

**The hair growth promoting effect of *Russelia equisetiformis*
(Schlect&Chan)**

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ABSTRACT

In search of natural extracts for hair growth, we found that the methanol extract of the whole plant of *Russelia equisetiformis* (MERE) (Family-*Scrophulariaceae*) has hair growth promoting effect. Topical application of MERE onto a known diameter of shaved area of the back of albino wistar rats, produced a significant increase in the rate of hair growth ($P < 0.05$), in a concentration dependent manner. The effect was shown by reduction in the diameter of the shaved area. These results suggest that, *R. equisetiformis* has hair growth promoting potential, the effect of which may be attributed to the presence of triterpenes and flavonoids in the plant extracts.

Keywords: *Russelia equisetiformis*, Crude extract, Hair growth promoting activity.

INTRODUCTION

Hair loss is a distressing condition for an increasing number of men and women. Therefore it is of great importance, to develop new therapies for the treatment of hair loss.

Russelia equisetiformis (Schlecht & Chan) is a shrub belonging to the family Scrophulariaceae. It grows up to 4ft high with red flowers, and much reduced leaves (Daziell, 1937). Its growth pattern, the structure of the entire plant (especially its hair-like and dryness), its hair growth promoting activity and its reported analgesic effect after put to use are parts of its ethnomedical applications (Personal communication). Phytochemically, it has been reported to contain triterpenes of lupane type (Burns, et al., 2001). Two phenolic compounds, flavonoids, recently isolated from the plant's extract. have been reported to be responsible for the observed analgesic effect (Awe,

et al., 2008). The aim of this study was therefore, to investigate the hair growth promoting activity of the crude methanol extract of *R. equisetiformis* in the experimental laboratory animal model *in vivo*

MATERIALS AND METHODS

The experimental protocols and procedures used in this study were approved by the Ethical committee, University of Ibadan, Ibadan, Nigeria and conform to the guideline of the care and use of animals in research and teaching (NIH publications no 85-93, revised 1985).

Plant material: The plant sample was collected in the month of October, 2005 from Bodija in the South West of Nigeria. The was identified in the herbarium of the Forest Research Institute, Ibadan, Nigeria, where voucher specimen was deposited with voucher number 106998. The plant sample was air-dried at room temperature, and reduced to powdery form using electric blender

Preparation of plant extract: 500 g of powdered sample of the plant was extracted with cold 100 % methanol. The resulting crude methanol extract was then concentrated under reduced pressure at 40 °C in a rotary evaporator (Rota vapor) to obtain a solid sample giving 19.7 % yield. This was stored in the refrigerator at 4 °C. The crude extract was dissolved in normal saline.

Animal test: Female strain Wistar Albino rats used for this study were housed in a well ventilated pre- clinical animal house, College of Medicine, University of Ibadan. The method used is as described by Rho, et al., 2005. Fourteen-week-old female wistar albino rats were obtained and then allowed to adapt for one week with food and water *ad libitum*. The backs of rats were shaved into a circle of 2.5 cm diameter, using animal clipper. From the following day (day1), 0.05 ml of each of the concentrations 25, 50, 100 mg/ml of MERE in normal saline, was topically applied for seven days. Hair growth promoting effect was checked by the reduction in the diameter of the shaved area.

Statistical analysis: Values are expressed as Mean \pm S.E.M. Statistical significance was determined using student t-test. Values with (P<0.05) were considered significant.

RESULTS AND DISCUSSION

Topical application of MERE onto the shaved area on the animals, produced a significant increase rate of hair growth (P<0.05), compared with the vehicle (normal saline) treated animals. At 25mg/ml, MERE, produced a reduction in the diameter of the shaved area on day 6 and 7, while the extract at concentrations of 50, 100 mg/ml produced significant reduction in the diameter of the shaved area from day1-7 (Table-1, Figure-1).

The number of men and women suffering from hair loss is increasing. Thus it is very important to develop new therapeutic materials to stop hair loss and to enhance hair growth. Alternative medicine is one interesting area, which is getting more popular.

Although, it has not yet been incorporated into the mainstream of medical care, due to limited scientific evidence and incomplete mechanisms involved, alternative medicine has become an increasingly attractive approach worldwide (Bhaumik, et al., 2000).

R. equisetiformis is a medicinal plant that is used by an individual in Nigeria to treat various ailments, such as hair loss and pain (Personal communications). The

present study demonstrated the hair growth promoting potential of the crude methanol extract of *Russelia equisetiformis*. The exact mechanism of action or the component(s) responsible for the hair growth promoting activity in the plant extract could not be established in this study. However, a number of investigators have shown that flavonoids and triterpenoids possess hair growth promoting activity by strengthening the capillary wall of the smaller blood vessels supplying hair follicles, improve blood circulation to nourish the hair follicles and thereby promoting hair growth (Kobayashi, et al., 1993) Other workers also implicate flavonoids in stimulating telogen to anagen phase, a process involved in hair growth, and also cause expressions of some growth factors, such as insulin-like growth factor-1(IGF-1), vascular endothelial growth factors(VEGF), keratinocyte growth factors(KGF) and hepatocyte growth factors (HGF), all of which has stimulatory effects on hair growth(Tomoya, et al., 1999; Roh, et al., 2002;2004). Recently we isolated two flavonoids compounds which were found to be responsible for the analgesic activity (Awe, et al., 2008). It may therefore, be possible that the two phenolic compounds and other chemical components such as triterpenes contained in the plant's extract are responsible for the observed hair growth promoting effect and that, these compounds may also have stimulatory actions on these hair growth factors.

