CHAPTER 3
MATERIALS AND METHOD

3.0 Introduction

This chapter explains the materials and equipment that are used in the experiment of this research and provides discussion to the method used for preparation of natural dye solution, the yarns pre-mordanting process, and the process of dye adsorption onto yarns.

3.1 Raw Materials

Dragon fruits (Hylocereus polyrhizus) were obtained from Gambang, Pahang. The fruits was cut and cleaned, and peeled. The small cuts of dragon fruits peels were stored at -20°C in properly sealed plastics and containers to avoid oxidation. Alum (potassium aluminium sulphate) was bought from Sigma Aldrich. Three types of yarns namely polyester cotton, rayon, rayon coolmax were provided by Pusat Tenun Pahang.

3.2 Apparatus

Beakers, test tubes, stainless steel filter, and cuvettes.

3.3 Equipment

Equipment that were used in the experiment are;

3.3.1 Eppendorf 5810R Centrifuge

Eppendorf 5810R Centrifuge was used to extract the dye solution from peel fibres and mucilaginous material of dragon fruit peel, at 4°C, 10000 rpm for 15 minutes.
3.3.2 *Incubator Shaker KS4000i*

Incubator shaker KS4000i was used to dye fabric yarns with dye stock solution at 100 rpm at room temperature.

3.3.3 *Hitachi U-1800 Spectrophotometer*

Hitachi U-1800 Spectrophotometer was used to analyse the absorbance of dye to the three fabric yarns at 560nm against a blank of deionized water.

3.4 *Overview of Processes*

There are six stages of research methods of this study. At first stage, dragon fruit peel was extracted by using distilled water for pigment recovery and natural dye preparation. The second stage is process of mordanting of each yarn with potassium alum sulphate. The third stage is the determination of equilibrium time of adsorption process, next is dying process with various dilution factors at equilibrium time. The fifth stage is analysis of adsorbed and development of Langmuir and Freundlich isotherm graph as well as error analysis. The sixth stage is the desorption process to determine the wash fastness of dye on yarns. Figure 3.1 shows the flow diagram of research methods.
Figure 3.1: Flow diagram of research methods of adsorption of betacyanin on yarns.