Summary

The principal aim of the present study is to shed light on various kinds of coupling reactions for phenolic nature compounds, such as diazotization - coupling reactions and azo dyes formation and oxidation reactions of di (OR) groups compounds (R=H, CH_3 , C_2H_5 ....) and coupling of their oxidative product (ortho, meta or para - benzoquinone) with primary aromatic amines and indophenol dyes formation by oxidative - coupling reactions . This study also includes oxidation reaction and hydrolysis of oxidative product of p-phenylene diamine and coupling with phenolic compounds and indoaniline dyes formation. Lastly, antipyrine coupling reactions companed with condensation reactions are applied to form antipyrine dyes .

Different spectrophotometric studies have been carried out to determine suitable circumstances of these reactions and the factors which affect them, such a study as that of the effect of the substituting groups , environment and the stability of the products which comprise various dyes that have so many advantages in many fields . Suitable circumstances of these reactions are determined in order to benefit of their stable coloured products in the precise spectrophotometric analysis of some phenolic nature compounds found in the biological medium and pharmaceutical preparations such as salicylic acid and its derivatives , adrenaline and amoxycillin.

Azo dyes formation method was applied for salicylic acid analysis by its coupling with diazoniun salts prepared from p-nitro aniline (PNA), Sulfanilic acid (p-sulfo aniline) (PSA), p-amino acetophenone (p-Acetyl aniline) (PAA), 1-Naphthyl amine (1NPA) and p-hydroxy aniline (PHA) with (100.17 - 100.58) % and (99.96 - 100.03)% recoveries. The recoveries of adrenaline are about (100.06 - 103.26)% by applying the same method for adrenaline coupling with p-nitro benzene diazonium chloride and about (96.46 - 100.12)% and (100.27 - 101.93)% by applying indophenol dyes and indoaniline dyes formation methods respectively. Antipyrine dyes formation method was applied for amoxycillin analysis in pure solutions and dosage forms with (99.05 - 100.06)% recoveries.

This study also includes a design of a developed galvanic cell for second derivatives differential potentiometric analysis which is used successfully to chloride ion analysis in pure solutions with (99.85 - 101.63)% recoveries for (10 - 200) ppm and in different samples of tap water , urine and pharmaceutical preparations with (99.97 - 100.33)% recoveries by using a pair of identical silver electrodes (Ag/Ag^{+}) as indicator electrodes . This method also is applied to salicylic acid analysis in its pure solutions and some pharmaceuticals by using a pair of identical antimony - antimony oxide electrodes ($Sb/Sb_2O_3(s) / OH^{-}$) as indicator electrodes with (99.73 - 104.99)% recoveries for (20 - 300) ppm . The results are compared with the results of common methods and it has been found that there is no difference in accuracy, selectivity , and speed in addition to the new method invented for the first time .

It is concluded from this study how to determine the phenolic compound suitable to every coupling reaction and the ability of using it for certain purposes such as biological selective electrodes preparation and developing of second derivative potentiometric analysis cell and its applications in different fields.