ISRCTN79156900 https://doi.org/10.1186/ISRCTN79156900

Coriander essential oil and chlorhexidine mouthwashes in adults with Stage III or Stage IV periodontitis: effects on saliva microbiome and inflammation

Submission date
16/03/2026

Recruitment status
No longer recruiting

Registration date
11/05/2026

Overall study status
Completed

Last Edited
05/10/2026

Condition category
Oral Health

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Periodontitis is a serious gum disease that damages the tissues supporting the teeth. It is linked to changes in the bacteria living in the mouth and to inflammation. Chlorhexidine mouthwash is commonly used in dental care because it can reduce bacteria, but it may also affect beneficial bacteria and can cause side effects such as an unpleasant taste, changes in taste, dry mouth, mouth irritation, or tooth staining.
This study aims to compare three mouthwashes in adults with periodontitis: a mouthwash containing coriander essential oil, a standard chlorhexidine mouthwash, and water. The study looks at how these mouthwashes affect the bacteria found in saliva and saliva inflammatory markers over a 2-week period.

Who can participate?
Adults aged 18 to 60 years with Stage III or Stage IV periodontitis

What does the study involve?
Participants first provide an unstimulated saliva sample in the morning under fasting conditions. They are then randomly assigned to one of three mouthwash groups:
1. Coriandrum sativum essential oil mouthwash, 4 mg/ml
2. Chlorhexidine mouthwash, 0.12%
3. Water control
Participants use 20 ml of their assigned mouthwash twice daily for 2 weeks while maintaining their usual diet and lifestyle. After 2 weeks, participants provide a second unstimulated saliva sample in the morning under fasting conditions. The saliva samples are analysed in the laboratory to study the oral microbiome, meaning the bacteria and other microbes present in saliva, and inflammatory markers.

What are the possible benefits and risks of participating?
Participants may not receive a direct personal benefit from taking part. The study may help

researchers better understand how different mouthwashes affect the oral microbiome and inflammation in people with periodontitis. This knowledge may support the development of oral hygiene products that are effective but less disruptive to beneficial oral bacteria.
Saliva collection is non-invasive and has minimal risk. Possible risks from using the mouthwashes include unpleasant taste, temporary changes in taste, dry mouth, burning or irritation in the mouth, tooth or tongue staining, and possible sensitivity or allergic reaction. Chlorhexidine is known to be associated with taste disturbance and staining in some users. Participants can stop taking part if they experience discomfort or no longer wish to continue.

Where is the study run from?
The study is run from Riga Stradiņš University, Riga, Latvia. Participants were recruited and sampled through the RSU Institute of Stomatology, Riga, Latvia.

When is the study starting and how long is it expected to run for?
August 2024 to August 2025

Who is funding the study?
The study is funded through the Postdoctoral Grant “Oral microbiome and inflammatory dynamics in Stage III periodontitis: comparative effects of mouthwash formulations containing Latvian-grown Coriandrum sativum essential oil versus standard chlorhexidine regimen” (Grant No. RSU-PG-2024/1-0010), as part of the project “RSU Internal and RSU with LASE External Consolidation” (Project No. 5.2.1.1.i.0/2/24/I/CFLA/005), funded by the European Union Recovery and Resilience Facility and the budget of the Republic of Latvia.

Who is the main contact?
Dr Alisa Kazarina, alisa.kazarina@rsu.lv

Contact information

Type(s)
Principal investigator, Scientific, Public

Contact name
Dr Alisa Kazarina

ORCID ID
https://orcid.org/0000-0003-3602-5261

Contact details
Riga Stradiņš University
Dzirciema Street 16
Riga
Latvia
LV-1007
+371 (0)29832898
alisa.kazarina@rsu.lv

Additional identifiers

Rīga Stradiņš University Research Ethics Committee Number

2-PĒK-4/356/2024

Study information

Scientific Title
A randomized, three-arm, parallel clinical study in adults with Stage III or Stage IV periodontitis comparing Coriandrum sativum essential oil mouthwash, 0.12% chlorhexidine mouthwash, and water control for changes in salivary microbiome composition and salivary inflammatory markers

Acronym
EOsPerio

Study objectives
Current study objectives as of 20/07/2026:
1. To determine the effect of a Coriandrum sativum essential oil mouthwash on the salivary microbiome of adults with Stage III or Stage IV periodontitis and to compare this effect with chlorhexidine and water control
2. To compare changes in salivary inflammatory markers between the three study groups during the 2-week pre-treatment intervention period

Previous study objectives:
1. To determine the effect of a Coriandrum sativum essential oil mouthwash on the salivary microbiome of adults with Stage III periodontitis and to compare this effect with chlorhexidine and water control
2. To compare changes in salivary inflammatory markers between the three study groups during the 2-week pre-treatment intervention period

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 15/04/2024, Riga Stradiņš University Research Ethics Committee (16 Dzirciema iela, Riga, LV-1007, Latvia; +371 (0)67409219; pek@rsu.lv), ref: 2-PĒK-4/356/2024

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Open (masking not used)

Control
Placebo

Assignment
Parallel

Purpose

Basic science, Prevention

Study type(s)

Health condition(s) or problem(s) studied
Stage III or Stage IV periodontitis

Interventions
This is a single-centre, randomized, three-arm, parallel, placebo- and active-controlled interventional study conducted in Latvia.

