

## Efficacy of Ferulic Acid Peel as a Monotherapy for Photoaging.

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Submitted: 25 Apr 2022; Accepted: 02 May 2022; Published: 10 May 2022

**Citation:** Sukhbir Singh and Ashish Chauhan. (2022). Efficacy of Ferulic Acid Peel as a Monotherapy for Photoaging, *Int J Clin Exp Dermatol*, 7(1), 17-22.

### Abstract

**Objectives:** Chemical peels are used to treat photoaging and skin discoloration. Ferulic peel is a non-exfoliating peel having antioxidant properties. The aim of this study is to validate the efficacy of ferulic acid peel as a monotherapy for photoaging. It is a technique-sensitive procedure, and injury must be in a proper tissue plane to achieve the desired results.

**Materials and Methods:** This is a prospective study from Feb 2018 to Feb 2020 in which 55 patients were treated with Ferulic acid peel 12% (hydro alcohol base) with L-ascorbic acid 15% as a monotherapy. The patients were followed up for 6 months. Data were summarised in Mean  $\pm$  SD. Pre and post data were compared by paired *t* test. A two-tailed ( $\alpha=2$ )  $p<0.05$  was considered statistically significant. Two scales were used for assessing the results; Allergan Skin Roughness Scale (ASRS) and Allergan Fine Line Scale (AFLS).

**Results:** The scores were assessed at pre-treatment (pre) and post treatment (post). The results achieved were highly satisfactory as measured using the ASRS and AFLS Scale with  $p$ -value  $<0.001$  (statistically significant). No complications were observed in our study.

**Conclusion:** Ferulic Peel with L-Ascorbic Acid is very useful as a monotherapy in Photoaging cases; initial results of our six-month follow-up study have yielded promising results.

**Keywords:** Ferulic acid peel, L-ascorbic acid, Photoaging, Allergan skin roughness scale (ASRS) score, Allergan fine lines scale (AFLS) score.

### Introduction

A chemical peel is a skin resurfacing procedure in which a solution is applied to the skin to peel away the accumulation of dead cells, altered cell turnover, increase the metabolic activity of dividing cells & enhance cell viability.

Chemical peels are used to treat fine lines (photoaging), skin discoloration, usually on the face but also on the neck, trunk, hands & other body parts [1]. It can be performed alone or in combination with other aesthetic procedures. Ferulic peel is not a trade name. Ferulic Acid is professionally used having higher percentage of active ingredient (12%), applied to desired area for a time period and then sealed with 15% Vitamin C solution.

Ferulic acid peel is a non-exfoliating peel having antioxidant properties. It is a technique-sensitive procedure<sup>2,3</sup> & photoaging re-

sults improve if correct protocols are followed [2, 3]. The aim of this study is to validate the efficacy of ferulic acid peel as a monotherapy for photoaging.

### Materials and Methods

This was a prospective study at our clinic from Feb 2018 to Feb 2020 in which 55 patients were treated with Ferulic acid peel 12% (hydro alcohol base, Sesderma SI Spain) with L-ascorbic acid 15% as a monotherapy. Total 220 peels were performed in 55 patients over two years with an age distribution of 20 years to 40 years with a mean age of 28 years.

Inclusion criteria: Healthy young adults of both genders with age range of 20-40 years with signs of photoaging, rhytides, loss of tissue elasticity, dull complexion, Fitzpatrick 3 and 4 skin types were included in the study.

**Exclusion criteria:** Non-compliant patient; pregnancy; breast feeding; systemic illness like diabetes, hypertension, etc; active infection like active acne or pustules; recent parlour activity like waxing, threading; recent surgery; steroid use; Isotretinoin; radiation & allergies to peels.

Written informed consent was taken from each patient describing

**Allergan Skin Roughness Scale (ASRS) [4].**

Grade	Term	Description
0	None	Smooth visual skin texture
1	Minimal	Slightly coarse and uneven visual skin texture
2	Moderate	Moderately coarse and uneven visual skin texture; may have early elastosis
3	Severe	Severely coarse visual skin texture, crosshatched fine lines; may have some elastosis
4	Extreme	Extremely coarse visual skin texture, crosshatched deep creases; extreme elastosis

**Allergan fine line scale (AFLS) [5]**

Grade	Term	Description
0	None	No fine lines
1	Minimal	1-2 superficial lines
2	Moderate	3-5 superficial lines
3	Severe	Greater than 5 superficial lines, no crosshatching
4	Diffuse	Diffuse superficial lines, crosshatching

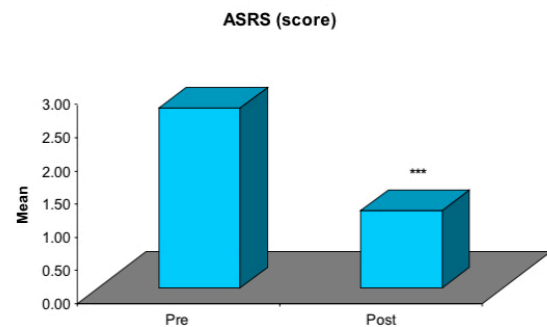
We performed six sessions each (Ferulic acid peel 12 % with L-ascorbic acid 15%) after 15 days for all patients. The post-procedure advises included to avoid face wash with soap for next 24 hours after the peel (normal tap water rinsing is recommended), sunscreen 50spf and UVA pf 30 at least three times a day and avoiding any other treatments or parlour procedures on the face. The follow-up period was for six months.

