



Black Seed Oil's Intraoral Effects : A Pilot Study

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INTRODUCTION

- Increased medical distrust and decreased access to care have led to an increase in holistic oral health practices, such as oil pulling.
- Periodontal disease is driven by the dysbiosis of the oral microbiome.
- Black seed oil, specifically its active ingredient, thymoquinone, has documented antimicrobial and anti-inflammatory properties.
- The purpose of this study is to evaluate black seed oil's ability to decrease the oral bacterial load associated with periodontal disease as compared to standard mouthrinse.

METHODS

- Design: Randomized crossover pilot study (n=10) evaluating black seed oil vs Listerine on oral microbiome
- Groups:
 - A: Black seed oil -> Listerine
 - B: Listerine -> Black seed oil
- Intervention
 - Black seed oil: 5mL, 7-13 min daily
 - Listerine: 20mL, 30 sec twice daily
- Timeline
 - 10-20 day intervention periods
 - 2-3 week washout between phases
- Data Collection
 - Pre- and post- intervention saliva/buccal swabs
 - Microbial analysis via external lab (BioTek) using qPCR-based CFU/mL data
- Analysis: Paired t-tests ($p < 0.05$), Observed trends
- Microbial analysis of bacteria as listed by BioTek company : *Campylobacter rectus*, *Capnocytophaga gingivalis*, *Enterococcus faecalis*, *Fusobacterium nucleatum*, *Parvimonas micra*, *Peptostreptococcus anaerobius*, *Prevotella intermedia*, *Streptococcus mutans*, *A. actinomycetemcomitans*, *Porphyromonas gingivalis*, *Tannerella forsythia*, *Treponema denticola*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Acinetobacter species*, *Haemophilus species*, *Candida albicans*, *Candida species*, *Streptococcus salivarius*, and *Lactobacillus species*

RESULTS

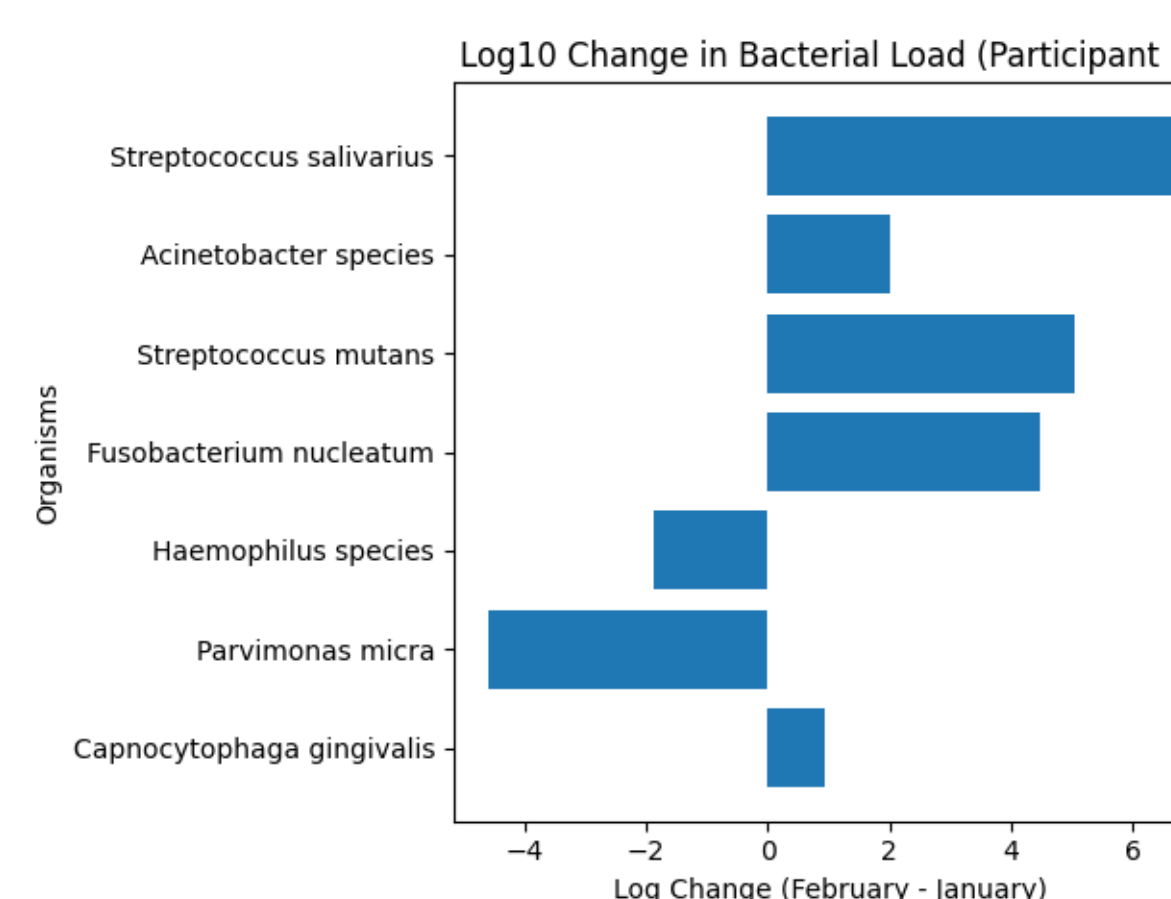
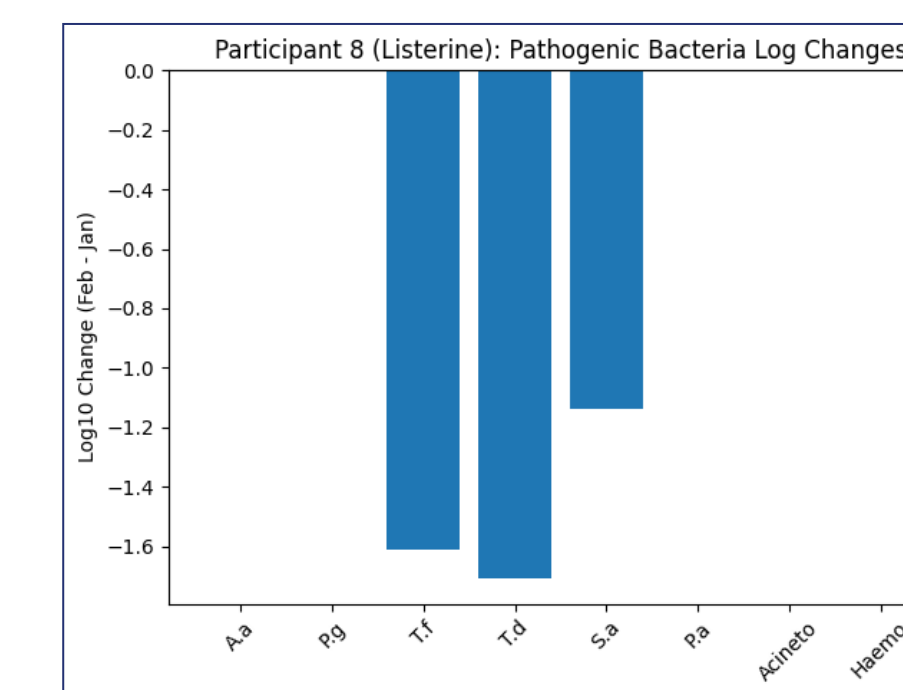
- Significant intra-individual variability with microbial changes ranging from complete eradication of some species to multi-log increases ($>7\log_{10}$) in some, which reflects restructuring rather than uniform reduction
- Listerine shows broad-spectrum antimicrobial activity, which leads to large reductions in certain pathogenic bacteria; however, it was also associated with increases in *Candida species* in multiple participants
- Black seed oil showed more selective antimicrobial effects with less frequent complete eradication in bacteria and gradual increases in commensal bacteria, such as *Streptococcus salivarius*, and lower incidences of fungal overgrowth.
- There were dysbiosis patterns that emerged: microbiome shifts included simultaneous loss of bacteria and emergence of new ones, initially undetected. The Listerine group showed a higher frequency of fungal overgrowth, while the black seed oil group showed less fungal overgrowth but more variability in bacterial response.
- Adverse effects were reported from Group A during their first intervention of Black Seed Oil (6% TQ), including mucosal irritation, erythema, and ulceration
 - Their symptoms resolved after discontinuation.
 - After a washout period, they were switched to a lower concentration of Black Seed Oil (1.7%)
- Both the black seed oil and Listerine showed reductions in bacterial load
- Limitations
 - Small sample
 - Participation dropout
 - Variable compliance and intervention duration + variable efficacy
 - Possible contamination during sample collection and handling

