EFFECT OF *Sonchus oleraceus* EXTRACT ON THE REPAIR OF EXPERIMENTAL WOUNDS IN RATS

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Abstract

The growing of scientific support for the use of medicinal plants has been expanding its use in traditional medicine. *Sonchus oleraceus* is popularly used for the treatment of various diseases and its healing action was demonstrated in experimental cutaneous wound. The objective of this study was to evaluate the expression of collagen type I and III in wounds treated with the extract of *S. oleraceus* in the form of ointment or balm, in concentrations of 5%, 10% and 15%. To quantify the collagen types I and III, after 15 days of treatment, biopsies were collected and processed by picrosirius red stain. The type I collagen showed expression of 19.6% in the samples treated with balm and 12.5% on the ointment treated with (p=0.026), regardless of extract concentration. Likewise, the type III collagen showed values of 1.48% for the balm and 0.68% for the ointment (p=0.004). There was no difference between extract concentrations and the control group (p>0.005). The *S. oleraceus* extract engaged in the repair of skin wounds by a process that does not involve the modulation of the expression of collagen type I and III.

INTRODUCTION

The use of medicinal plants in Brazil has its origin in Indian and African cultures and, with the scientific evidence of its effects, this use in medicine has become broader (BARRETO, 2011). The Brazilian National Agency of Health Surveillance (ANVISA) defines herbal medicines as those obtained from medicinal plants without adding of isolated drugs that can lead to health damage (JUNIOR and PINTO, 2005). According to the World Health Organization (WHO), 85% of the population of the developing countries makes use of medicinal plants, since its status in natura or in herbal formulation (BARRETO, 2011). The *Sonchus oleraceus* plant, popularly known as milkweed, milkweed-smooth is a cosmopolitan species, found in many agricultural regions like weed crops. It is used in popular medicine in a variety of diseases such as anemia, vitiligo, liver problems, besides being used as a diuretic (FRAGA and TASENDE, 2003; Lima et al., 2009). The healing effect of wounds of *S. oleraceus* been shown in an experimental model (NONATO et al., 2014). Thus, the aim of this study was to evaluate the expression of collagen type I and III during the healing of wounds treated with *S. oleraceus* extract in different concentrations and presentations.

MATERIAL AND METHODS

Specimens of *S. oleraceus* were obtained in agricultural trade in the city of Viçosa, Minas Gerais, Brazil. Stem and leaves of the plant were dehydrated, crushed and subjected to ultrasound for 60 minutes in an alcoholic solution and after concentrated on a rotary evaporator to afford an aqueous extract. The extract was used at concentrations of 5%, 10% and 15% to produce the medicaments in the form of balm (50% almond oil and 50% of grape seed oil) and ointment (40% polyethylene glycol 400 and 60 % polyethylene glycol 4000). The project was approved by the Ethics Committee on the use of animals of the institution (Process 113/2013 CEUA/UFV). Forty adult male rats of the Wistar strain were sedated and anesthetized for the experimental wound production, on the backs of animals with a tissue punch of 6 mm. The animals were divided into 8 groups according to the treatment which the combined extract concentrations (0%, 5%, 10% or 15%) with the presentation (balm or ointment). Every day, each animal received the application of the medicine related to your group on the wound. Biopsies were obtained after 15 days of treatment. The tissue samples were fixed in formalin solution, dehydrated in increasing alcohol solutions, diaphanized in xylene and embedded in paraffin. Histological sections were stained with picrosirius red stain and analyzed by polarized light microscopy. Micrographs were analyzed in ImageJ software to yield the percentage of collagen, according to staining red for collagen type I and green to type III. Data were analyzed by ANOVA for two factors (presentation x concentration), followed by the Tukey test, with 5% significance level.

RESULTS

The expression of the two types of collagen (I and III) only showed effect of the medicine presentation. The type I collagen showed an expression of approximately 19.6% in the samples treated with balm and 12.5% in those treated with ointment (p=0.026), independent of the extract concentration. Likewise, the type III collagen expression showed values of 1.48% for the balm and
Among the components of the *S. oleraceus* extract, there are the flavonoids that are common in various types of herbal medicine (LIMA et al., 2009). According to Stipcevic et al. (2006), the flavonoids can stimulate the production of some types of collagen but inhibit other and protect them from the action of proteinases. However, the extracts used in this work were not able to alter the expression of collagen type I and III (p=0.05). But, in spite of this, the healing effect of the extract has been reported (NONATO et al., 2014), suggesting that this effect is not related to the modulation of collagen expression. Generally, the skin resistance is directly related to the amount of collagen in the dermis (SILVA et al., 2008). The type III collagen is produced in primary form, called immature collagen fibers which is disorganized, being replaced by collagen type I at the end of the repair process (BORGES et al., 2007). Possibly the efficacy of the ointment containing the extract is related to the increased penetration capability when compared to the balm presentation. The extract of *S. oleraceus* in concentrations of 5%, 10% and 15% operates in the repair of skin wound by a process that does not involve the modulation of the expression of collagen type I and III and needs to be more deeply studied.

REFERENCES