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ANTIOXIDANT ACTIVITY OF STREPTOMYCES SPECIES JKCM1

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ABSTRACT

Streptomyces species being the largest members of actinomycetes have been known for their metabolic capacities and form an august source of pharmacologically important compounds. Streptomyces is a genus of high G+C Gram-positive filamentous bacteria belonging to the phylum actinomycetes. Oxygen radicals and other reactive species are generated in biological systems either as by- products of oxygen reduction or by xenobiotic catabolism (Chance.B et al;, 1979). The influences of both the concentration of antioxidant and duration of reaction on the inhibition of the radical cation absorption are takeninto account when determining the antioxidant activity.

KEYWORDS: Streptomyces species, Oxygen radicals, antioxidant and antioxidant activity.

INTRODUCTION

Streptomyces is a genus of high G+C Gram-positive filamentous bacteria belonging to the phylum actinomycetes. A complex life cycle involving the multicellular development into an aerial hyphae that is developed into spores is a special trait of *Streptomyces species* (Ohnish Y et al;,2002). Moreover, they produce various extracellular enzymes that degrade complex biopolymers, such as chitin and lignocellulose. This feature makes them important in the nutrient recycling processes(McCarthy AJ, et al;,1992, Brown ME et al;,2014). Previous studies demonstrated that a variety of Streptomyces inhabit a wide range of plants as either symbionts or parasites(Schrey SD et al;,2008, Pornthip R, et al;,2012).Oxygen radicals and other reactive species are generated in biological systems either as by- products of oxygen reduction or by xenobiotic catabolism(Chance.B et al;,1979). The reactive oxygen species (ROS) such as superoxide anion (O2.), hydroxyl radicals (OH.), nitric oxide (NO) and peroxy radicals (ROO.) are unstable and can attack key biomolecules such as lipids, proteins and

nucleic acids(Badmus JA,et al;,2011). The consequences of oxidation of these biomolecules have been linked to a variety of different human disorders, including atherosclerosis, cancer and disease of the nervous system (Cross CE et al;,1987).

ANTI OXIDANT ACTIVITY

ABTS SCAVENGING RADICAL

The pre-formed radical monocation of 2, 2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid)(ABTS•1) is generated by oxidation of ABTS with potassium persulfate and is reduced in thepresence of such hydrogen-donating antioxidants. The influences of both the concentration ofantioxidant and duration of reaction on the inhibition of the radical cation absorption are takeninto account when determining the antioxidant activity. ABTS solution was prepared bydissolving light green colored ABTS in autoclaved distilled water to reach final concentrationof 7.4mM: 2.46mM potassium persulfate solution was also prepared. Then ABTS·+stocksolution was prepared by mixing the two solutions properly in ratio 1:1 and keeping thesolution in dark for 24 hours. The working solution of ABTS·+ was prepared by diluting thesolution in methanol in ratio 1:25. 1mg/ml extracts in DMSO was prepared. Ascorbic acid wasused as standard and methanol was used as blank. DMSO was used as negative control. To3ml of ABTS·+solution, sample extracts (or ascorbic acid as standard) containing antioxidantwas added at the concentrations 20, 40, 60 and 80 µg/ml and mixed properly for 30 seconds.Absorbance was then measured at 734 nm. (Roberta et al., 1998). The percentage inhibition ofABTS·+ can be calculated using the formula:

$$I_{734} = \left(1 - \frac{A_f}{A_o}\right) \times 100$$

Where, Ao is the absorbance of the radical cation before addition of the sample extracts and Afis the absorbance after addition of sample.

RESULTS

Extract: *Streptomyces species* JKCM1.

Table 1: ABTS Scavenging Radical of *Streptomyces species* JKCM1.

S.No	Sample	Concentration (µg/ml)	% of Inhibition	IC_{50} Value (µg/ml)
1	***Streptomyces species*** JKCM1	5	49.03±0.85	85.51±1.03
		10	53.41±1.06	
		25	59.07±0.96	
		50	66.09±1.21	
		75	78.38±0.82	
		100	94.51±1.34	

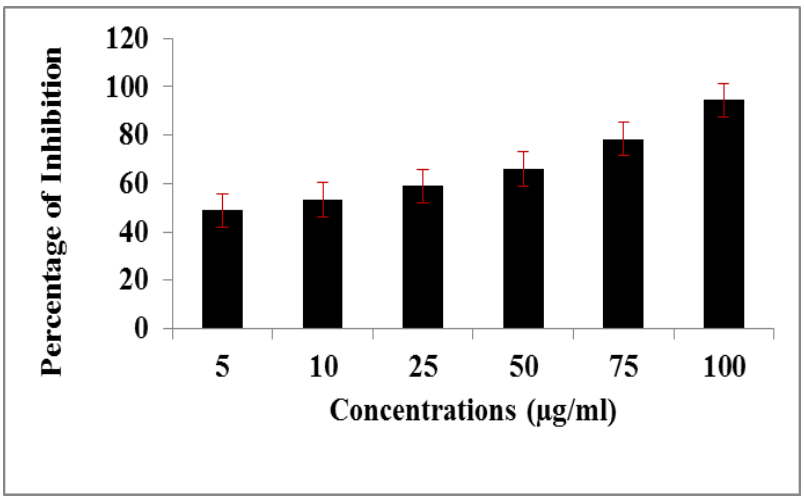

Figure 1: Percentage of *Streptomyces species* JKCM1.

ASCORBIC ACID

Table 2: ABTS Scavenging RadicalAssay of Ascorbic Acid.

S.No	Sample	Concentration (µg/ml)	% of Inhibition	IC_{50} Value (µg/ml)
2	Ascorbic acid	5	35.58±0.96	23.79±0.78
		10	41.79±1.05	
		25	46.17±0.89	
		50	50.85±1.52	
		75	51.79±0.87	
		100	52.39±0.95	

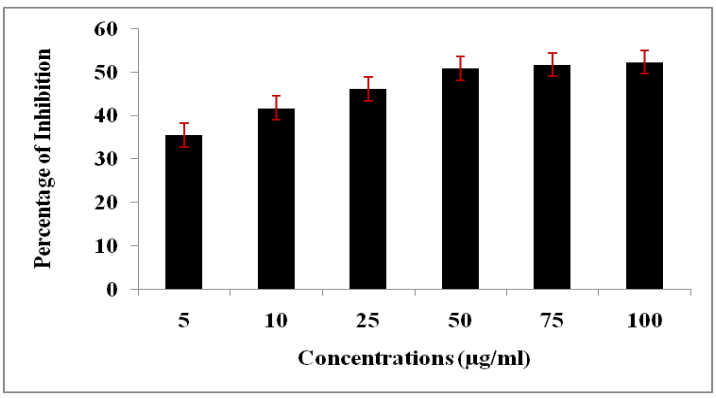

Figure 2: Percentage of Ascorbic Acid.

CONCLUSION

The results of this study indicate that the *Streptomyces species* JKCM1 could be probed further for isolating some medically useful compounds.

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