Evaluation of Some Therapeutic Effects of Ayurvedic Herbo-minaral Formulation: *Chandraprabha vati*

Weerasekera[1], K.R., & Ratnasooriya[2], W.D. & Ranasingha[3], P. & Dhammarathana[4], I. & Tissera[5], M.H.A. & Ariyawansha[6] H.A.S.

[1] University of Colombo, Rajagiriya, [2], University of Colombo, Colombo [3] Industrial Technology Institute, Baudhaloka Mawatha, Colombo [4] University of Kelaniya, Kelaniya [5] Wickramaarachchi Ayurveda Institute, University of Kelaniya, Yakkala

Introduction

Ayurveda is the art and science of life, it is one of our richest heritage gifted us by ancestors. Through countless transmission from generation to generation it may have lost some of its original sparkle, but it is still playing a key role for better human health, in many incurable, chronic and degenerative diseases by its effectiveness. *Chandraprabha vati* (CV) is one of the effective and very popular Ayurvedic formula consisting of 37 ingredients for prescribe many diseases (Narayanadharmana, 1932), including urinary tract, Skin and Gastro intestinal tract diseases. Apart from these conditions CV is recommended to improve strength, for anticipate aphrodisiac and as an anti aging remedy.

Research Problem

Cell damage caused by free radicals appears to be a major contributor to aging and many diseases. These free radicals are capable of attacking the healthy cells of the body. This may lead to damage; disease and severe disorders. Anti-oxidants are substances that protect the cells against the effects of free radicals. Numerous epidemiological studies have indicated that herbal medicines rich in antioxidant properties provide protection against oxidative stress induced diseases and disorders. However, antioxidant activity of CV has not been reported. Therefore In this study, *in vitro* antioxidant potency of CV was evaluated. Apart from this, most of the practitioners recommended CV as a diuretic. But this claimed activity are not tested and validated by scientifically controlled experiments. Hence this study scientifically tested its diuretic potential by using hydrate rat model. Another useful action of CV is anti-inflammatory activity. Therefore acute anti-inflammatory action was

evaluated in rat models. Although acute and sub chronic toxicity were done for safety profile of CV.

Methodology

For the evaluation of anti-oxidant action, water extract of *Chandraprabha vati* prepared using 10g of *Chandraprabha vati* 100 ml cold distilled water. The diluted supernatant was used for the antioxidant assays. Antioxidant activity of *Chandraprabha vati* extracts was investigated in terms of 2-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) (Re *et al*., 1999) radical scavenging activity, ferric reducing antioxidant power (FRAP)(Benzine *et al*, 1999) and oxygen radical absorbance capacity (ORAC) (Ou *et al.*, 2001) and 6-hydroxy-2-5-7-8-tetramethylchroman-2-carboxylic acid (Trolox) was used as a standard antioxidant.

Three different doses of CV in 1 ml (1000, 2000, 4000mg/kg) or furosemide (positive control) (13 mg/kg) or 1 ml of distilled water (negative control) was orally administered to different groups of rats (N=6/group) which were previously starved (for 18 h) and subsequently hydrated (15 ml of isotonic saline). The rats were individually placed in metabolic cages and their urine output was monitored hourly for 6h. The colour of urine was also noted. For the endeavor of the broad mechanism of diuretic action, the urine collected from group 1 (control) and group 4 (2000mg/kg of CV) were subjected to the following investigations: pH, Na^+ , K^+ and Cl^- levels, specific gravity and conductivity. And also indexes of aldosterone secretion, thiozide secretion urine alkaline, carbonic anhydrase and diuretic action and diuretic activity/potency ratios were computed. Saliuretic index for Na^+, K^+ and Cl^- were also calculated (Duraj *et al*., 2007; Somova *et al*., 2003; Junior *et al*., 2009; Lahlou *et al*., 2007; Wright *et al*., 2007). Estimation of creatinine clearance was tested by using treated (2000 mg/kg of CV) and control groups after 24 hours. Acute and sub chronic toxicity tested with highest dose (4000mg/kg) and control groups for 30 days.

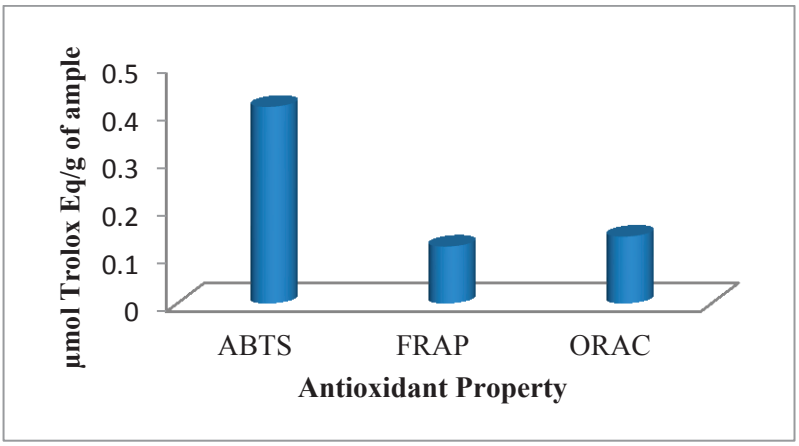
For evaluate the acute anti-inflammatory action, male rats were treated with 1000, 2000, 4000mg/kg of CV, Indomethacine (positive control) and 1ml of distilled water as negative control respectively (Forestieri *et al*, 1996). After 1h these rats were injected with 0.05ml of 1% carregeenan suspension into the foot pad of left hind paw (Winter *et al*, 1962). The paw volumes of these rats were measured using a Plethysmometer at 1h before, and 1,2,3,4

and 5h after the carregeenan injection and the paw oedema was calculated. For the mechanisms of anti-inflammatory effect, Prostaglandin synthesis inhibition (Lindsey *et al*, 1999) and Antihistamine effects (Spector, 1956) were observed.

