RESEARCH PAPER

Black Peel versus Yellow Peel in the Treatment of Acanthosis Nigricans –A Randomised Control Trial

[1]Dr. Bommaka Sruthi, Dr. Suresh Kumar K[2*], Dr. Rajashekar TS[3] and [4]Dr. Madhu Kiran C

[1]*Final year post graduate, Dept of Dermatology, Venereology & Leprosy, Sri Devaraj Urs Medical College*
[2] *Professor& HOD, Department of Dermatology, Venereology & Leprosy, Sri Devaraj Urs Medical College*
[3] *Professor, Department of Dermatology, Venereology & Leprosy, Sri Devaraj Urs Medical College*
[4]*Assistant professor, Department of Dermatology, Venereology & Leprosy, Sri Devaraj Urs Medical College*
[*]***Corresponding author:*** *Dr. Suresh Kumar K*
skindrsureshk@sduaher.ac.in

ABSTRACT

Background: Acanthosis Nigricans (AN) is a common pigmentary disorder characterized by hyperpigmented, velvety thickening of flexural skin. Chemical peels are increasingly used for cosmetic improvement. Black Peel and Yellow Peel are widely used in dermatological practice; however, comparative evidence regarding their efficacy and safety in AN is limited.

Objective: To compare the efficacy and safety of Black Peel and Yellow Peel in patients with Acanthosis Nigricans using the Acanthosis Nigricans Area and Severity Index (ANASI).

Methods: A randomized controlled trial was conducted involving 60 patients with clinically diagnosed Acanthosis Nigricans. Patients were randomized into Group A (Black Peel) and Group B (Yellow Peel), with 30 patients in each group. Four treatment sessions were administered at two-week intervals. ANASI scores were assessed at baseline, each visit, and final follow-up. Patient satisfaction and adverse effects were also evaluated.

Results: Both groups demonstrated significant improvement in ANASI scores. However, Yellow Peel showed significantly greater reduction in disease severity. The mean ANASI score decreased from 18.4 ± 3.5 to 8.2 ± 2.1 in the Yellow Peel group compared to 18.7 ± 3.2 to 11.9 ± 2.5 in the Black Peel group ($p < 0.001$). Treatment success was achieved in 76.7% of patients receiving Yellow Peel compared to 43.3% receiving Black Peel ($p = 0.008$). Both treatments were well tolerated with only mild transient adverse effects.

Conclusion: Yellow Peel was significantly more effective than Black Peel in reducing pigmentation and thickness in patients with Acanthosis Nigricans while maintaining a comparable safety profile.

Keywords: Acanthosis Nigricans, Yellow Peel, Black Peel, ANASI, Chemical Peel.

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INTRODUCTION

Acanthosis Nigricans (AN) is a chronic dermatosis characterized by symmetrical hyperpigmented, velvety plaques affecting flexural regions, particularly the neck and axillae.[1,2,3,4] It is commonly associated with obesity, insulin resistance, metabolic syndrome, endocrinopathies and, rarely, internal malignancies.[1,2,4] Cosmetic disfigurement frequently results in psychological distress and reduced quality of life.[1,2]

Conventional treatment modalities include lifestyle modification, topical retinoids, keratolytic agents and depigmenting agents.[3] However, therapeutic response is often slow and incomplete. Chemical peels have emerged as effective procedural options because they promote epidermal turnover, reduce pigmentation and improve skin texture.

Black Peel contains black acetic acid, salicylic acid, jasmonic acid, bio-sulfur and potassium iodide, providing keratolytic and depigmenting effects.[6] Yellow Peel contains retinoic acid, kojic acid, azelaic acid, phytic acid and salicylic acid, producing potent depigmenting and rejuvenating effects.6,7,8

Although both peels are commonly employed in pigmentary disorders, direct comparative studies in Acanthosis Nigricans are lacking. The present study was undertaken to compare their efficacy and safety using the validated ANASI scoring system.[5]

MATERIALS AND METHODS

Study Design

Randomized controlled trial.

Study Setting

**Author for Correspondence: rajashekardermat@sduaher.ac.in*

Department of Dermatology, Venereology and Leprosy, R.L. Jalappa Hospital and Research Centre, Kolar.

Study Duration

September 2025 to February 2026.

Sample Size

60 patients.

Inclusion Criteria

* Age ≥18 years.

* Clinically diagnosed Acanthosis Nigricans.

* Disease duration >6 months.

* Baseline ANASI score ≥3.

Exclusion Criteria

* Pregnancy and lactation.

* Recent use of depigmenting agents.