In summary, the experimental evidence obtained in the present laboratory animal study indicates that *R.equisetiformis* methanol crude extract possesses hair growth promoting potential. Further work needs to be carried out in order to establish the mechanism of action and the exact chemical component responsible for the hair growth potential of *R.equisetiformis*.

REFERENCES

- Awe, E.O, Adeloje, A., Idowu, T., Olajide, O.A., Makinde, J., (2008): Antinociceptive effect of *Russelia equisetiformis* leave extracts: Identification of its active constituents. *Phytomedicine*, 15:301-305.
- Burns, D., Reynolds, W.F., Reese, P.B., Enriquez, R.G., (2001): Phytochemical screening of *Russelia equisetiformis*. *Maqgn. Reson. Chem.*, 387:488-493.
- Kobayashi, N., Suzuki, Koide C., (1993): Effect of leaves of Ginkgo biloba on hair growth in C 3Hstrain mice. *Takagala Zasshi.*, 113(10): 718-24.
- Tomoya Tahahashi, Toshikazu Kamiya, Atsuhiro Hasegawa, Yoshiharu Yokoo, (1999): Procyanidin Oligomers Selectively and Intensively Promote Proliferation of Mouse Hair Epithelial Cells In Vivo. *The Society for nvestigative Dermatol.*, 113: 310-316.
- Roh Seok-Seon, Chang Deok Kim, Min-Ho Lee. Seong-Lok Hwang, Moon-Jeong Rang, Yeo-Kyeong Yoonn (2002): The hair growth promoting effect of *Sophora flaavescens* extract and its molecular regulation. *J. Dermatol. Sci.*, 30:43-49.
- Roh Seok-Seon, Su-Jin Park, Seong-Lok Hwang, Min-Ho Lee, Chang Deok Kim, In-Ho Lee, Sug-Youn Chang, Moon-Jeong Rang, (2004): The hair growth promoting effect of *Asiasari radix* extract and its moleculaer regulatuion. *J. Dermatol. Sci.*, 38: 89-97.

Table-1: Effects of *R. equisetiformis* on hair growth

Treatment	Conc. mg/ml	Diameter of Shaved area (cm)							
		0	1	2	3	4	5	6	7
Normal saline control	-	2.5±0	2.5±0	2.5±0	2.42±0.06	2.20±0.16	2.10±0.16	2.08±0.16	2.0±0.2
Extract	25	2.5±0	2.34±0.11	2.26±0.11	2.18±0.13	1.94±0.11	1.65±0.11	1.30±0.9	0.7±0.7
Extract	50	2.5±0	2.22±0.13	2.22±0.13	1.94±0.11	1.50±0.08	1.13±0.12	0.65±0.7	0.3±0.3
Extract	100	2.5±0	1.94±0.11	1.72±0.13	1.64±0.11	1.20±0.08	0.65±0.12	0.25±0.3	0±0

- Results are mean of five observations ± S.E.M. (n=5)
- *P<0.05 compared with control student t-test

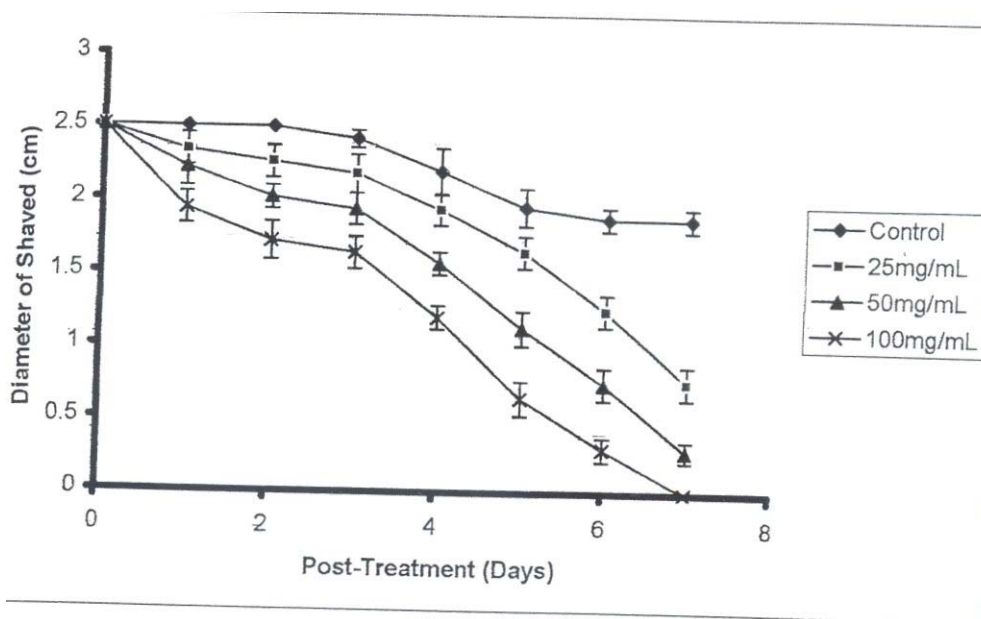


Figure- 1: shows the graphical representation of the effect of MERE on the hair growth. Each point on the graph represents mean ± SEM in the diameter of the shaved area of control, 25, 50 and 100gm/ml.