OPPORTUNISTIC BACTERIA			
TEST	RESULT	H/L	REFERENCE
Campylobacter rectus	<DL	↓	<(1.00)
Capnocytophaga gingivalis	0.05	↓	<(3.00)
Enterococcus faecalis	<DL	↓	<(1.00)
Fusobacterium nucleatum	<DL	↓	<(4.00)
Parvimonas micra	0.04	↓	<(4.00)
Peptostreptococcus anaerobius	<DL	↓	<(5.00)
Prevotella intermedia	<DL	↓	<(5.00)
Streptococcus mutans	<DL	↓	<(1.00)

PATHOGENIC BACTERIA			
TEST	RESULT	H/L	REFERENCE
A. actinomycetemcomitans	<DL	↓	<(1.00)
Porphyromonas gingivalis	<DL	↓	<(4.00)
Tannerella forsythia	<DL	↓	<(3.00)
Treponema denticola	<DL	↓	<(2.00)
Staphylococcus aureus	<DL	↓	<(1.00)
Pseudomonas aeruginosa	<DL	↓	<(1.00)
Acinetobacter species	<DL	↓	<(1.00)
Haemophilus species	4.32 H	↑	<(1.00)

MYCOLOGY			
TEST	RESULT	H/L	REFERENCE
Candida albicans	0.00	↓	<(1.00)
Candida species	<DL	↓	<(1.00)

NORMAL ORAL FLORA			
TEST	RESULT	H/L	REFERENCE
Streptococcus salivarius	<DL L	↓	>(5.00)
Lactobacillus species	<DL L	↓	>(1.00)



CONCLUSION

- Black seed oil demonstrates potential as an antimicrobial rinse that is comparable to OTC products such as Listerine
 - It has more selective antimicrobial activity
 - Less disruption of microbiome = less dysbiosis
 - Supports gradual recolonization of commensal bacteria
- The concentration of the black seed oil is an important factor in adverse side effects
 - This may effect compliance
- Microbial changes were characterized by both the **emergence** of previously undetectable organisms and **elimination and suppression** of others, suggesting that the microbiome has complex responses to antimicrobial interventions
 - Non-linear and very dynamic
- Increases in commensal organisms like *Streptococcus salivarius* were observed, suggesting partial restoration of the oral microbiome.

Clinical Implications: Antimicrobial therapies should be evaluated not only based on pathogen reduction but also on the impact of the microbiome, which the use of broad spectrum antimicrobials often throws into dysbiosis.

These findings suggest that a larger and long-term study may help to determine the safety, dosing, and possible clinical application of black seed oil as an alternative holistic adjunctive to traditional rinses.

REFERENCES

Scan QR Research Document and References



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