* Recent use of metformin.

* Active skin infections.

* Known hypersensitivity to peel components.

METHODS OF DATA COLLECTION:

All patients fulfilling the inclusion criteria will be provided with written informed consent will be enrolled.

- After enrollment, baseline demographic and clinical details will be recorded in a structured proforma.
- Patients will be randomly assigned into two groups:
  - **Group A:** Participants will be treated with Black Peel once in every 2 weeks for 4 sessions.
  - **Group B:** Participants will be treated with yellow Peel once in every 2 weeks for 4 sessions.
  - Randomization will be carried out using a **computer-generated random number sequence**.

Group A: Pre procedurally neck skin will be cleaned with a cotton pad. Patients will be subjected to 2-3 coats of black peel classical solution of black acetic acid, salicylic acid, mandelic acid, lactic acid. Allowed to dry for 3 minutes and will be cleaned with normal saline. Each patient will be given 4 sessions 2 weeks apart. Peels will be performed under aseptic precautions, and patients will be advised post-procedure care (sunscreen, moisturizers, avoidance of sun exposure).

Group B: Pre procedurally neck skin will be cleaned with a cotton pad. Patients will be subjected to 2-3 coats of yellow peel classical solution of retinol, kojic acid, glycolic acid, lactic acid. Allowed to dry for 3 minutes and will be cleaned with normal saline. Each patient will be given 4 sessions 2 weeks apart. Peels will be performed under aseptic precautions, and patients will be advised post-procedure care (sunscreen, moisturizers, avoidance of sun exposure).

Assessment:

- **Primary Outcome:** ANASI score at baseline, each sitting, and final follow-up (2 weeks after last session).

1. Parameters Assessed

(A) Extent of Involvement (per site):

- 0 = None
- 1 = <10% involvement
- 2 = 10–29% involvement
- 3 = 30–49% involvement
- 4 = 50–69% involvement
- 5 = 70–89% involvement
- 6 = 90–100% involvement

(B) Pigmentation Intensity:

- 0 = Normal skin color
- 1 = Slightly brown
- 2 = Light brown
- 3 = Dark brown
- 4 = Black

(C) Thickness / Textural Changes:

- 0 = Normal skin
- 1 = Slight elevation
- 2 = Mild thickening / velvety feel
- 3 = Moderate thickening / coarse texture
- 4 = Severe thickening / papillomatous surface

2. Formula

For each site (Neck, Axilla, Others):

Site Score=Extent×(Pigmentation + Thickness)

Then,

Total ANASI Score=Neck Score + Axilla Score + Other Sites Score

- **Secondary Outcomes:**
  - Patient-reported improvement and satisfaction.
  - Adverse effects (erythema, burning, peeling, PIH) monitored and documented at each visit.
- **Documentation:** Standardized clinical photographs will be taken at baseline and each follow-up visit.

Follow-Up:

Patients will be followed up at **2-week intervals during the 6 sittings** and a final follow-up at 2 weeks after the last session

Outcome Measures

Primary Outcome

Reduction in ANASI score.

Secondary Outcomes

Patient-reported improvement and satisfaction.

Adverse effects (erythema, burning, peeling, PIH) monitored and documented at each visit

Statistical Analysis

Data were analyzed using SPSS version 27. Continuous variables were expressed as mean ± SD. Independent t-test and Chi-square test were used. A p-value <0.05 was considered statistically significant.

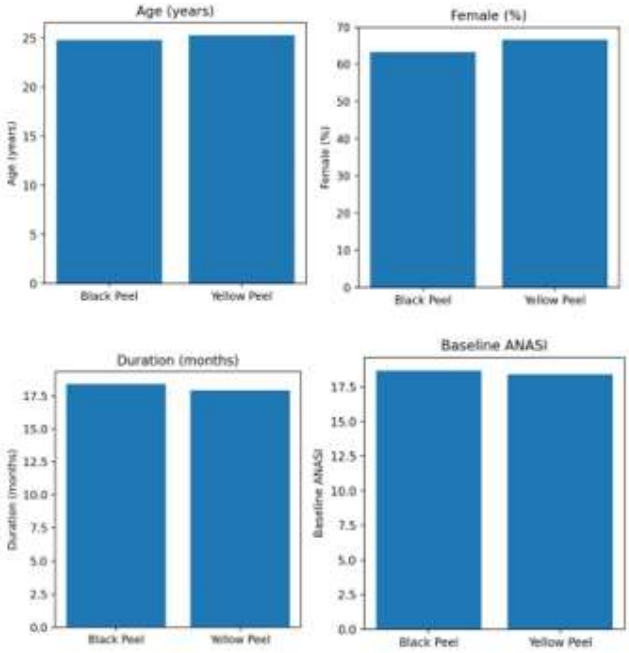
RESULTS

Baseline Characteristics

A total of 60 patients completed the study. Baseline demographic and clinical parameters were comparable between both groups.

