PREFACE

There is continual need for great emphasis to be placed on the causes, prevention and treatment of foodborne diseases. Of the greatest interest is the foodborne diseases caused by microorganisms. The major microorganisms that cause foodborne diseases are viruses, bacteria, fungi and parasites. As a result of the wide spread nature of foodborne diseases they have become an increasing Public Health Problem in developed and developing countries.

The parasites of importance in the transmission of food borne are Cryptosporidium, Giardia, Cyclosporia, Toxoplasma, Sarcocysts spp. Microsporidia, Trematodes, Cestodes, Nematodes and Entamoeba histolytica. Food borne diseases are caused by eating or drinking food contaminated by bacteria, viruses, parasites and fungi. Harmful chemicals also cause foodborne diseases if they contaminate foods while they are being harvested or during processing.

Most foodborne diseases are rarely diagnosed because they have mild effects. Microorganism and their toxins play a prominent role in foodborne diseases. Mycotoxins are metabolites of biological origin. They occur regularly in the world wide food supplies due to mold infestation of susceptible agricultural products such as cereals, grains, nuts and fruits. The six major mycotoxins of importance to man are: aflatoxins, Ochratoxins, Citrinin, Ergot Alkaloids, Patulin and Fusarium toxins.

Mushrooms and their toxins are not considered to be microbial. However, because of their classification as fungi, they require notable mention. Mushroom toxins are very potent and result in rapid death. It is therefore important that edible mushrooms are expertly identified or grown agriculturally where experts are readily available. Wild poisonous mushrooms are sometimes morphologically similar to edible mushrooms. Hence, there is an inherent danger in the consumption of mushrooms.

For every foodborne disease there is a causal organism, along with techniques for identification and diagnostic treatments to prevent the spread of the disease. They are also treatment plans that include medication. Despite the availability of approved methods, variability in sampling and testing procedures present difficulties for precise determinations. There still a need for efficient, cost effective sampling and analysis methods that can be used in laboratories. Instead of PCR, microbial DNA can be detected in foods using FTIR infrared spectroscopy. The preparation of food extracts is desirable for the detection of microbial DNA using FTIR infrared spectroscopy. It might

be possible to detect mycotoxins in in food using FTIR infrared spectroscopy of food extracts. A possible extraction procedure is outli8ned in the book. The proposed "new" methods outlined in the book are cost effective, and simple to use once elucidated. It might also be possible to use the same extracts for the detection of microbial DNA using FTIR infrared spectroscopy.

The identification of parasites in stool via light microscopy –both modified and simple-is an important technique for diagnosis. However, in the case of cestodes, nematodes, trematodes and microsporidia where species are determined to be morphologically similar by light microscopy it might be possible to use Scanning Electron Microscopy of prepared slides or paper strips to reveal morphological differences.

All countries, developing and developed should have an agency for monitoring food and food products, recording incidences of foodborne diseases, educating their population of the importance of proper food preparation and storage, adequate hygiene, and the importance of available vaccines. It should be noted that almost all foods consume by humans can be subjected to microorganisms that can cause foodborne diseases. Some foodborne diseases are very fatal and others are asymptomatic.

This book is written for the interest of Microbiology students, Professors and members of the health profession. It outlines all the microorganisms of the major groups that cause foodborne diseases in man and animals. It also mentions the preventative measures and up to date treatments. Possible research areas are outlined.

Dr. Earl Anthony Sealy

BSc (Biology and Chemistry- Honors) MSc. (Science Education) PhD-Biology Formerly of Lynn University, College of Arts and Science, 3601 N Military Trail, Boca Raton, Florida, U.S.A.

Contents			
S. No.	CHAPTER	PAGES	
1	Introduction	7	
2	Bacteria in Foodborne Disease	8	
	Yersinia entercolitica	8	
	Vibrio vulnificus	9	
	Staphylococcus aureus	10	
	Campylobacter	11	
	Listeria monocytogens	12	
	Salmonella	13	
	Shigella	14	
	Escherichia coli 0157:H7	15	
	Clostridium botulinum	15	
	Clostridium perfringens	16	
	Bacillus cereus	17	
	Brucella	17	
3	Viruses in Foodborne Disease	19	
	Noraviruses	19	
	Hepatitis A Virus (HAV)	20	
	Hepatitis E Virus (HEV)	21	
	Rotaviruses	23	
	Astroviruses	25	
4	Fungi in Foodborne Disease	27	
	Fusarium	27	
	Claviceps	28	
	Aspergillus	29	
	Penicilium	29	
	Symptoms of Fungal Food Poisoning	29	
5	Mycotoxins	31	
	Aflatoxins	31	
	Ochratoxins	32	
	Citrinin	33	
	Ergot Alkaloids	33	
	Fusarium Toxins	34	
	Trichothecenes	35	
	Zearalenone	37	
	Fumonisms	38	
	Prevention and Control of Mycotoxin in Stored Grains and Seeds	41	
	Drying the Grain	41	
	Avoid Grain Damage	41	
	Ensure Proper Storage Conditions	42	
	Detecting Mycotoxins	43	
6	Mushroom Poisoning		
	Mushroom Toxins and Symptoms	45	
	Alpha-amanitin	45	
	Orellanine	45	
	Muscarine	45	
	Gyromitrin	46	
	Coprine	46	
	Ibotenic Acid	46	
	Psilocybin	47	
	Arabitol	47	
7	Parasites in Foodborne Disease	48	
	Cryptosporidium	48	
	Giardia	51	
	Cyclosporia	54	

		Toxoplasma	55
		Sarcocysts spp	57
		Microsporidia	57
8	Trematodes		59
		Faciola hepatica	59
		Clonorchis, Sinensis, Opisthorichis, Virverrini, and	60
		Opisthorichis felineus	
		Heterophyes heterophyes, and Metagonimus	60
		yokogawai	
		Paragonimus spp	61
		Echinostroma spp. And Echistroma spp	61
9	Cestodes		
		Taenia solium (Pork Tapeworm)	63
		Taenia saginata (Beef Tapeworm)	64
		Diphyllobothrium latum (Fish Tapeworm)	65
		Echinococcus spp	65
		Echinococcus granulosus	65
		Echinococcus multilocularis	67
10	Nematodes		70
		Trichinella spp	70
		Enterobius vermicularis (Pinworm)	72
		Trichuris trichiura (Whipworm)	73
		Capillaria philippinensis	74
		Gnathostroma spingerum	74
		Pseudoterranova decipiens	74
		Parastrongylus spp	75
11	Entamoeba histolytica		
	Conclusion		78
	References		83