

Contents

Contents	vii
List of Figures	ix
List of Tables	x
1 Introduction	1
1.1 Central Dogma(view) of Molecular Biology	1
1.1.1 DNA (Deoxyribonucleic Acid)	1
1.1.2 RNA (Ribonucleic Acid)	2
1.1.3 Transcription	3
1.1.4 Translation	5
1.2 Organisms and their habitats	8
1.2.1 Mesophiles	8
1.2.2 Thermophiles	8
1.2.3 Psychrophiles	9
2 Effect of environmental factors on amino acid composition of protein	10
2.1 Thermostability	10
2.2 Adaptations at proteome level	10
2.3 Adaptations at genome(DNA) level	11
3 Our Work	12
3.1 Data collection	12
3.2 Computation of proteome sequences and intragenic regions	12
3.3 Analysis of proteome sequences and intragenic regions	14
4 Results and Analysis	15
4.1 Dataset Used	15
4.1.1 Datasets used in the study of proteomes	15

4.1.2	Datasets used in the study of RDF	17
4.2	Results and Analysis	18
4.2.1	Results of analysis of proteome sequences	18
4.2.2	Result of analysis of RDF values of intragenic regions . . .	20
5	Conclusion and future work	21
	Bibliography	22

List of Figures

1.1	Central Dogma of Molecular Biology(initial statement) [15]	1
1.2	Central Dogma of Molecular Biology(extended statement) [15] . .	1
1.3	Watson and Crick model of DNA double helix [10]	2
1.4	Process of Transcription in bacteria	3
1.5	Example of Transcription	4
1.6	Example of Translation	5
1.7	Genetic Code Table [6]	6
1.8	Structure of tRNA	7
3.1	Boxplot definition	14
4.1	Figure showing percentage of usage of amino acids, Glutamine and Glutamate. Boxplot represents mesophiles, thermophiles and psychrophiles from left to right	18
4.2	Figure showing percentage of usage of amino acids, Valine and Tyrosine. Boxplot represents mesophiles, thermophiles and psychrophiles from left to right	19
4.3	Boxplots showing relative dinucleotide frequencies. A sixteen panel figure is presented here showing box-plots for the sixteen di-nucleotides.Boxplot represents nonthermophiles and thermophiles from left to right.	20

List of Tables

4.1	List of Psychrophiles used in the study of proteome sequence . . .	15
4.2	List of Mesophiles used in the study of proteome sequence	16
4.3	List of Thermophiles used in the study of proteome sequence . . .	17
4.4	List of Mesophiles used in the study of RDF	17
4.5	List of Thermophiles used in the study of RDF	18