Table 1. Baseline Characteristics

Variable	Black Peel	Yellow Peel	p value
Age (years)	24.8 ± 5.6	25.3 ± 5.2	0.728
Female (%)	63.3	66.7	0.785
Duration (months)	18.4 ± 8.2	17.9 ± 7.6	0.814
Baseline ANASI	18.7 ± 3.2	18.4 ± 3.5	0.742



No statistically significant difference was observed between groups at baseline.

Comparison of ANASI Scores

Both groups showed progressive reduction in ANASI scores throughout the study period. However, improvement was significantly greater in the Yellow Peel group.

Table 2. ANASI Score Comparison

Outcome	Black Peel	Yellow Peel	p value
Baseline ANASI	18.7 ± 3.2	18.4 ± 3.5	0.742
Final ANASI	11.9 ± 2.5	8.2 ± 2.1	<0.001
Mean Reduction	6.8 ± 2.6	10.2 ± 3.0	<0.001
Percentage Reduction (%)	36.4 ± 10.8	55.4 ± 11.2	<0.001

Visit	Black Peel (Mean ± SD)	Yellow Peel (Mean ± SD)	p-value
Baseline	18.7 ± 3.2	18.4 ± 3.5	0.742
After 1st sitting (Week 2)	17.2 ± 3.1	16.3 ± 3.3	0.284
After 2nd sitting (Week 4)	15.6 ± 2.9	13.9 ± 2.8	0.021*
After 3rd sitting (Week 6)	13.7 ± 2.7	10.8 ± 2.4	<0.001*
After 4th sitting (Week 8)	11.9 ± 2.5	8.2 ± 2.1	<0.001*

Figure 1. Change in Mean ANASI Score During Treatment

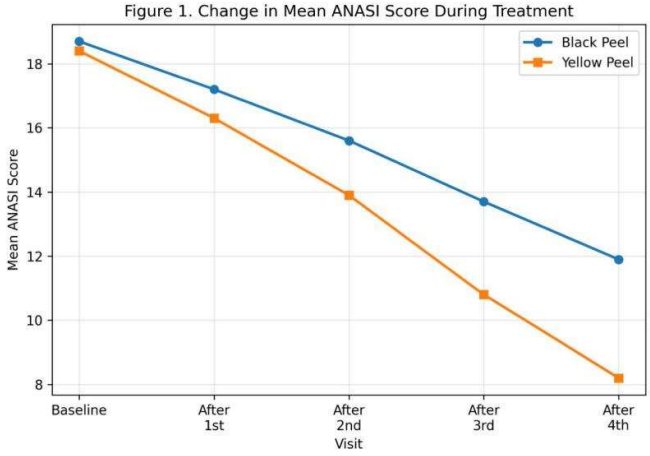


Figure 2. Mean Reduction in ANASI Score

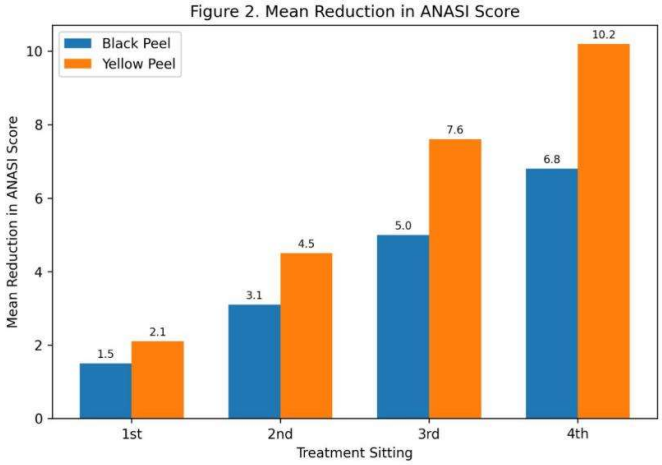
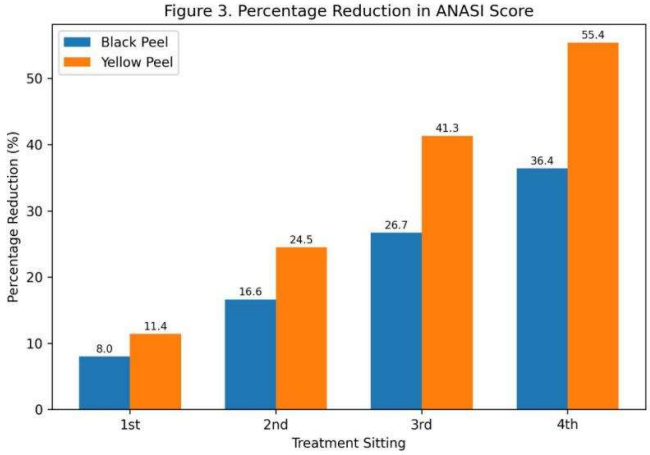


