CHAPTER 8

SUMMARY
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Wheat grass has been traditionally used, since ancient times, to treat various diseases and disorders. Wheat grass is an effective natural supportive in cancer. Wheat grass contains vitamins including B12, many minerals and trace elements, including selenium, and almost all amino acids. It also contains the hormone abscisic acid, the antioxidant enzyme Superoxide Dismutase (SOD), a novel isoflavonoid and vitamin E succinate (VES) and over 30 other enzymes, the antioxidant enzyme cytochrome oxidase, laetrile, and a lots of nutrients. There are no reports to evaluate percentage presence of abscisic acid and laetrile in Wheat grass species like *Triticum dicoccum*, *Triticum durum* and *Triticum aestivum* and its anticancer activity, which may be due to abscisic acid and laetrile, hence present investigation was aimed to study the anti-proliferative activity of three species of wheat grass.

The study was conducted with the objectives: (a) To evaluate percentage presence of abscisic acid and laetrile in *Triticum dicoccum*, *Triticum durum* and *Triticum aestivum* using HPLC technique. (b) To estimate anti proliferative activity of one of the *Triticum* species by in-vitro microculture tetrazolium (MTT) assay. (c) To study clinical efficacy of wheat grass tablets as a supportive treatment in leukemia patients (in-vivo).

The phytochemical experiment of wheat grass species revealed that three species contained the Abscisic acid and laetrile. The amount of Abscisic acid or laetrile was varied in the three species. The wheat grass species *Triticum aestivum* (14.13 %) contained maximum amount of Abscisic acid as compared to *Triticum durum* (8.59 %) and *Triticum dicoccum* (3.84 %). The amount of laetrile was highest in *Triticum aestivum* (9.10 %) as compared to *Triticum durum* (5.63 %) and *Triticum dicoccum* (2.95 %). The anti-cancer activity of wheat grass species may be due to abscisic acid and laetrile, so it was decided to study the anti-
proliferative activity of three species of wheat grass using the in-vitro method of MTT assay.

The results of MTT assay of wheat grass species revealed that *Triticum aestivum* was found to have highest cytotoxic activity (Anti-proliferative activity) as compared to other two species. The cytotoxic activity was in ascending order: Abscisic acid > *Triticum aestivum* > Methotrexate > *Triticum durum* > Laetrile > *Triticum dicoccum*.

The anticancer activity of the Abscisic acid may be probably due to production hyperpolarization condition on plasma membrane through a decrease of intracellular Na+ and K+. Such phenomenon is produced in cancer cells by mediation of ion channel and activation of the signaling g-protein pathway. Abscisic acid aborting sustained depolarization in malignant tissue may produce a change in the configurational state of cell from damage to a normal state. Additionally, a positive polarization of hCG outer layer accomplished through a removal of electrons will permit immune system cells coming close to cancer cells for destruction.

The results revealed that *Triticum aestivum* contained the highest amount of Abscisic Acid and possess the highest cytotoxic activity in MTT assay.

The results of the clinical study indicated that wheat grass tablets may be one of the effective supportive treatments for leukemia in term of reducing the adverse event and improving the patient lifestyle. It was found that the wheat grass tablets helped to produce healthier blood levels while receiving the chemotherapy thus decreasing the need for blood building medications.