



Effectiveness of *Camellia sinensis* (L.) Kuntze for treatment of *Acne vulgaris* stages 0, I and II

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Abstract

Several studies with *Camellia sinensis* (L.) Kuntze (syn. *Thea sinensis* L.) suggest that topical application may be potentially effective for acne, however this effectiveness has not always been demonstrated. The objective of this study was to demonstrate the efficacy of *C. sinensis* leaves extract for the treatment of acne. A double-blind, randomized, controlled clinical trial was carried out including 60 patients between 18 and 25 years old diagnosed with grade O, I and II acne in whom the clinical evaluation, measurement of sebaceous secretion and hydration were performed, in addition to photographic records. The intervention time was 3 weeks and the follow-up was 3 additional weeks. Patients were selected according to inclusion criteria and divided into two groups by simple randomization. The intervention group received the glycolic extract of *C. sinensis* as treatment and the control group received a preparation with the same organoleptic characteristics. Both groups used the preparation topically for three weeks. The evaluations and measurements of the study variables were carried out weekly. The application of glycolic extract of *C. sinensis* showed an adequate control of the sebaceous secretion ($P=0.001$) without producing dry skin. The hydration levels were higher in the intervention group in relation to the control group ($P=0.18$). It was also observed that the color of the skin is uniform. No side effects were observed. This study demonstrates that the glycolic extract of *C. sinensis* is effective in the treatment of acne O, I and II.

Keywords: *Camellia sinensis*, Acne, Sebaceous secretion, Seborrhea

Introduction

Acne is a physiological inflammatory condition of the skin characterized by skin rashes around the hair follicles, mainly on the face and chest, due to a pilosebaceous alteration, which generates a high production of sebum as sebaceous glands increase in activity. It is characterized by the appearance of “comedons” that develop at the sebaceous pilo-follicle level. There are multiple factors for the appearance of acne that can be classified into intrinsic factors (genetic factors, seborrhea, hormonal disorders, hyper keratinization, saprophytic contamination, emotional factors) and extrinsic factors (use of drugs, occupational, diet).¹⁻⁴

The incidence is 80% in adolescents although only 25% is pathological. It has been recorded that between 14 and 25 years old the incidence is 70% to 87%, between 14 and 16 years old it is more frequent in women and between 16 and 19 it is more frequent in men.³⁻⁵

There are many medications for the treatment of acne, in a large majority the cost-benefit ratio does not justify

the use of these compounds, it would be easier to resort to phytopharmaceuticals that offer, in some way, greater safety and greater benefit for the treatment of this ailment. This is the reason why more research is needed in this area for look up natural products that ensure efficacy and less adverse effects.

Isotretinoin, an oral retinoid medication that is used to treat acne and other cutaneous disorders, is often used in adolescents. It is reported as the most effective acne therapy available, but has the potential for a number of adverse effects. Several side effects of this substance have been reported including: panic attack, mood instability in both directions - depression and mania - especially in a predisposed population.⁶⁻⁹

There are a number of lines of evidence showing that isotretinoin can cause depression and suicide in some susceptible individuals. An interesting finding from the brain imaging studies in isotretinoin treated subjects was that the patients with headache were more likely to have decreased orbitofrontal function with isotretinoin.



It raises the possibility that subjects who are sensitive to isotretinoin induced effects on the central nervous system, such as headache, may also be susceptible to other neural side-effects, topical retinol can dry to much the skin. Other side effects reported are clinically insignificant leukopenia or thrombocytopenia, elevated liver transaminases (infrequently) significant elevations of the triglyceride and cholesterol levels, and alanine transaminitis.¹⁰⁻¹²

Use of topical and systemic antibiotics for acne is associated with formation of resistance in *Propionibacterium acnes* and other bacteria, with clinical consequences.^{13,14}

Medicinal plants have traditionally been used for millennia and their application in topical creams, lotions and preparations.¹⁵

In the last 20 years, clinical and laboratory studies have identified the benefits of a series of natural ingredients for skin care. Several studies with *Camellia sinensis* suggest that topical application may be potentially effective for atopic dermatitis, acne vulgaris, rosacea, androgenetic alopecia, hirsutism, keloids, genital warts, cutaneous leishmaniasis and candidiasis.¹⁶⁻²⁵ *C. sinensis* is a perenne middle bush of Theaceae family, know traditionally with the name of “green tea.” The leaves contain several polyphenols with anti-inflammatory, antiseptic and antioxidant properties. The most important compounds for an anti-acnes activity are catequines.²⁵⁻²⁹ There are promising results with the use of this species for several dermatological conditions, however, the effectiveness of oral and topical green tea applications has not always been confirmed and the recommendations are the performance of controlled studies to demonstrate its effectiveness.

Materials and Methods

The study was a randomized double-blind controlled trial with *C. sinensis* topical glycolic extract versus placebo. It was carried out in the month of August to November 2017 in Hospital “La Paz” and Eduardo Abaroa Educational Unit as an extension of attention to adolescents by the Hospital. We have contemplated a total sample of 60 patients distributed by simple randomization in 2 groups.

