4. WORK PLAN AND METHODOLOGY

WORK PLAN:
1) Extraction of natural polysaccharides from plant or animal sources and their characterization etc.
2) Screening of natural polysaccharides for interaction with other polymers using various methods like, IR analysis, DSC analysis etc.
3) Preparation of modified polysaccharides and their characterization.
4) Preparation, evaluation and selection of hydrogel or interpolymer complexes (IPC) of natural polysaccharides cross-linked with other polymers.
5) Formulation and optimization of various oral delivery systems using IPC for targeting drug to colon.
6) To study *in vitro* release characteristics from the formulated oral dosage form either in presence or absence of rat caecal content.
7) To study *in vivo* performance of selected dosage forms in rats.

METHODOLOGY:
1) *Extraction and characterization of natural polysaccharides from plant sources:* The polysaccharides will be extracted from various plant species as per literature. The extracted gums will be characterized as per the method specified in Indian Pharmacopoeia.
2) *Preparation and Characterization of modified polysaccharides:* After characterization, the gums will be modified to prepare its various derivatives like acrylation, carboxymethyl or carbamoylethyl derivative etc. The modified gums will be characterized by employing DSC analysis, IR spectroscopy, etc.
3) *Preparation, evaluation and selection of interpolymer complexes (IPC) of natural polysaccharides (either alone or in modified form) cross-linked with other polymers:* The modified or unmodified and characterized polysaccharides will be interacted with other polymers in various ratios. The optimum ratio at which maximum interaction occurs will be obtained using various methods like Viscosity estimation, DSC analysis, IR spectroscopy.
4) *Formulation optimization of oral delivery system using IPC for transporting drug to colon:* The dosage form will be developed using IPC containing drugs used for the treatment of colon disease, like tablets, nanoparticles or microspheres.
5) To study *in vitro* release characteristics from the formulated oral dosage form either in presence or absence of rat caecal content: The *in vitro* drug release from dosage form will be determined in different pH mediums like pH 1.2, 6.4 and 7.8 buffers either in presence or absence of rat caecal content.

6) To study *in vivo* performance of dosage form in rats: The selected dosage form will be subjected to pharmacokinetics as well as pharmacodynamics investigation. It will be done by ingesting the drug through oral route to a group of six rats or mice. The animal will then be dissected to recover the drug. In case of the pharmacodynamic studies, the disease will be induced in the animals like rat or mice by different pharmacological models. The disease will then be treated by using the optimized dosage form.