

Why researchers use Streptomyces to produce antibiotics?

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Antibiotics are the most commonly used therapeutic agents in the treatment of bacterial infections and diseases. These antibiotics are produced through industrial fermentation from microorganisms. The production of most antibiotics is species-specific and about 50% of antibiotics are produced from Streptomyces bacteria. Streptomyces spp. are Gram-positive bacteria consisting of a large number of species. Streptomyces live mainly in the soil although they contain a few aquatic species. They are used so often in antibiotic production owing to one of the most important reasons, which is secondary metabolites production. Secondary metabolism is usually controlled by a group of genes in DNA or rarely by genes on plasmid DNA. These genes in Streptomyces help in antibiotic production because these secondary metabolites help them in inhibiting competing microbes and allow them to thrive. Through this competitive advantage, Streptomyces spp. continue their living while other microorganisms get eliminated. It is their larger genome that provides molecular diversity. Another important reason for their preference is the availability of manifold varieties. Studies reveal that the competition and collaboration between different species of Streptomyces awake silent antibiotic-synthesis clusters that were not always expressed. This could elicit antibiotic production. Therefore, Streptomyces is considered an extremely important natural source of antibiotics. Moreover, many novel bioactive compounds from Streptomyces could be obtained by activating their cryptic secondary metabolite pathways in the future to improve human health.

Keywords: Streptomyces, Antibiotic production, Bacterial infections, Secondary metabolites

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