DEVELOPMENT OF BIODEGRADABLE PVA SPONGE INCORPORATED WITH ANTIMICROBIAL AGENT

Deepika. P, Simpana.D.K, Dr. Suneetha T. B.
Dept of Biotechnology,
Acharya Institute of Technology, Bangalore- 560107, Karnataka

ABSTRACT

PolyVinyl Alcohol (PVA) is a synthetic polymer used in wide range of industrial, commercial, agriculture and medical application. It is environmental friendly, water soluble with excellent emulsifying properties. They are biodegradable and hence environmental friendly. The PVA sponges can be produced by using large closed reactors and hence are suitable for mass production. The preparation of the basic PVA solution is by adding the surfactant, catalyst, oxidizing agents, and formaldehyde. For PVA sponges many surfactants and softeners can be incorporated in order to improve its performance. The resultant PVA sponge is open-celled, highly absorbent porous material with good absorption property. The PVA sponge properties are characterized and optimized based on temperature it can withstand, height of the foam, agitation time, pH, pore structure, pore diameter, structure of the pore, chemical composition and antimicrobial activity. This paper refers to the development of PVA sponge incorporated with antimicrobial agents that is degradable which can be used for multiple applications including medical and agricultural applications.

KEYWORDS: polyvinyl alcohol, biodegradable, antimicrobial agents.

INTRODUCTION

Polyvinyl alcohol (PVA) sponge is a synthetic sponge essentially consisting of Polyvinyl Alcohol. It is an open celled, highly adsorbent porous material that wicks aqueous solutions quickly. It is compressible when dry, expandable when wet, has good elongation with excellent resistance to wear and tear.

PVA has low protein adsorption characteristics, better biocompatibility, high water solubility and chemical resistance. PVA, is biodegradable and hence is environmental friendly . PVA decomposes rapidly above 200℃ as it can undergo pyrolysis at high temperature.

The reaction of polymerization takes place between polyvinyl alcohol along with addition of catalyst, surfactants, blowing agent, softeners and curing agent. The formaldehyde employed comprises 37% aqueous solution and when compared to para formaldehyde, formaldehyde can be easily removed from the sponge by washing with water to obtain non-toxic levels of formaldehyde.

Various catalysts have been used in the process namely sulphuric acid, hydrochloric acid, phosphoric acid, nitric acid and formic acid. Surfactant are used to lower the surface tension, generally cationic and non-ionic surfactants are preferred. Other additives are added to increase the foaming height. Finally polyvinyl alcohol acetalised with an acid catalyst.