RESEARCH

(i) Dissertation and Thesis

1. The use of the gum obtained from *Cerathotheca sesamoides* Endl Pedaliaceae as a binder in chloroquine phosphate tablets [B. Pharm., 1995]
2. Spectrophotometric determination of aspirin using Diazotized 4-amino-3,5-dinitrobenzoic acid [M.Sc., 1999]
3. Novel colorimetric assays of some selected pharmaceutical phenol ethers using 4-Carboxyl-2,6-dinitrobenzene diazonium ion (CDNBD) [Ph.D., 2005]

(ii) Research completed

1. The use of the gum obtained from *Cerathotheca sesamoides* Endl Pedaliaceae as a binder in chloroquine phosphate tablets (B. Pharm, 1995)
2. Spectrophotometric determination of aspirin using Diazotized 4-amino-3,5-dinitrobenzoic acid (M.Sc., 1999)
3. Comparative analysis of brands of Sulphadoxine-Pyrimethamine tablets
4. Determination of physicochemical properties of Halofantrine
5. Colorimetric Assay of propranolol by derivatization: Novel application of diazotized 4-amino-3, 5-dinitrobenzoic acid (ADBA)
6. Physicochemical properties of pyronaridine-a new antimalarial
7. Novel colorimetric assays of some selected pharmaceutical phenol ethers using 4-Carboxyl-2,6-dinitrobenzene diazonium ion (CDNBD) Ph.D. Thesis

(iii) Research in progress

1. Determination of the physicochemical properties of some important drugs and relationship to their biological activities
2. Synthesis, isolation, purification and characterization of novel 4-Carboxyl-2,6-dinitrobenzene diazonium ion (CDNBD)-derived azo dyes
3. Evaluation of CDNBD as a precolumn derivatizing reagent for HPLC analysis of some clinically useful drugs
4. Chromatographic separations and isolation of some bioactive principles from medicinal plants
5. Application of charge transfer techniques for the analysis of drugs

6. Studies on structure-spectra relationships of 4-carboxyl-2,6-dinitrophenylazohydroxynaphthalenes
7. Development of 4-carboxyl-2,6-dinitrophenylazo hydroxynaphthalenes as non-toxic azo dyes
8. Antimicrobial activities of novel azo dye series based on 4-carboxyl-2,6-dintrophenylazohydronaphthalene skeleton
9. Development and assessment of new acid-base and metallochromic indicators based on sulfonated amino-naphthol skeletons
10. Impurities profiling of antibiotic preparations
11. Development of novel colorimetric chemosensors for environmental pollutants
12. Evaluation of pharmacopoeial compliance of marketed drugs in Southwest Nigeria
13. Synthesis and evaluation of new charge transfer reagents for analysis of pharmaceuticals
14. Design and development of novel azo dyes as non-genotoxic food colourants

RESEARCH FOCUS

My primary area of research is analytical method development using three main derivatization methodologies; azo dye formation, Schiff base synthesis and organic charge transfer techniques. Methods based on UV-VIS spectroscopy have been well developed with current extension to precolumn derivatization for chromatographic analyses. The applications of 4-carboxyl-2,6-dinitrobenzene diazonium (CDNBD) ion as a derivatizing reagent have produced methods based on simple and validated spectrophotometric determination of pharmaceuticals of varied skeletons such as secondary amines, reactive methylene centres and phenol ethers. Applications of CDNBD as a chromophoric labeling reagent for reactive methylene centres and phenol ethers represent ***novel contributions*** to spectrophotometric assays as other diazonium ions do not readily react with these skeletons. The application of the reagent has yielded the synthesis of four novel azo dyes which possess the phenylazohydroxynaphthalene skeleton similar to approved colorants. These dyes have been characterized and details of their properties are reported. The dyes are also potential anti-MRSA agents. CDNBD has also been extended as a precolumn derivatization reagent for the artemisinin derivatives. A novel study in the azo dye derivatization technique was the application of *para*-dimethylaminobenzaldehyde (DMAB) as a coupling component for the analysis of diazotized skeletons for the ***first*** time. DMAB has also been used as a Schiff base reagent, oxidizing agent and reducing agent for the spectrophotometric analysis of pharmaceuticals. The application of DMAB alongside other aldehydes is currently being pursued for the design, synthesis and characterizations of novel Schiff bases for monitoring environmental pollutants. Further derivatization methodology adopted organic charge transfer reactions with chloranilic acid as charge acceptor. Various equations for the physicochemical characterizations of the formed charge-transfer complexes have been applied and these established the superiority of the new methods. In particular, the use of room temperature metal hydride reductions for nitroimidazoles prior to charge-transfer complexation was ***first reported*** by my group.

Recognizing that the physicochemical properties of drugs play an important role in disposition within the body and eventual pharmacological activity, physicochemical characterization of halofantrine and pyronaridine have been carried out using various spectrophotometric and chromatographic parameters. The physicochemical parameters generated were at variance with that reported in literature inserts emphasizing adequate post-marketing surveillance.

As collaborative efforts, I have contributed to ensuring the safety and efficacy of multisource (generic) drugs and the results have been published. The need to adequately control diet before medication has also been reported for diclofenac following co-administration with a natural fruit juice.

The need to investigate folkloric claims of medicinal plants has been carried out with the plant *Cnestis ferruginea* (de Candolle). The acute and chronic toxicities of crude extracts and purified chromatographic fractions as well as its anti-reproductive effects have been studied. These studies have also been conducted for *Portulaca oleracea*.