

DEDICATION

*To my lovely wife **Zienab** and my daughter **Jumana** and my grand family.*

Acknowledgments

I would like to express my deepest thanks and gratitude to Prof. Samir Yanni Mishrigi for his supervision and advice. Also I would like to extend my sincere thanks to Dr. Mohd. Tag El-Din (Sudan University), Dr. Muzzamil Ata (Juba University), Dr. Adel Moneium Khlid (Fisheries Research Centre), Dr. Hatim Idress (Sinar University) and all my colleagues in Sudan University Science and Technology and college of Veterinary Medicine and Animal Production for their support, assistance and encouragement.