

Sentiment Analysis of EPSOLAY (Microencapsulated Benzoyl Peroxide 5%) on Reddit: Pre- and Post-FDA Approval

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Dear Editor,

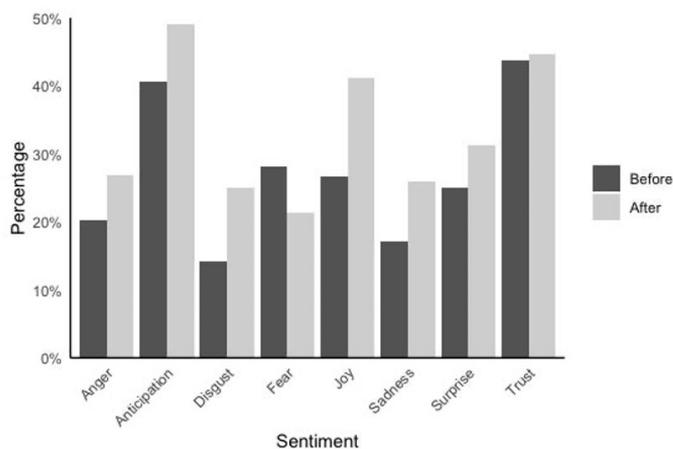
Whereas benzoyl peroxide (BPO) may result in itching and burning, Microencapsulated Benzoyl Peroxide 5% (E-BPO cream) encapsulates the BPO which may reduce irritation by limiting the direct contact of BPO with the skin.¹ Results from two phase 3 trials found that E-BPO was efficacious in reducing inflammatory lesion counts in patients with papulopustular rosacea.¹ Moreover, E-BPO was tolerable and demonstrated good safety, with no treatment-related serious adverse events (AEs). FDA has indicated the use of this treatment (Epsolay/E-BPO) for inflammatory lesions of rosacea in adults. Assessing public sentiment can play an important role in ensuring a commitment to patient-centered care through understanding patient attitudes and expectations toward the treatment alongside complementing post-market surveillance and patient-focused drug development. As such, we sought to investigate public sentiment toward this treatment pre- and post-FDA approval based on comments posted by Reddit users.

The RedditExtractoR package was used to retrieve all posted comments using the keyword Epsolay on March 29.² The Syuzhet package to assess post sentiment.³ All retrieved comments were assessed manually and were assigned an author type (Consumer, investor, blogger, or other) based on content or Reddit account postings. Comments were separated into pre- and post-FDA approval based on the April 22, 2022 FDA approval date. These comments were analyzed for differences in sentiment across 8 emotions (anger, anticipation, disgust, fear, joy, sadness, surprise, and trust).

We retrieved 176 comments, attributable to 102 unique authors, from 28 distinct threads on Reddit. 64 (36.36%) comments were posted before approval and 112 (63.64%) comments were posted after FDA approval. A majority of unique authors were individuals with rosacea 61 (59.80%). On the whole, comment sources were varied, with consumers authoring a majority of comments 96 (54.55%), followed by investors 52 (29.55%), bloggers 14 (7.95%), and others 14 (7.95%). Fewer messages expressed anger (20.3% vs 26.8%), anticipation (40.6% vs 49.1%), disgust (14.1% vs 25.0%), joy (26.6% vs 41.1%), sadness (17.2%

vs 25.9%), and surprise (25.0% vs 31.2%) before vs after FDA approval. After FDA approval, messages expressed less fear (21.4% vs 28.1%) and more trust (44.6% vs 43.8%), compared to before FDA approval (Figure 1).

FIGURE 1. Public sentiment regarding EPSOLAY before and after FDA approval on Reddit.



There were more messages expressing positive sentiment after FDA approval (65.2% vs 48.4%). There was a significant difference in the proportion of positive messages after FDA approval ($P=0.030$), and messages expressed significantly more joyous sentiment ($P=0.023$). See Table 1 for examples of comments with associated sentiments.

Several limitations limit the applicability of these findings. While we manually assessed comments, it is possible that some were authored by bots. Also, this analysis only assessed the sentiment of comments posted to Reddit, and it is possible that the sentiment of Reddit users towards Epsolay is not representative of the general public or consumers interested in the product.

TABLE 1.