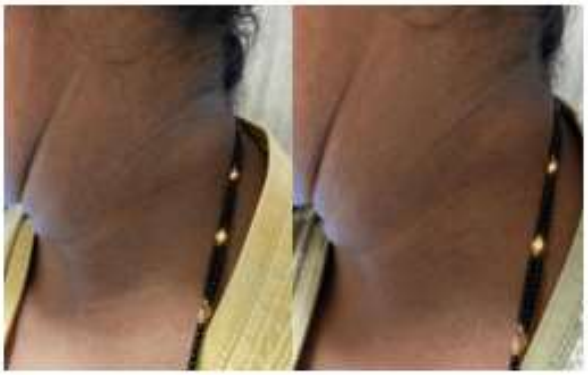
Figure 3. Percentage Reduction in ANASI Score



Yellow Peel demonstrated significantly greater reduction in ANASI scores.

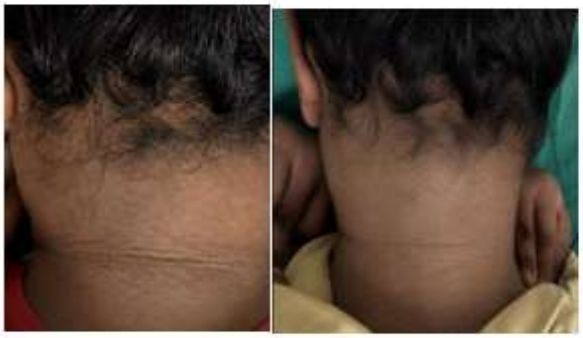
Group A: Black peel

Baseline 2 weeks 4 weeks



6 weeks 8 weeks

Group B: yellow peel



Global Improvement Assessment

Table 3. Clinical Improvement

Improvement	Black Peel n (%)	Yellow Peel n (%)
Excellent	4 (13.3)	12 (40.0)
Good	9 (30.0)	11 (36.7)
Fair	10 (33.3)	5 (16.7)
Poor	7 (23.3)	2 (6.7)

Treatment success was significantly higher in the Yellow Peel group (76.7% vs 43.3%; p=0.008).

Patient Satisfaction

Patient satisfaction was significantly higher among patients treated with Yellow Peel.

Table 4. Patient Satisfaction

Satisfaction	Black Peel	Yellow Peel
Highly Satisfied	20.0%	50.0%
Satisfied	40.0%	33.3%
Moderately Satisfied	26.7%	13.3%
Unsatisfied	13.3%	3.3%

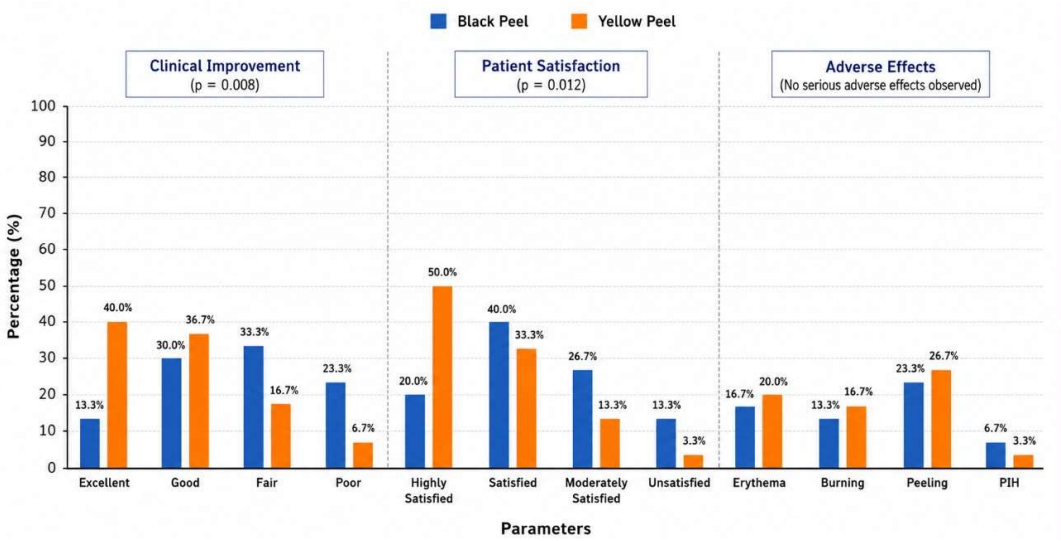
(p = 0.012)

Safety and Adverse Effects

Both treatment modalities were well tolerated.