Adults with Stage III or Stage IV periodontitis were recruited at the Rīga Stradiņš University Institute of Stomatology. Participants were randomised to one of three parallel study groups using a simple computer-generated random allocation sequence prepared before enrolment. No stratification or blocking was used. Study intervention bottles were prepared in advance according to the allocation sequence. After eligibility assessment, informed consent, and baseline saliva collection, each participant was assigned sequentially to the next pre-prepared bottle in the sequence. The study was open-label, and no masking was used.

Participants were assigned to one of three study arms:
1. Coriandrum sativum essential oil (CSEO) mouthwash, 4 mg/ml
2. Chlorhexidine (CHX) mouthwash, 0.12%
3. Water control

Participants used 20 ml of their assigned mouthwash twice daily for 2 weeks while maintaining their usual diet and lifestyle. At baseline and after the 2-week intervention, unstimulated whole saliva (minimum 2 ml) was collected in the morning in a fasting state. Saliva aliquots were used for inflammatory marker profiling and microbiome analysis. The microbial endpoint was assessed using shotgun metagenomic sequencing of saliva, with human reads removed before downstream microbial analyses.

Intervention Type
Other

Primary outcome(s)
1. Salivary microbiome changes measured using shotgun metagenomics of microbial reads at before and 2 weeks after the intervention

Key secondary outcome(s)

Completion date
16/08/2025

Eligibility

Key inclusion criteria
Current inclusion criteria as of 07/07/2026:
1. Adults aged 18 to 60 years
2. Diagnosis of Stage III or Stage IV periodontitis
3. Systemically healthy with no known systemic disease likely to materially affect study results
4. Able to understand and communicate in Latvian

Previous inclusion criteria:
1. Adults aged 18 to 60 years
2. Diagnosis of Stage III periodontitis
3. Systemically healthy with no known systemic disease likely to materially affect study results
4. Able to understand and communicate in Latvian

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Upper age limit
60 Years

Sex
All

Total final enrolment
38

Key exclusion criteria
Current exclusion criteria as of 20/07/2026:
1. Acute illness within the previous 3 months
2. Current or previous chronic systemic disease likely to affect study outcomes, including but not limited to cardiovascular disease or diabetes
3. Malignancy within the previous 3 years or ongoing cancer treatment
4. Use of antibiotics, probiotic tablets/capsules, immunosuppressive drugs, anti-cytokine therapy, or corticosteroids within the previous 1 month
5. Pregnancy or breastfeeding
6. Major dietary changes during the previous month, especially changes in major food groups
7. Recent dental procedures or periodontal therapy likely to affect periodontal health or the oral microbiome, including major dental surgery or periodontitis therapy within the previous 1 month
8. Current participation in another clinical study or research study that could affect the results

Previous exclusion criteria:
1. Acute illness within the previous 3 months
2. Current or previous chronic systemic disease likely to affect study outcomes, including but not limited to cardiovascular disease or diabetes
3. Malignancy within the previous 3 years or ongoing cancer treatment
4. Use of antibiotics, probiotic tablets/capsules, immunosuppressive drugs, anti-cytokine therapy, or corticosteroids within the previous 3 months
5. Pregnancy or breastfeeding
6. Major dietary changes during the previous month, especially changes in major food groups
7. Recent dental procedures or periodontal therapy likely to affect periodontal health or the oral

microbiome, including major dental surgery or periodontitis therapy within the previous 6 months
8. Current participation in another clinical study or research study that could affect the results

Date of first enrolment
01/08/2024

Date of final enrolment
01/08/2025

Locations

Countries of recruitment
Latvia

Sponsor information

Organisation
Riga Stradiņš University

ROR
https://ror.org/03nadks56

Funder(s)

Funder type

Funder Name
Rīgas Stradiņa Universitāte

Alternative Name(s)
Rīga Stradiņš University, Rīga Stradiņš University, Universitas Rigensis Stradina, Riga Medical Institute, Medical Academy of Latvia, RSU

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
Latvia

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		03/10/2026	05/10/2026	Yes	No