Abstract of the thesis

Cyanogenic plants most commonly used as foods are cabbage, cauliflower, mustard and radish; consumed in fresh and also after cooking. The major goitrogens viz. cyanogenic glucosides, glucosinolates and thiocyanate contents and in vitro anti-thyroid potential of those plants were measured before and after cooking. The effect of prolonged consumption of those plants in uncooked and cooked conditions respectively on morphology and function of thyroid gland were evaluated by studying alterations in thyroid weight, histology, thyroid peroxidase (TPO) activity and circulating triiodothyronine (T₃) and thyroxine (T₄) levels in albino rats. The consumption patterns of dietary iodine and goitrogens were monitored by iodine and thiocyanate excretion pattern and their ratios.

Dietary goitrogens were found in edible parts of all the studied plants in varying proportions. Cyanogenic glucosides and glucosinolates contents were reduced markedly while thiocyanate content was slightly increased after cooking. Varying degrees of inhibition in TPO activity were shown by the aqueous plant extracts in both the conditions in in vitro experiment. Cooked extracts had shown more anti-TPO potency. The relative anti-TPO potency of uncooked and cooked plants was determined by IC₅₀ and PTU equivalence. Enhanced excretion of thiocyanate, along with iodine were noted in the studied plant fed groups indicating that cyanogenic glucosides and glucosinolates were metabolized to thiocyanate and excreted through urine that also increased the concentration of iodine in urine. Development of hypertrophy and hyperplasia of thyroid follicular cells of relatively small follicles containing less colloid with less iodine in the experimental groups resembled a state of morphological hypothyroidism. After feeding the studied plants, a relative state of biochemical hypothyroidism was developed as evidenced by reduced TPO activity, T₃ and T₄ levels. The effects were more pronounced in the uncooked plant fed groups because of higher concentration of goitrogenic constituents.

Prolonged consumption of cyanogenic plants had developed a state of morphological as well as biochemical hypothyroidism because cyanogenic glucosides and glucosinolates metabolized to thiocyanate or thiocyanate like compounds and thiocyanate itself present in edible parts of the plants might interfere iodine concentrating mechanism of thyroid and inhibited TPO activity resulting in reduced synthesis of thyroid hormones. The goitrogenic / anti-thyroid potential of fresh plants was reduced to an extent during cooking but failed to prevent the anti-thyroid activity completely.