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# URKUND

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## Urkund Analysis Result

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117

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## Urkund Analysis Result

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 Submitter email: kperumal3@gmail.com  
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## Entire Document

1 Endophytic bacteria associated with an ethnomedicinal plant *Cissus quadrangularis* Linn. – A promising alternative source of bioactive metabolites

41%

**MATCHING BLOCK 1/248**

**SA** D Nagarajan.pdf (D48303010)

Thesis submitted to the University of Madras in partial fulfillment of the Degree of DOCTOR OF PHILOSOPHY (Ph.D.) in MICROBIOLOGY- PLANT BIOLOGY AND PLANT BIOTECHNOLOGY INTERDISCIPLINARY By Mrs. PARVIN ZEENATH ANWAR, M.Sc., M.Phil. Under the guidance of Dr. Mrs. S. UMA GOWRIE, M.Sc., M.Phil., Ph.D.

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**SA** PRIYOM BOSE.pdf (D34839337)

DEPARTMENT OF PLANT BIOLOGY AND PLANT BIOTECHNOLOGY ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS).

Affiliated to the University of Madras, Chennai – 600 008, Tamil Nadu, India, JUNE – 2021

2.1 INTRODUCTION Plants and microorganisms are excellent and rich sources of valuable natural compounds. Natural products from plant and microorganisms possess a wide range of biological activities and are structurally and chemically diverse. Novel bioactive compounds from plants and microorganisms find great potential in medical, agricultural, drug discovery and industrial sectors. Natural bioactive compounds harnessed from biological sources serve as therapeutics which include (but are not limited to) antimicrobial, antioxidants and anticancer agents (Demain, 2014; Chandra et al., 2020). Although plant sources are being largely explored for unearthing of new biologically active chemical compounds, microorganisms are worthwhile in the search for natural bioactive compounds as they can be grown under controlled conditions at a faster rate and is suitable for unhindered large-scale production. Microorganisms also serve as an environment friendly alternative to conserve plant resources (Pham et al., 2019). Bioactive compounds synthesized by microbes are more convenient for use than that of plants. Production of bioactive compounds by the plants suffers problems like heterogeneous quality and insufficient level of productivity. Microorganisms yield primary and secondary metabolites under controlled environmental conditions assuring their maximum efficiency in uniformity and high quality (Sato & Kumagai, 2013). Bioactive compounds such as secondary metabolites synthesized by microorganisms have been extensively used as pharmaceuticals (Elander, 2003; Erdo, 2010; Yoon et al., 2004) as well as in the manufacturing process of therapeutic products (Kirk et al., 2002; Merino & Cherry 2007). Microorganisms are ubiquitous and they are present almost in all living as well as non-living things. Among the biotic factors, plants are a suitable niche for microorganisms. Microorganisms may occupy the surface of the plant as epiphytes or may inhabit intercellularly or intracellularly. The microorganisms that reside within the plants are known as endophytes. Endophytes are closely associated to their respective host plants than the epiphytes or soil microorganisms. Endophytes can be defined as microorganisms that colonize the inner healthy plant tissues and establishes

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for all or part of their life cycle without causing any

disease symptoms (Wilson, 1995). The interaction of the endophyte with the plant is different from pathogen-plant host interaction, in that it is symptomless and non-disease producing. The endophyte-plant host interaction ranges from neutralism, mutualism to that of commensalism (Stone et al., 2000). Endophytes are protected in the

3 plant's interior from exposure to extreme environmental conditions such as temperature, osmotic potentials and ultraviolet radiation, with little competition from other microorganisms for a constant and reliable source of nutrition. Microbial endophytes in turn contribute to the health of host plant or increase resistance against the plant pathogens by producing wide range of bioactive compounds (Lam, 2007). As a result of these long-held associations, it is hypothetical to conceptualize that some of these endophytes may have devised genetic systems allowing for the transfer of information between themselves and the host plant and vice versa (Stierle et al., 1993). Endophytes are now considered as an important part of biodiversity. Endophytes are an important source of precious bioactive compounds and secondary metabolites that contribute to more than 80 % of the natural drugs available in the market (Singh & Dubey, 2015). Many of