Table 5. Adverse Effects

Adverse Effect	Black Peel	Yellow Peel	p value
Erythema	16.7%	20.0%	0.739
Burning	13.3%	16.7%	0.712
Peeling	23.3%	26.7%	0.766
PIH	6.7%	3.3%	0.551



No serious adverse effects were observed.

DISCUSSION

Yes. For most dermatology journals, the Discussion should be about 50–60% of what I wrote, i.e. around 600–800 words. Here's a concise, publication-style version:

DISCUSSION

The present randomized controlled study compared the efficacy and safety of Black Peel and Yellow Peel in patients with Acanthosis Nigricans using the ANASI scoring system. Acanthosis nigricans is seen in metabolic syndrome because of hyperkeratosis, epidermal proliferation by IGF,EGFR,FGF.[9,10,11,12] Both treatment modalities resulted in significant clinical improvement; however, Yellow Peel demonstrated superior efficacy, with greater reduction in ANASI scores, higher treatment success rates, and better patient satisfaction.

Baseline demographic and clinical characteristics were comparable between the two groups, indicating that differences in treatment outcomes were attributable to the interventions rather than baseline variability. Both groups showed progressive reduction in ANASI scores following four treatment sessions, but the reduction was significantly greater in the Yellow Peel group. This finding suggests that Yellow Peel provides more effective improvement in both pigmentation and epidermal thickening.

The superior efficacy of Yellow Peel may be explained by its combination of retinoic acid, kojic acid, azelaic acid, and phytic acid. Retinoic acid promotes epidermal turnover and normalizes keratinization, while kojic acid and azelaic acid inhibit melanogenesis by suppressing tyrosinase activity. Phytic acid acts as an antioxidant and enhances depigmentation. The synergistic action of these agents results in greater improvement in hyperpigmentation and skin texture. In contrast, Black Peel primarily acts through salicylic acid-induced keratolysis along with the anti-inflammatory and keratolytic properties of bio-sulfur and other components, producing comparatively modest depigmenting effects.[13,14,15,16]

Patient satisfaction was significantly higher among patients treated with Yellow Peel, reflecting the greater objective clinical improvement achieved. Since cosmetic appearance is a major concern in patients with Acanthosis Nigricans, improvement in pigmentation and skin texture is likely to contribute to higher treatment satisfaction and better quality of life.

Both treatment modalities were well tolerated. Adverse effects such as transient erythema, mild burning sensation, superficial peeling, and occasional post-inflammatory hyperpigmentation were mild, self-limiting, and did not require discontinuation of therapy. The incidence of adverse effects was comparable between the two groups, indicating that the superior efficacy of Yellow Peel was not associated with increased treatment-related complications.

The findings of the present study are in agreement with previous studies that have demonstrated the effectiveness of chemical peels in improving pigmentation and hyperkeratosis in Acanthosis Nigricans. Although various peeling agents, including glycolic acid, trichloroacetic acid, and retinoic acid-based peels, have shown favorable outcomes, comparative studies between Black Peel and Yellow Peel are limited. The present study therefore adds valuable evidence by directly comparing these two commonly used peeling agents using an objective clinical scoring system.

LIMITATIONS

The strengths of this study include its randomized controlled design, standardized treatment protocol, objective assessment using the ANASI score, and evaluation of both efficacy and safety outcomes. However, the study has certain limitations. It was conducted at a single center with a relatively small sample size and a short follow-up period, limiting assessment of long-term

efficacy and recurrence. Larger multicenter studies with extended follow-up are warranted to validate these findings.

CONCLUSION

Overall, both Black Peel and Yellow Peel were effective and safe in the management of Acanthosis Nigricans. However, Yellow Peel demonstrated significantly greater improvement in disease severity, higher patient satisfaction, and a comparable safety profile, suggesting that it may be considered a more effective treatment option for patients with Acanthosis Nigricans.

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