

Cassia grandis a simple and affordable source as a Natural Indicator for Acid-Base Titration.

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Abstract:

In most of the acid-base titrations indicator is used of synthetic. These synthetic indicators are prepared from various types of chemicals. The preparation process for synthetic reagents causes hazardous effects on the environment. Now a days environmental awareness is increased and worldwide researchers are finding eco-friendly alternatives for the synthetic chemical reagent. In this work natural indicators are prepared from flowers of *Cassia grandis*, this indicator gives very sharp color change at the equivalence point of the acid-base titration. The whole process for this natural indicator is eco-friendly, economically cheap and materials for process are easily available.

Key Words: *Cassia grandis*, Acid base titrations, indicators.

Introduction:

In 1964 Robert Boyle gave the information on the uses of natural indicator in acid-base titration in his book 'Experimental History of colors'. Colorant extraction of the various plant materials has ability to change their color in acidic or basic solution. Due to the presence of organic pigment like Anthocyanins gives different types of color to the parts of the plant and this color is changes with pH.[1-2]

To determine the unknown concentration of solution by treating with exact known concentration of another solution, this method is called titrimetric analysis. There are various type of the titrations such as acid-base titration, redox titration, complexometric titration and precipitation titration in titrimetric analysis. At the end point of titration analysis is determined by using reagent which changes the color at this changes the color at this stages is known as indicator. In acid-base titrations usually pH indicators are use, which are weak organic acids or bases. It shows the color change at different pH range of the solution. Some standard indicators use such as phenolphthalein, methyl red and methyl orange. [3-5]

Flowers of *cassia grandis* used for preparation of natural indicator, this plant are belongs to fabaceae family. It is ornamental plant. The color of flowers are pink. It is also known as pink shower tree. The genus *cassia* plants contains flavanoids chemical constituent which are pH sensitive, show color change at acidic or basic solution. Using this natural indicator, can be made pH paper alternative for litmus paper. Preparation of such type of Natural indicators we have been reported earlier. [6-7]

Material and Methods

Fresh flowers of *cassia grandis* were collected from the local gardens of Kolhapur regions, Maharashtra, and they were authenticated from R. C. Shahu college botany department, Kolhapur. All other ingredients were of analytical grade and purchased from Loba Chemie Pvt Ltd, Mumbai. Reagents and volumetric solutions were prepared as per standard books[8-9]. The flowers were cleaned by distilled water and Petals cut into small pieces and macerated for 20 min. in 25ml of water. The extract was preserved in tight closed container and stored away from direct sun light. The experiment was carried by using the same set of glassware's for all types of titrations. As the same aliquots were used for both titrations i.e. titrations by using standard indicators and flowers extract, the reagents were not calibrated. The equimolar titrations were performed using 25 ml of Titrant with three drops of indicator. All the parameters used for Analysis and the Comparison of Color Change are given in Table 1. A set of three experiments each for all the types of acid base titrations were carried out. The mean and standard deviation for each type of acid base titrations were calculated from results obtained.

Titration

The developed indicator tested for all three types of acid base titration viz. strong acid vs. strong base (HCl Vs NaOH), weak acid vs. strong base (CH₃COOH Vs NaOH) and strong acid vs. weak base (HCl Vs. NH₄OH). The sharp end point was observed for all types.