**Results**

The study evaluates the efficacy of Ferulic acid peel as monotherapy for photoaging. Total 55 symptomatic patients, age between 21-38 years, of either sex (female=45 and male 10) were recruited. Data were summarised in Mean ± SD. Pre and post data were compared by paired t-test. A two-tailed ( $\alpha=2$ )  $p<0.05$  was considered statistically significant. Analysis was performed on SPSS software (windows version 17.0).

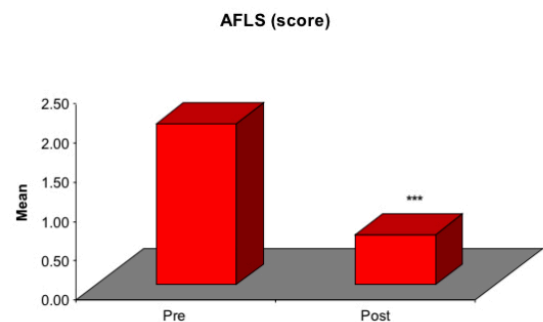
The ASRS and AFLS scores were assessed at pre-treatment (before starting first peel session) and post treatment (one month after last peel session) (Table-1), (Figure 1, Figure 2 and Figure 3, Figure 4) The pre-treatment ASRS score of patients ranged from 1-4 with a mean ( $\pm$  SD)  $2.71 \pm 0.69$  and median 3 whereas at post-treatment it ranged from 0-3 with a mean ( $\pm$  SD)  $1.16 \pm 0.76$  and median 1. The mean ASRS score decreased comparatively at post-treatment. Comparing the pre and post-treatment ASRS score, paired t-test showed significant decrease (57.0%) in ASRS score at post-treatment as compared to pre ( $2.71 \pm 0.69$  vs.  $1.16 \pm 0.76$ , diff.=1.55, 95% CI=1.41 to 1.68,  $t=22.81$ ,  $p<0.001$ ) (Table 1 and Figure. 6).

complete procedure details, post procedure care, and the procedure's side effects. The consent for photography release was also taken. The baseline scores (pre) and final scores (post) were recorded for each patient by a trained nurse using the ASRS4 and AFLS5 (visual analogue scales). The final scores (post) were taken after one month of the last peel session.



