Abstract

Thesis Title: **Studies on Antioxidants and Antimetastatic Components from Spices Against Cancer**

Cancer is a complex multi-step disease, rising constantly in both developing and developed countries leading to mortality. Developing a strategy for cancer therapy has been difficult since cancer cell poses lots of challenges to normal cells by self-regulating their survival and dysregulating normal cellular action. Antioxidants, quenchers of free radicals - that initiates cancer, chemo/radio therapeutics, that inhibit proliferative cancer cell, surgery/immuno therapies that envisage the removal of the affected tissue/cell, have been in practice for cancer therapy; yet cancer cells find their way successful due the limitations encountered in these therapies such as lack of discrimination between cancer cell and a normal cell. Current thesis entitled “**Studies on Antioxidants and Antimetastatic Components from Spices Against Cancer**” explores the possibility of dietary antioxidants and antimetastatic polysaccharides that can effectively bring down oxidative stress and target galectin-3, a key molecule in metastasis causing severity of cancer pathogenicity and death as revealed in scheme - 1. During the study, potential water soluble antioxidants and antimetastatic polysaccharides from Black cumin – BC - *Nigella Sativa* and Swallow root – SR- *Decalepis hamiltonii* have been identified, characterized and determined their efficacy *in vitro* and *in vivo*. Results indicated tannic acid and gentisic acid followed by gallic, protocatechuic, and vanillic acid as major multi-potent antioxidants in BC and SR respectively. SR also found to contain higher levels of 2-Hydroxy-4-methoxybenzaldehyde (HMBA) but contributing little to the activity. A potent galectin-3 inhibitory pectic polysaccharide was also identified in SR - SRPP and structure – function analysis reveal the presence of higher levels of galactose and arabinose and
their probable contribution to antimetastatic potency. Antioxidants of BC and SR and antimitastatic SRPP was effective in inhibiting Reactive oxygen species - mediated hepatotoxicity/cervical cancer and B16F10 melanoma cells induced lung metastasis in vivo, suggesting their in vivo efficacy against cancer. Overall data thus suggest that selected sources have both antioxidants and antimitastatic components that can effectively inhibit cancer spread/metastasis (Scheme-1).

Scheme-1: Cancer process with initiation, transformation, upregulation of galectin-3, initiation of interaction between cancer cell and normal cell leading to cancer spread / metastasis; Potent blockade by dietary antioxidants and antimitastatic components