Key Findings

Cold water extract of *Chandraprabha vati* contained 39.0 ± 0.9 mg/ml dry matter. The extract showed $ABTS^+$ radical scavenging activity in dose dependent manner (1.6 ± 0.8, 7.6 ± 4.5, 15.1 ± 4.0, 29.0 ± 1.7 and 57.1 ± 2.1 % inhibition for 1.5, 3.0, 6.0, 12 and 25 µg/ml concentrations respectively). The results showed comparable radical scavenging activity 50% inhibitory concentration (IC_{50}) of the extract *vs* standard was 20.9 *vs* 6.8 µg/ml. Further, the results showed as Fig;1, 2-azino-bis (412 ± 0.113 µmole TE/g sample), ferric reducing (119.4 ± 8.1 µmole trolox equivalents (TE)/g sample) and oxygen radical absorption capacities (139.7 ± 6.9 µmole TE/g sample) of *Chandraprabha vati.*

Figure 1: Antioxidant Activity of *Chandraprabha Vati*



CV markedly increased the urinary output at 1st hour itself in an inversely dose – related manner (r^2 = -1). The onset of the diuretic action of CV was very rapid (within 1h) and so was the peak diuresis (within 1h) (Table 1) but the effect was short lived (2h) as furosemide. Interestingly, the diuretic potential of CV was superior (by 2 fold) to furosemide. Further, CV increased the specific gravity, conductivity, urinary Na^+ level, urinary Na^+/ K^+ ratio, urinary Na^+/ K^+ ratio, urinary Na^+/Cl^- ratio, urinary Na^+/ H^+ ratio and

creatinine clearance. Although CV did not induced acute or sub chronic toxicity (general, renal, hepatic and neurotoxicity).

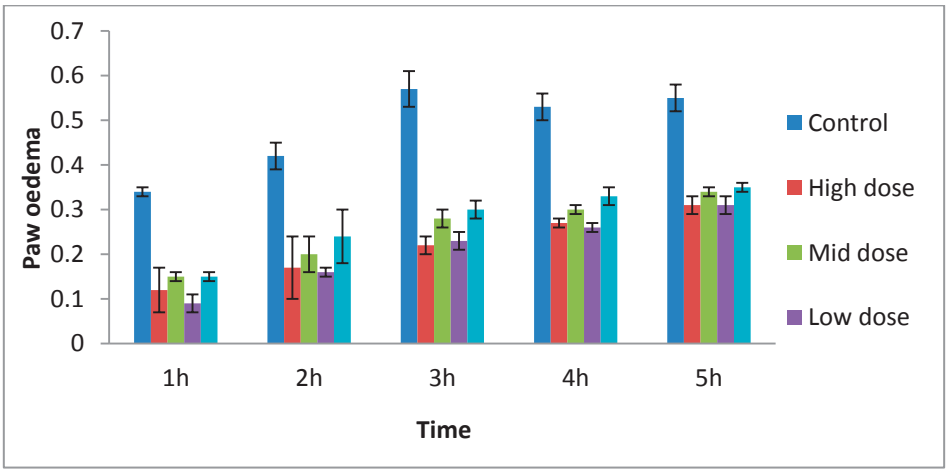
Table 1: Cumulative Urine Output in Rats at 1h Period Following Oral Administration of *Chandraprabhavati* (Mean ± SEM) N=6

Treatment	Urine output at 1st hour(ml/100g/b.wt./h)
Control	2.56±0.13
1000mg / kg	6.30 ±0.72**
2000mg/kg	6.08±0.56**
4000mg/kg	3.75±0.49*
13mg/ kg of furosemide	3.38±0.44*

*P<0.05 and **<0.01 as compared with control (Mann-Whitney U- test)

Results revealed that, all three doses of CV significantly inhibited the carrageenan induced paw oedema of rats compared to control at each time point measured (Fig:2); 1sth (by 56%-73%), 2ndh (by 43%-62%), 3rdh (by 47%-61%), 4thh (by 43%-66%) and 5thh (by 36%-43%). Overall, the anti-inflammatory activity of CV was curvilinearly and dose dependent (r^2- 1, P<0.05), EC 50 value of this anti paw oedema action was 2550 mg/kg. Indomathacin indeed significantly impairment of oedema at all time point measured (by 36%-56%).

Figure 2: Effect of Oral Treatment of CV on the Paw Oedema of Rats



*P<0.05 and **<0.01 as compared with control

Conclusion

These observations provide evidence for the antioxidant activity of *Chandraprabha vati*, anti-inflammatory activity and also *Chandraprabha vati* is a potent, safe orally acting diuretic. Further, it shows a multiple mechanism of actions in executing the diuretic and anti-inflammatory activities.

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