

Antibacterial Properties of *Rhazya stricta* and Methicillin-Resistant *Staphylococcus aureus*

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COMMENTARY

Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most dangerous and commercially significant nosocomial infections in the world. Multidrug-resistant MRSA, which is resistant to a wide range of antibiotics and antimicrobial agents, has exacerbated the problem in the previous two decades. Drug-resistant *S. aureus* has been classified into several groups. The mid-1940s saw the discovery of penicillin G-resistant *S. aureus*, which manufactures penicillinase, and the late 1950s saw the discovery of multidrug-resistant (MDR) *S. aureus*, which is resistant to penicillin G, chloramphenicol, tetracycline, and erythromycin. Since 1961, MRSA has been a life-threatening MDR bacterium, adapting its resistance patterns as it obtains resistance to new antibiotics.

MRSA is a common cause of skin, soft tissue, respiratory infections, bones and joints, surgical wounds, urinary tract infections, and bloodstream infections. Because they are resistant to multiple routinely used medicines, these infections are difficult to cure. Medicinal herbs, according to the World Health Organization, could be valuable sources of novel antimicrobial medications. Medicinal plants are unquestionably better equipped than typical laboratory procedures for metabolic bioengineering of their unique active medicinal components. Herbal extracts often utilised in Folkloric Medicine have proved to have a great potential for development as bactericidal or bacteriostatic agents in several investigations. Medicinal plant extracts have been used as natural therapeutic alternatives to antibiotics in order to reduce or overcome the continuous rise of antibiotic resistance.

Rhazya is a genus of Apocynaceae that includes two species: *R. stricta* Decne (Decaisne) and *R. orientalis* (Harmal in Arabic). It is a medicinal herb that is widely used in many Asian nations, including Saudi Arabia, to treat a variety of illnesses in humans and animals. Cancer, skin illnesses, hypertension, rheumatism, sore throat, syphilis, helminthiasis, inflammatory conditions, and fever are all treated with *R. stricta* and its metabolite. Several investigations have revealed that various portions of *R. stricta* contain abundant phytochemical elements such as alkaloids, flavonoids, triterpenes, and volatile bases, all of which have medicinal effects for a variety of maladies.

According to research conducted in our lab, the aqueous extract of *R. stricta* displays antibacterial activity against *Neisseria meningitidis*. Baeshen et al. have published a review of investigations on the medicinal potential of *R. stricta* chemicals, including non-alkaloids such oleanolic acid. Oleanolic acid is a pentacyclic triterpenoid phyto-compound with antibacterial activity against a variety of Gram-positive pathogens, most notably methicillin-resistant *Staphylococcus aureus* (MRSA). Oleanolic acids were found to impact peptidoglycan metabolism and prevent peptidoglycan cross-linking, altering bacterial cell shape and increasing pathogenic cell autolysis.

The antibacterial activity of an organic, non-alkaloid extract obtained from *R. stricta* leaves against MRSA were investigated using a 1% agarose well-diffusion method and transmission electron microscopy in previous investigations from our laboratory (TEM).

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