxidant and antimicrobial properties.