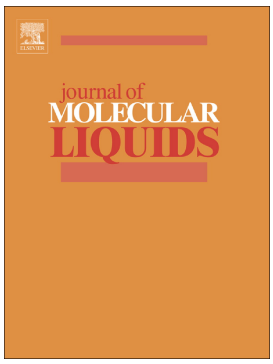

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THERMAL STABILITY OF WATER-SOLUBLE POLYMERS IN SOLUTION

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ABSTRACT

The thermal stability of carboxymethyl cellulose (CMC), kappa carrageenan (KC) and partially hydrolyzed polyacrylamide (HPAM) was evaluated in aqueous solution, by monitoring the viscosity of polymer solutions as a function of aging time at temperatures between 40 and 120°C. The concept of half-life decomposition was used to determine the viscosity decay constant (τ, the time required for the specific viscosity of the solution to fall 1/*e* times the original viscosity) for each polymer, by applying the exponential decay viscosity model. The HPAM exhibited the greatest thermal stability, with τ values of 63.69 and 25.31 days at 80 and 100°C, followed by CMC with τ values of 10.25 and 2.29 days at 80 and 100°C, and KC with τ values of 3.89 and 1.26 days at 80 and 100°C, respectively. The methodology used in this study made it possible to predict the time needed to reach certain levels of viscosity when the polymer solutions are exposed to different temperatures.

*Keywords***:** thermal stability in solution; kappa carrageenan; partially hydrolyzed polyacrylamide; carboxylmethyl cellulose; viscosity decay constant

Declarations of interest: none.

1. Introduction

When water soluble polymers come in contact with water, they dissolve, disperse or swell, thereby modifying the physical properties of aqueous systems. They can be natural or synthetic and generally contain hydrophilic groups in their structure that can be non-ionic, anionic, cationic or amphoteric[1]. Interest in this type of polymer lies primarily in their ability