

ADSORPTION STUDY OF BETACYANIN ON FIBRE

P.S.K. Manpreet^a, A.M.M. Sakinah^{a,b*}, A.W. Zularisam^b

^aFaculty of Chemical & Natural Resources Engineering
University Malaysia Pahang, Tun Razak Highway, 26300 Kuantan, Pahang, MALAYSIA.

^bFaculty of Engineering Technology
University Malaysia Pahang, Tun Razak Highway, 26300 Kuantan, Pahang, MALAYSIA

ABSTRACT

The usage of synthetic dye in food and textile industries has generally shown some threatens to the environment and also human. Since then, natural dye has been introduced as an alternative and recently, research in extracting dye from natural fruit is being done in a large scale. In this research experiment, pitaya's waste was selected as a source for natural dye. However, since pitaya has high viscosity as one of the properties, it has difficulty to fast on the cloth in textile industries. The ratio of pitaya waste and water is also not known to ensure maximum adsorption on the cloth. In order to tackle this problem, this research will be carried out by using mordant named aluminium sulphate to pretreat the fibres before the dyeing process to ensure the dye fasts on the cloth effectively. Experiments will be conducted to determine the adsorption level by using spectrophotometer and calculations for maximum adsorption will also be done using adsorption isotherm. This experiment was carried out by chemical mechanism. Chemical mechanism refers to solvent extraction using water to extract the dye from the fruit's peel, the usage of mordant on fabric and also the different concentration of the dye due to the ratio of pitaya waste and water. Three different factors that will be studied in this research, namely, the rate of adsorption on fibre using various dye concentrations, the effectiveness of adsorption on different types of fabric and the length of time required for the process of adsorption on the fabric. Basically, the adsorption process increases with the increase of dye concentration and cotton fabric has the highest adsorption effectiveness, followed by polyester fabric and finally chiffon fabric because of the different fastening level on the fabrics. The time required for the process of adsorption on the fabric increases in the same order due to the ability of the fabric to adsorb dye onto the fabric.

Key words: natural dye, adsorption, pitaya waste, fabric

INTRODUCTION

The usage of synthetic dye in food and textile industries has generally shown some threatens to the environment and also human by causing environmental and health problem. Most of them contain a high content of toxic material and this constitutes a serious hazard for human and aquatic animals (Alver et al., 2012). Since then, natural dye has been introduced as an alternative and recently, research in extracting dye from natural fruit is being done in a large scale.

To overcome the consequences of using synthetic dye, natural dye is used as an alternative in textile, food processing, and dye manufacturing industries. Pitaya waste, one of the many natural dyeing source existing currently drew much attention of worldwide researchers, not only because of their red-purple color as natural dye, but also for phenolic and flavonoids contents in pitaya waste which have potential health benefits (Lee, 2009).