Examples of Comments and Associated Sentiment	
Comment	Associated Sentiment
Anger	"I use it and I'm on the fence. When I first started it, I saw positive results. It's been about a month now of daily use and my acne is like crazy. Super red cysts all over my jaw."
Anticipation	"Yeah, I assumed my skin would not be happy with this, but I'm also willing to try anything at this point. Thanks for letting us all know."
Disgust	"There have been a few mentions of it so far, but it's still so new there's not a lot of reports about it yet. And unfortunately, it's also somewhat shockingly expensive for a Benzoyl Peroxide product."
Fear	"I tried it about a month ago and skin went crazy. Sandpaper like skin, flaking, and crazy itching. Took a break and started again every other night once my skin calmed down. Same thing. Looked like I had hand foot and mouth. Couldn't continue, but I have very sensitive skin. I'm sure the BPO in that form might work for some."
Joy	"I've been using Epsolay once daily for 10 days. I have rosacea 2 and it's helped a great deal. My insurance doesn't cover it so that's the bad news. I'm 72 and some new medications triggered a big outbreak. It is working so far. Good luck."
Sadness	"I have been using it for 2 months and not sure about continuing- I can't tell a huge difference, it's very expensive - \$60 for 30 days (the bottle says dispose after 30 days of use - which I did - even though I didn't even use half the bottle), and my husband HATES the smell. ... Hope more people chime in - I want to believe this works! ..."
Surprise	"I've also had a ton of burning and itching! When I was prescribed Epsolay along with Oracea and while my nose is looking better my cheek is freaking out and feeling so uncomfortable. I'm thinking of stopping the Epsolay and Oracea to go back to the originally stuff that seemed to work better."
Trust	"Well, thank you! I'm gonna call the dermatologist and see what she says and then see how much it costs! ..."

The main result of the study is that after FDA approval of Microencapsulated Benzoyl Peroxide 5% (E-BPO cream) for treating inflammatory lesions of rosacea in adults, there was a shift in public sentiment, whereby there was an increase in positive sentiment (65.2% vs 48.4%), expressed in comments posted on Reddit. Greater anticipation and trust were observed and there was less fear after FDA approval. Our findings may be explained by FDA approval conferring a degree of trust in the treatment's safety and efficacy. Additionally, patient-centered drug design is important in dermatology, where topical treatments play a significant role in managing conditions like rosacea.

In a retrospective cohort analysis of patients from the MarketScan Commercial Claims and Encounters and the Medicare Supplemental database, it was found that 6270 (12.7%) patients had an adverse event (AE), with the majority of these leading to either treatment switch or discontinuation.⁴ Moreover, they found that the highest adverse event rates and higher-rosacea-related costs were attributable to BPO.⁴ Drug design of topical medications that center patients may improve adherence.⁵ Through assessment of public sentiment toward topical treatments such as E-BPO cream, researchers can better understand and attend to stakeholder interests.

Owing to the importance of assessing the public's sentiment toward therapies with novel FDA approvals, future research may benefit from including non-social media users alongside comments from a myriad of social media platforms.

DISCLOSURES

The authors have no conflicts of interest or financial disclosures, and all authors had access to the data and a role in writing the manuscript.

REFERENCES

- Bhatia N. Efficacy and Safety of Microencapsulated Benzoyl Peroxide (E-BPO) Cream, 5% in Papulopustular Rosacea: Results from Two Phase 3, Vehicle-controlled Trials, in Fall Clinical Dermatology Conference. Las Vegas: NV; 2019.
- Rivera I. *RedditExtractoR: Reddit Data Extraction Toolkit*. R package version 3.0.9. 2023. <https://CRAN.R-project.org/package=RedditExtractoR>. Accessed Jul 17, 2023.
- Jockers M. Introduction to the Syuzhet Package. <https://cran.r-project.org/web/packages/syuzhet/vignettes/syuzhet-vignette.html>. Accessed Jul 17, 2023
- Williamson T, Kamalakar R, Ogbonnaya A, et al. Rate of adverse events and healthcare costs associated with the topical treatment of rosacea. *Am Health Drug Benefits*. 2017;10(3):113-119. PMID: 28626508; PMCID: PMC5470237.
- Oliveira R, Almeida IF. Patient-centric design of topical dermatological medicines. *Pharmaceuticals*. 2023;16(4):617.

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