

Wound healing property of coconut leaf sheath scale

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The popularly known 'Kalpa vriksha' is truly one of nature's wonders. Each and every part of the coconut palm is useful in one or another way. Because of the immense nutritional and medicinal value, it is called as "fruit of life". People from many diverse culture, religion and races across the world have revered coconut as a unique source of food and medicine. For example, in coastal jungles of Central and South America coconut is commonly used for all kinds of illness. In the Philippines, coconut oil is used to speed the healing of broken bones, burns, cuts, bruises, and even, massaged into swollen joints. In Polynesian islands, traditional healers use coconut as part of the cure. When it comes to India, coconut in its many forms is widely used to treat a variety of health problems. Before medically trained doctors were available, healers took care of the people's medical needs using coconut and its products. Coconut palm enjoys a pride of place as folklore and in the Ayurvedic medicinal system. Every part of the palm starting from roots, stem, leaf, leaf sheath, mid rib, spathe, spadix, fruit including the kernel, haustorium, oil etc. has diverse uses both as food and as a medicine.

An adult coconut palm comprises about 30-40 opened leaves. Leaf consists of a rachis (popularly known as leaf-stalk) and leaflets. The different parts of coconut leaf are shown in Fig.1. The leaf stalk continues as a mid rib or rachis till the tip of the leaf where it merges into a green leaflet. The leaf stalk attaches to the stem by means of a sheath in the form of a bracket firmly clasping the stem with its wings nearly round it, providing mechanical strength to it to withstand strain from the wind and the weight of the bunch. The young sheath is made up of a mass of parenchyma. With the development of leaf at the distal margin, a thin narrow tissue occurs (brown in colour) starting from the distal end, till the tip of young growing leaflet. The tissue may be completely used up, as the leaflet mature which is nothing but the leaf sheath scale. But usually towards the tip portion of the leaf which is first emerging, the structure persists forming a long drawn tip (Fig. 2). Towards the tip, the thickness of the tissue starts reducing. Anatomically, it is cell debris of the actively dividing meristematic tissue which is the leaf sheath scale. This meristematic tissue is fibrous in nature. Cell debris can be clearly visible under

Presence of thick mass of leaf sheath scale towards the distal end of petiole



Fig. 2 Diagram showing the leaf sheath scale

Growth of leaf sheath scale from distal end of leaf petiole to towards the tip of leaflet.

a compound microscope.

Traditionally in rural areas, leaf sheath scale of coconut is used in wound healing (Fig. 3) According to them, it is very effective even for head injuries. Some studies have also been carried out to find their medicinal properties. This kind of scale can be seen in other palms also. It primarily protects the tender leaves from the changing environmental conditions and attack of microorganisms. In order to state its medicinal property, it is necessary to know the active compounds present in it. A study revealed that coconut leaf sheath scale contains ketone, amides, esters, unsaturated nitrogen compounds, polyphenols, sulphur compounds, halogen compounds, phytochemical radicals, fatty acids and cholesterol (Jose, 2006). Since it is derived from meristem, it may contain growth promoting factor like gibberellins. Sulphur present in leaf sheath scale hasten the production of fibrinogen (glycoprotein that helps in the formation of blood clots) which is another reason for blood clotting activity of leaf sheath scale. The wound healing activity of ketone is also well proven and documented (Keshl *et al.*, 2014). Presence of gibberellins helps in rapid cell proliferation. In addition to the effect of hormones, fatty acids also have a direct role in developing new

tissues since they are necessary for the creation of cell membranes. Role of fatty acids in building collagen and promoting wound healing had been reported in neem oil (Raina et al., 2008). A similar effect might be there in the fatty acids of coconut leaf sheath scale.

Wound colonization is polymicrobial involving numerous microorganisms. Antimicrobial activity of coconut leaf sheath scale is well documented. It is effective against *Proteus vulgaris*, *Klebsiella pneumonia* and *E.coli* which are the major facultative anaerobes responsible for wound infection. They generally contaminate wounds, thereby causing infections. Crude extract of coconut leaf sheath scale has shown effective in inhibiting zone formation in the bacterial cultures indicating its antimicrobial activity. Antimicrobial activity of polyphenols is also well known. The presence of polyphenols in the sheath scale has a distinct role in the antibacterial activity. All these bioactive compounds present in coconut leaf sheath scale contribute towards the wound healing as well as the antimicrobial activities.

Recently two students of Lakshadweep received innovation award at the India International Science Festival (IISF) at IIT Delhi for the science project on wound healing property of leaf sheath scale. The wound healing property is mainly due to three major reasons. Since it contains growth promoting factor, rapid cell proliferation is facilitated. Secondly, prevention of the microbial infection due to its antimicrobial activity or the antimicrobial ingredients and thirdly fibrous nature of the raw material assisting the wound healing by accelerating the clot formation. ■



Fig. 3 Scrapped Leaf sheath scale and the usage in cuts and wounds

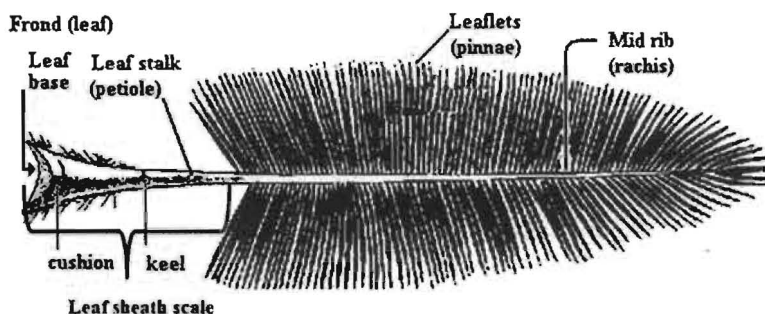


Fig. 1 Parts of Coconut leaf

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