A glycolic extract was elaborated in La Paz, Bolivia, we used a Chinese organic species, with the help of SES (Seniors Experts Service.) The SES is Germany’s leading volunteering organization for experts and executives who are either retired or taking some time off work. The SES has been helping people to help themselves since 1983 – all around the world, in every industry and sector. We developed the glycolic extract and we use a 3% concentration.

Scheduled visits of evaluation and follow-up have been made during classes. In the realization of the study the parents and the teachers have been involved for the fulfillment of the treatment, in the same way the parents signed an informed consent authorizing the participation of their children in the study.

The inclusion criteria were: diagnosis of acne in stage O, I and II, age between 18 and 25 years, positive sebaceous secretion levels for acne. The exclusion criteria were: people with hormonal treatments such as anabolics and contraceptives, diagnosis of deep acne or in grades III and IV, underlying diseases that generate acne. The output criteria were: Evolution to grade III, allergic reactions.

Individual interviews, dermatological clinical histories, sebaceous secretion measurements, and hydration test were carried out, as well as photographic records on three times weekly and the follow-up after treatment of three additional weeks without the use of the extract, to observe the effectiveness of the treatment. *C. sinensis* glycolic extract was used topically twice a day in affected areas after cleaning for three weeks.

Results and Discussion

Descriptive and inferential statistics were performed with the student *t* test to be able to perform the comparative analysis.

The population had an average age of 16 years, 55% corresponded to female gender.

The abandonment rate was 4%. The main measurement has been the index of sebaceous secretion, hydration level of the skin on the forehead, cheeks and nose. Oiliness levels in both groups are show in Tables 1 and 2.

Table 1. Oiliness Levels Expressed in Averages

	Forehead Intervention Group	Forehead Control Group	Cheeks Intervention Group	Cheeks Control Group	Nose Intervention Group	Nose Control Group
Basal	16.08	14.64	14.34	14.43	16.63	14.25
Week 1	15.36	17.62	13.07	14.29	15.66	15.46
Week 2	11.96	16.68	10.84	15.32	12.56	16.37

Table 2. Oiliness Levels – Differences Between Initial and the End of Treatment

Forehead		Cheeks		Nose	
Intervention Group	Control Group	Intervention Group	Control Group	Intervention Group	Control Group
-4.12381	2.03810	-3.50476	0.83810	-4.07143	2.11429



Figure 1. Photographic Record After and Before the Treatment.

Application of *C. sinensis* extract, increase hydration levels of the skin, compared to the placebo group, Figure 1 shows the differences of skin hydration levels at the beginning and the end of the study in both groups.

Statistical Analyses

Student *t* test to mean difference of basal and final values of both groups demonstrates that the glycolic extract of *C. sinensis* shows a statistically significant better control of the sebaceous secretion than placebo ($P > 0.001$).

In the analysis for each facial region, statistically significant effectiveness was shown for the control of

sebaceous secretion in the forehead with a *P* value of 0.001

The use of *C. sinensis* glycolic extract proved effectiveness when controlling the sebaceous secretion in acne type O, I and II, it was observed that hydration levels increased in the area of the cheeks and nose, not significantly in the forehead, the use of the extract did not dry out the skin, it was additionally observed that the skin uniformed its color and that the brown spots after acne lesions improved more quickly in relation to the control group. No side effects were observed.

The statistical analysis of the study groups shows that the differences are highly significant in the use of the product to combat the oily facial skin problems, the levels of hydration show uneven improvements in the face, in the area of the forehead not there are changes between both groups, changes in hydration if they were significant for the cheeks and nose.

Conclusion

The use of *C. sinensis* glycolic extract proved effectiveness when controlling the sebaceous secretion in acne type O, I and II, it was observed that hydration levels increase in the area of the cheeks and nose, not significantly in the forehead; the use of the extract did not dry out the skin; it was additionally observed that the skin uniformed its color and that the brown spots after acne lesions improved more quickly in relation to the control group. No side effects were observed.

It is important to emphasize that the frequent use of the extract of *C. sinensis* is safe for the hydration levels of the skin. It is advisable to continue and deepen specialized studies considering the altitude and dryness of cities such as the La Paz city considering its high altitude and dryness (Tables 3 and 4).

Competing interests

None.

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Table 3. Hydrations Levels Expressed in Averages

	Forehead Intervention Group	Forehead Control Group	Cheeks Intervention Group	Cheeks Control Group	Nose Intervention Group	Nose Control Group
Basal	30.49	30.77	28.06	29.23	28.7	27.20
Week 1	33.17	29.09	31.96	30.22	32.35	30.53
Week 2	32.70	28.93	31.59	28.79	32.42	28.29

Table 4. Hydrations Levels – Differences Between Initial and the End of Treatment

Forehead		Cheeks		Nose	
Intervention Group	Control Group	Intervention Group	Control Group	Intervention Group	Control Group
-4.12381	2.03810	-3.50476	0.83810	-4.07143	2.11429

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