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A Wound Healer, Ampucare can Inhibits Bacterial Growth

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Bacteria are small living prokaryotes and important part of biological environment due to their various beneficial and health threatening activities. Their infection can cause severe illness in humans e.g. lyme borreliosis, relapsing fever and tularaemia (Brouqui *et al*., 2004). In human bodies bacteria form different communities in mouth, gut, skin etc.; highly complex bacterial communities are found on skin (Costello *et al*., 2009). The inhabitants of these communities vary from individual to individual and can determine the severity of a disease in its particular habitat. Nowadays several antibacterial drugs are available in market among which cephalosporins, macrolides, fluoroquinolones and penicillins are the leading drug groups, responsible for 80% sales of total drugs (Kresse *et al*., 2007). These antibacterial drugs are highly popular among peoples of weak immune system. But many bacteria e.g., *Escherichia coli, Staphylococcus aureus, Pseudomonas* spp. etc. have gain resistance against these drugs and now only few drugs are found effective against resistant bacterial strains (Bhowmick and Rashid, 2004). Thus there is a need of developing new competent antibiotic, which might be achieved through exploring medicinal plants. These plants are used as food additives and act as a source of natural antibacterial compounds e.g. phenols (Dorman and Deans, 2000). There antibacterial agents are always used in modified form i.e., extracting essential oils etc. Other types of decoctions (crude extracts) can also be used for this purpose; these extracts are obtained from roots, leaf, fruits, pod, stem, flower, seeds, bark and whole plant (Kumar *et al*., 2006). A combination of different plants can also be employed as an antibiotic. As a topical polyherbal anti-acne gel derived from *Garcinia mango*stana and *Aloe vera* has inhibitory property against *Propionibacterium acne* and *Staphylococcus epidermidis* (Bhaskar *et al*., 2009). Moreover its bacterial inhibitory activity was better than a market gel, clindamycin phosphate. Other than bactericidal activity the use of these plants can also provide protection from several diseases e.g. inflammation, cancer, wounds, diabetes etc. (Hamman, 2008; Karim *et al*., 2011; Sohail *et al*., 2011). So, antibacterial activity is characteristic of many plants used in daily routine and their use can provide protection from non-bacterial diseases.

Ampucare is a polyherb formulation with neem (*Azadirachta indica*) and turmeric (*Curcuma longa*) as its main ingredients. It is extensively used in wound healing and has antioxidant activities, its topical treatment in rats fasten the process of muscles healing (Dwivedi *et al*., 2008). For which, it lowers the malondialdehyde (an oxidation product) levels and increase the proteins, hydroxyproline and antioxidant enzymes levels. According to Shrivastava *et al*. (2009) Ampucare could be used as antibacterial agent, it inhibited the growth of *E. coli, Staphylococcus aureus, Klebsiella pneumoniae* and *Proteus vulgaris*. They conducted *in vitro* time based studies to evaluate the effects of Ampucare stored in different conditions on bacterial strains. In these experiments Ampucare showed significant inhibition of all bacterial strains and its bactericidal activity increased with time. As *E. coli* colony counts was 6.16 within first hour of Ampucare application which decreased up to 2.30 $\log_{10}$ cfu (colony-forming unit) mL^{-1} after 6 h. In addition the storage conditions (Ampucare-A: room temperature, B: 0°C for 5 h and C: centrifuged for 1 h) did not cause any effect on its inhibitory activity. Since within 0-6 h of killing, Ampucare-A *E. coli* colony counts were 6.16 to 2.30, Ampucare-B; 6.22 to 2.30 and for Ampucare-C 6.50 to 2.30 $\log_{10}$ cfu mL^{-1}. Thus there was not any significant difference in Ampucare A, B, and C antibacterial activity against *E. coli*, although at some times minute differences were found. Thus against a specific bacterial strain no difference was found in Ampucare-A, B and C activity. Similar results were obtained for other bacterial strains but Ampucare (A, B and C) was differentially active against these bacterial strains. As Ampucare-A 0-6 h inhibition logarithmic value for *P. vulgaris, K. pneumoniae, S. aureus* and *E. coli* was 6.36-2.70, 6.41-2.30, 6.16-2.30 and 6.16 to 2.30 $\log_{10}$ cfu mL^{-1}, respectively. Hence there was only minimal difference in Ampucare activity against different bacterial strains, while large similarity in its activity was found against *S. aureus* and *E. coli* strains. Thus Ampucare showed an excellent *in vitro* antibacterial activity within 6 h of its application against several bacterial strains. So it could be appreciated as bactericidal as well as wound healer agent and more research on its antibacterial mode of action would favor its use.

Bacteria live in mouth, gut and skin of humans and can cause serious diseases. Their growth can be inhibited

through the application of various commercial antibiotics, only if bacterium has not developed resistant against them. The antibiotic resistance has increased the demands of new bactericidal products with reliable results, which directed the founders towards plants antibacterial sources. Plant derived products have multipurpose effects and are used to treat number of human ailments. Shrivastava *et al.* (2009) found that Ampucare, a polyherbal wound healer formulation can significantly stop the growth of various bacterial strains within 6 h of its application. Moreover the storage conditions did not affect its bactericidal activity, hence could be considered as potent antibacterial agent. It is previously used to treat wounds; therefore its topical application for antibacterial purposes can be trusted.

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