LIST OF FIGURES

Figure No.	Title	Page no.
2.1	Total disease burden by cause in World	8
2.2	Disease burden by NCD in World	8
2.3	Total disease burden by cause in India	9
2.4	Disease burden by NCD in India	9
2.5	Neurodevelopmental disorder by type, World	10
2.6	Distribution of various mental morbidities among males and females	12
2.7	Mental morbidity rate across various age groups	13
2.8	Region wise cases of depressive disorders	14
2.9	Share of people with depression across world and India	15
2.10	DALYs relative to depressive disorders across Indian states in 2017	17
2.11	State wise crude prevalence of depressive disorders in India	18
2.12	Number of people with depression, World 2017	19
2.13	Number of people with depression, India	19
2.14	Prevalence of depressive disorders by WHO region	20
2.15	Hippocrates, *De Humorous*, 1525. Courtesy National Library of Medicine	21
2.16	The Anatomy of Melancholy	22
2.17	A PET scan comparing brain activity during periods of depression (left) with normal brain activity	31
2.18	Life on Earth – A chronological history	32
2.19	Use of microbes in ancient civilizations	33
2.20	The visualization of microbes	34

2.21	The real you with the visible and invisible constituents	35
2.22	Prominent Bacterial population within the human gut	36
2.23	Microbial diversity (good and bad) in human gut	36
2.24	Stages of microbial colonization of the infant and child intestine	37
2.25	Overview of the basic anatomy and functions of the vagus nerve	43
2.26	Potential mechanism of inflammatory cytokine effects on brain monoamine, glutamate and BDNF neurotransmitter	50
2.27	Diverse mechanisms likely to drive probiotic benefits to host health	53
2.28	Growth curve of a bacterial culture	61
2.29	Psychobiotics strategy in gut brain axis	66
4.1	Experimental design for the study: 'Role of Fructooligosaccharide, Buttermilk and Biogenic metabolites released from fermented beverage (Ambil) as a communicator between gut and brain'	73
4.2	Location of the study area	75
4.3	Experimental design for randomized control trial	81
4.4	Serial Dilution technique along with steps of Inoculation and Incubation	84
5.1.1	Retention time and peak of standards	95
5.1.2	Retention time and peak of Ambil	96
5.2.1	Percentage presence of depression levels in screened subjects according to Beck's Depression Inventory	99
5.2.2	Frequency of consumption of probiotics and prebiotic foods	103
5.2.3	Percent prevalence of medical complications among normal, mild to moderately depressed	106

5.2.4	Defecation pattern according to score analysis in normal, mild to moderate and severely depressed subjects	108
5.3.1	Log count of gut microbiota *Lactobacillus, Bifidobacterium* and *E. coli* before and after ambil supplementation	115
5.3.2	Changes in mean values of depression scores and blood serum cortisol post ambil supplementation	115
5.3.3	Percentage improvement in constipation post ambil supplementation	115
5.4.1	Log count of gut microbiota *Lactobacillus, Bifidobacterium and E. coli* before and after fructooligosaccharide supplementation	119
5.4.2	Changes in mean values of depression scores and blood serum cortisol post fructooligosaccharide supplementation	119
5.4.3	Percentage improvement in stool frequency post fructooligosaccharide supplementation	119
5.5.1	Log count of gut microbiota *Lactobacillus, Bifidobacterium and E. coli* before and after fresh buttermilk supplementation	123
5.5.2	Changes in mean values of depression scores and blood serum cortisol post fresh buttermilk supplementation	123
5.5.3	Percentage improvement in stool frequency post buttermilk tetra packed supplementation	123
5.6.1	Log count of gut microbiota *Lactobacillus, Bifidobacterium* and *E. coli* before and after tetrapacked buttermilk supplementation	127
5.6.2	Changes in mean values of depression scores and blood serum cortisol post tetrapacked buttermilk supplementation	127
5.6.3	Percentage improvement in stool frequency post buttermilk tetra packed supplementation	127
5.7.1	Range wise effectiveness of different supplementation products on mean depression scores	132

5.7.2	Percentage difference in mean depression scores post intervention with different supplementation	132
5.7.3	Range wise effectiveness of different supplementation products on mean blood serum cortisol	133
5.7.4	Percentage difference in mean blood serum cortisol post intervention with different supplementation	133
5.7.5	Range wise effectiveness of different supplementation products on mean log count of fecal *Lactobacillus*	134
5.7.6	Percentage difference in mean *Lactobacillus* count post intervention with different supplementation	134
5.7.7	Range wise effectiveness of different supplementation products on mean log count of fecal *Bifidobacteria*	135
5.7.8	Percentage difference in mean *Bifidobacteria* count post intervention with different supplementation	135
5.7.9	Range wise effectiveness of different supplementation products on mean log count of fecal *E.coli*	136
5.7.10	Percentage difference in mean *E.coli* count post intervention with different supplementation	136