INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title	:	Synthesis and physical studies of 2-aminopyrimidine and uracil derivatives as nucleobase analogues and oligonucleotides
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SHORT ABSTRACT

Modified nucleic acids or nucleobases have been reported for various biological applications such as gene target, gene silencing, efficient DNA-protein interaction and drugs. This thesis is mainly emphasis the synthesis and development of modified pyrimidine nucleobases. Here we have developed synthetic methods for pyrimidine nucleobase analogues using microwave condition in short time with simple precursors. The base-pairing interactions of modified nucleobases with natural nucleobases were efficiently studied through co-crystal structures. The co-crystals were formed by Watson-Crick and Hoogsteen hydrogen bonds similar to natural base pairs. Such co-crystals of free nucleobases are very rare. Fluorescence property of modified pyrimidines was explored by various studies and the detection of metal ion (Pd) contamination was performed through fluorescence titration. Self-assembly of modified pyrimidine was established through crystal structures, AFM and DSC experiments. We have also demonstrated the synthesis of modified peptide nucleic acid by solid phase peptide synthesis.