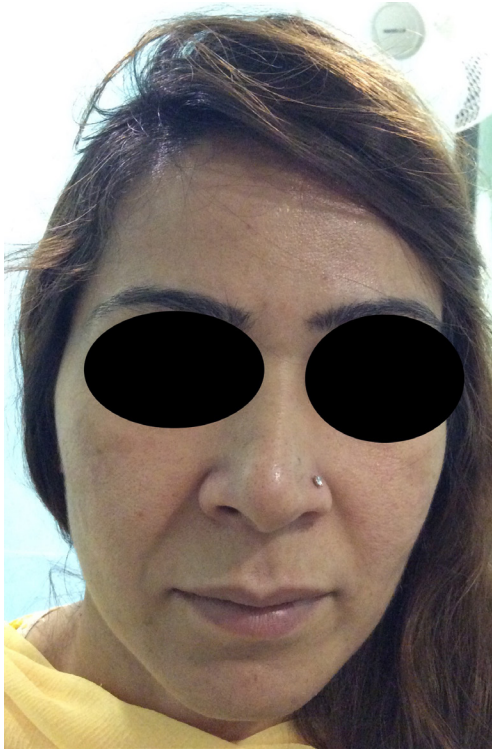
\*\*\* $p<0.001$ - as compared to pre

**Figure 1a:** Comparison of pre and post ASRS score of patients.



\*\*\* $p<0.001$ - as compared to pre

**Figure 1b:** Comparison of pre and post AFLS score of patients



**Figure 2a:** Pre procedure pic of patient



**Figure 2b:** Post procedure pic of patient after ferulic peel 6 sessions



**Figure 3a:** Pre procedure pic of patient



**Figure 3b:** Post procedure pic of patient after ferulic peel 6 sessions

**Table 1: Pre and post ASRS and AFLS scores of patients.**

S.No.	AGE	SEX	ASRS SCORE		AFLS SCORE	
			Baseline	Post(final score)	Baseline	Post(final score)
1	25	F	3	1	1	0
2	27	F	3	1	2	1
3	29	F	3	2	2	1
4	30	M	3	1	1	0
5	27	F	3	1	2	1
6	23	F	2	0	1	0
7	33	F	3	1	2	1
8	36	F	4	2	2	1
9	29	F	3	1	2	0
10	31	F	3	2	2	1
11	27	F	2	0	1	0
12	36	F	4	3	3	2
13	38	F	4	2	3	2
14	32	M	2	1	2	0
15	34	F	3	1	3	1
16	26	f	2	1	2	0
17	29	F	3	1	2	0
18	30	F	3	2	2	1
19	31	F	2	1	1	0
20	31	F	3	2	1	0
21	25	F	2	0	2	1
22	24	F	1	0	1	0
23	33	F	3	1	3	1
24	32	F	3	2	2	1
25	38	M	3	1	2	1
26	34	F	4	3	3	2
27	30	M	2	0	2	0
28	31	M	2	1	1	0
29	34	M	4	3	3	1
30	34	F	3	2	3	2
31	29	F	3	1	3	2
32	29	F	2	1	1	0
33	28	F	3	2	3	1
34	27	F	3	1	2	0
35	28	F	3	1	3	2
36	33	F	2	1	2	0
37	31	M	3	1	2	0
38	32	F	3	1	2	0
39	26	F	2	0	2	1
40	25	F	2	1	3	1



41	29	M	3	2	2	0
42	32	F	3	1	3	1
43	32	F	2	1	2	0
44	31	F	3	1	2	1
45	24	F	2	1	2	0
46	26	F	3	1	2	0
47	27	F	3	2	2	0
48	22	F	2	0	2	1
49	21	F	1	0	1	0
50	31	M	2	1	2	1
51	32	F	3	1	3	2
52	28	F	2	0	1	0
53	34	F	3	1	3	1
54	36	F	3	1	2	0
55	31	M	3	2	2	0

Note:- Post or final score indicates score taken 1 month after last peel session.

Similarly, the pre-AFLS score of patients ranged from 1-3 with mean ( $\pm$  SD)  $2.05 \pm 0.68$  and median 2 whereas at post-treatment it ranged from 0-2 with mean ( $\pm$  SD)  $0.64 \pm 0.70$  and median 1. Like, ASRS score, the mean AFLS score also decreased comparatively at post-treatment. Comparing the pre and post-treatment AFLS score, paired t test showed significant decrease (69.0%) in AFLS score at post-treatment as compared to pre-treatment ( $2.05 \pm 0.68$  vs.  $0.64 \pm 0.70$ , diff.=1.42, 95% CI=1.28 to 1.55,  $t=21.13$ ,  $p<0.001$ ) (Table 1 and Figure. 1B).

After complete statistical analysis, we found the results achieved were highly satisfactory as measured using the ASRS and AFLS scales with a p-value  $<0.001$  (statistically significant). No complications were observed in our study.

## Discussion

Ferulic acid (4-hydroxy-3-methoxycinnamic acid) (FA), is a natural and one of the most abundant phenols in many plants[6, 7]. FA occurs freely, or in dimers, or as esters bound to polysaccharides or proteins in cell walls [8, 9]. FA has the capacity to negate radical chain reactions through polymerization and is known to increase cross-linkages in polysaccharides and other polymers, giving it the capacity to prevent UV-radiation damage [10]. FA has a low toxicity index and its use is greatly limited by the fact that it is unstable in different solvents and has a low interaction with lipids [11, 13].

Ferulic peel is a non-exfoliating peel having antioxidant properties which modulates reactive oxygen species channels leading to tissue rejuvenation with improvement in photoaging. The Ferulic peel used in this procedure is composed of Ferulic Acid, Alcohol Denat, Ethoxydiglycol, PEG-400, Aqua. It is a technique sensitive procedure. Ferulic peel is a leave on peel having a PH of 4

to 5. Addition of ferulic acid, a ubiquitous plant antioxidant, provides stability of more than 90% for L-ascorbic acid[14]. In addition to improving stability, adding ferulic acid to the solution of 15% L-ascorbic acid and 1%  $\alpha$ -tocopherol doubles photoprotection when applied topically to skin from 4- to 8-fold. The photoprotection experiments, show reduction in thymine dimer formation generated by UV radiation and demonstrate reduction of apoptosis in keratinocytes with lowered caspase-3 and caspase-7 generation[14]. Indications for the use of ferulic acid include skin aging and photoaging, hyperpigmentation (melasma), seborrheic skin, and acne[15]. There has been recent interest in use of Ferulic acid and few studies have been published. A recent split face study[16] has evaluated the efficacy of Ferulic acid and Micro needling in reducing signs of photoaging. Another study has done a comparative analysis of Lactic Acid with Ferulic acid[17] vs Ferulic acid alone for photoaging. We did not encounter any complications in our study group and none has been reported so far in literature too suggesting a high safety profile of the peel.

## Conclusion

Within the limits of our study, we conclude that Ferulic Peel with L-Ascorbic Acid is very useful as a monotherapy in Photoaging cases with high safety profile, though we need RCT's and comparison with other peels/ combination vs monotherapy peels to validate findings.

1. The authors declare that they have no conflicts of interest to disclose.
2. This article contains studies with human participants performed by the authors.
3. A written Informed consent has been taken from each patient enrolled in the study.

1. Ethical approval: "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

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