Biosynthesis of xanthan gum by *Xanthomonas campestris* from nutrients extracted from sugar cane bagass

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Biopolymers, particularly derivatives of agroindustrial residues such as sugarcane bagasse, have emerged in the last decade due to the challenges posed by the traditional use of polymers, which has become a significant environmental concern arising from the sugar and alcohol industry.This convergence of biotechnology and sustainability has gained prominence. The central goal of this study was to evaluate xanthan gum production, with a specific emphasis on comparing sugar consumption to the resultant product during a 5-day cultivation period, and characterizing the gum by determining its viscosimetric molar mass and conducting thermogravimetric analysis. The production process begins with the inoculation of a microorganism *Xanthomonas camprestis* into a sterilized container filled with essential growth nutrients, followed by 24 hours in a shaker. Subsequently, the microorganism is transferred to a sterile cultivation medium and incubated for 120 hours in the shaker, maintaining specific conditions. The culture medium was centrifugated before being mixed with 90% alcohol (3 alcohol:1 culture medium v/v), causing the biopolymer to surface for recovery. The recovered biopolymer was then liophilized using a freeze dryer. The yield of the gum was calculated through precise weighing and sugar content analysis. The biopolymers were characterized by viscometry and thermogravimetry. It was found an average xanthan gum yield of 2.23g/L, in accordance with literature values and a high degree of purity. Analysis of reducing sugar content indicated that available sugar content maximizes gum production within the first three days of cultivation. Viscosimetric molar mass approximated 1,000,000 Da, consistent with literature references, and exhibited expected behavior when exposed to elevated temperatures. The results shown the potential of waste reuse to produce xanthan gum, a widely-used biopolymer in Brazil, reducing the need of traditional source of carbon like sucrose. Future research efforts aim to apply this method on a large scale.

Key words: Xanthan gum; Biopolymers; Bioprocesses.

Biossíntese de goma xantana por *Xanthomonas camprestis* a partir de nutrientes extraídos do bagaço de cana de açúcar
A produção de biopolímeros se mostra uma alternativa sustentável em relação aos polímeros convencionais. Neste trabalho foi utilizado o bagaço da cana de açúcar como fonte de sacarose e nutrientes um subproduto da indústria de açúcar e álcool. Neste contexto, o objetivo deste trabalho foi produzir e caracterizar a goma xantana, buscando otimizar o processo produtivo. Os rendimentos e graus de pureza das gomas obtidas foram similares aos da literatura. Projetos futuros visam estudar a produção de goma xantana em escala piloto.

Palavras-chave: Goma xantana; Biopolímeros; Bioprocessos.

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