ABSTRACT

This is the first study to report the wound healing activity of *Lobelia trigona Roxb*. The collected plant specimen (*Lobelia trigona Roxb*) was authenticated. Soxhlation was performed using different solvent systems to assess the qualitative phytochemical components of all the extracts. Based on the percentage of yield obtained, the ethanolic extract of *Lobelia trigona Roxb* was taken for the study. Further, the ethanolic extract of *Lobelia trigona Roxb* was characterized using spectroscopic (UV-Vis spectroscopy and FTIR spectroscopy) and chromatographic techniques (GC-MS). The evaluation of anti-microbial activity of *Lobelia trigona Roxb* was conducted employing agar well diffusion method. The quantitative estimation of total phenols, total alkaloids, total flavonoids, total tannins, total terpenoids and total saponins present in *Lobelia trigona Roxb* ethanolic extracts was performed. *In vitro* anti-oxidant activity of *Lobelia trigona Roxb* was performed employing four free radical scavenging assays namely DPPH free radical scavenging activity, Hydroxyl radical scavenging activity (OH), Superoxide anion radical scavenging activity (SO) and reducing power assay. Evaluation of wound healing activity of *Lobelia trigona Roxb* ethanolic extract was demonstrated employing Excision, Incision and burn wound models using adult male Wistar rats.
It was observed that ethanolic extract had all the phytochemical contents analyzed followed by the methanolic extract. Ethanolic extract of *Lobelia trigona Roxb* was rich in polyphenols followed by terpenoids, tannins, alkaloids and saponins. Major tentative compounds of *Lobelia trigona Roxb* ethanolic extract are Quinuclidine, Massoia lactone, Sclareolide, Canrenone, Tritriacontane. All of these compounds possess antimicrobial activity whereas Sclareolide and Massoia lactone possesses anti-oxidant activity and Canrenone possess anti fibrogenic and wound healing activity.

*Lobelia trigona Roxb* ethanolic extract had good anti-microbial (antibacterial and antifungal activity) against almost all the test microorganisms especially skin pathogens such as methicillin resistant *Staphylococcus aureus* (MRSA) and *Acinetobacter baumannii*. Ethanolic extract of *Lobelia trigona Roxb* showed good anti-oxidant activity.

The effect of *Lobelia trigona Roxb* ethanolic extract on the migration of HaCaT keratinocyte cells was investigated and a dose-dependent stimulation of migration observed. The cell migration was found to be most effective with 100 \( \mu g/mL \) of *Lobelia trigona Roxb* ethanolic extract. The *Lobelia trigona Roxb* ethanolic extract exhibited the most promising effects of wound healing *in vitro*.

Regarding excision and burn wound models, the control (untreated) groups showed least rate of wound healing. The rate of wound healing was faster in animal groups treated with 10% w/w *Lobelia trigona Roxb* extract ointment.
compared to the standard group. In the case of incision wound model, the animal group treated with 10% w/w ointment of Lobelia trigona Roxb had showed the highest tensile strength among all groups. Biochemical assays for the estimation of total protein, uronic acid, hexosamine and Hydroxyproline in the tissues of control and treated wounds showed a gradual increase from day 4 and peaked at day 12 after which decreased gradually till the end of the experiment (16th day). Results showed that groups treated with 10% w/w Lobelia trigona Roxb ointment healed faster than other groups, and this correlated with increase in fibroblasts and collagen content and decrease in inflammation and scar. Hence we propose that the ointment of Lobelia trigona Roxb ethanolic extract enhances the excision, incision and burn wound healing process consequently reducing the healing time.

The outcome of this research work concluded that Lobelia trigona Roxb ethanolic extract contains various bioactive compounds which has antioxidant potential and controlling microbial infection thereby, enhancing wound healing.

Keywords: Lobelia trigona Roxb, Phytochemicals, Incision, Excision, and Burn wound.