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FORUM BRASIL

# Avanços no uso de probióticos em pet food

Prof. Ananda P. Félix
Universidade Federal do Paraná

LENUCAN

UFPR
UNIVERSIDADE FEDERAL DO PARANÁ

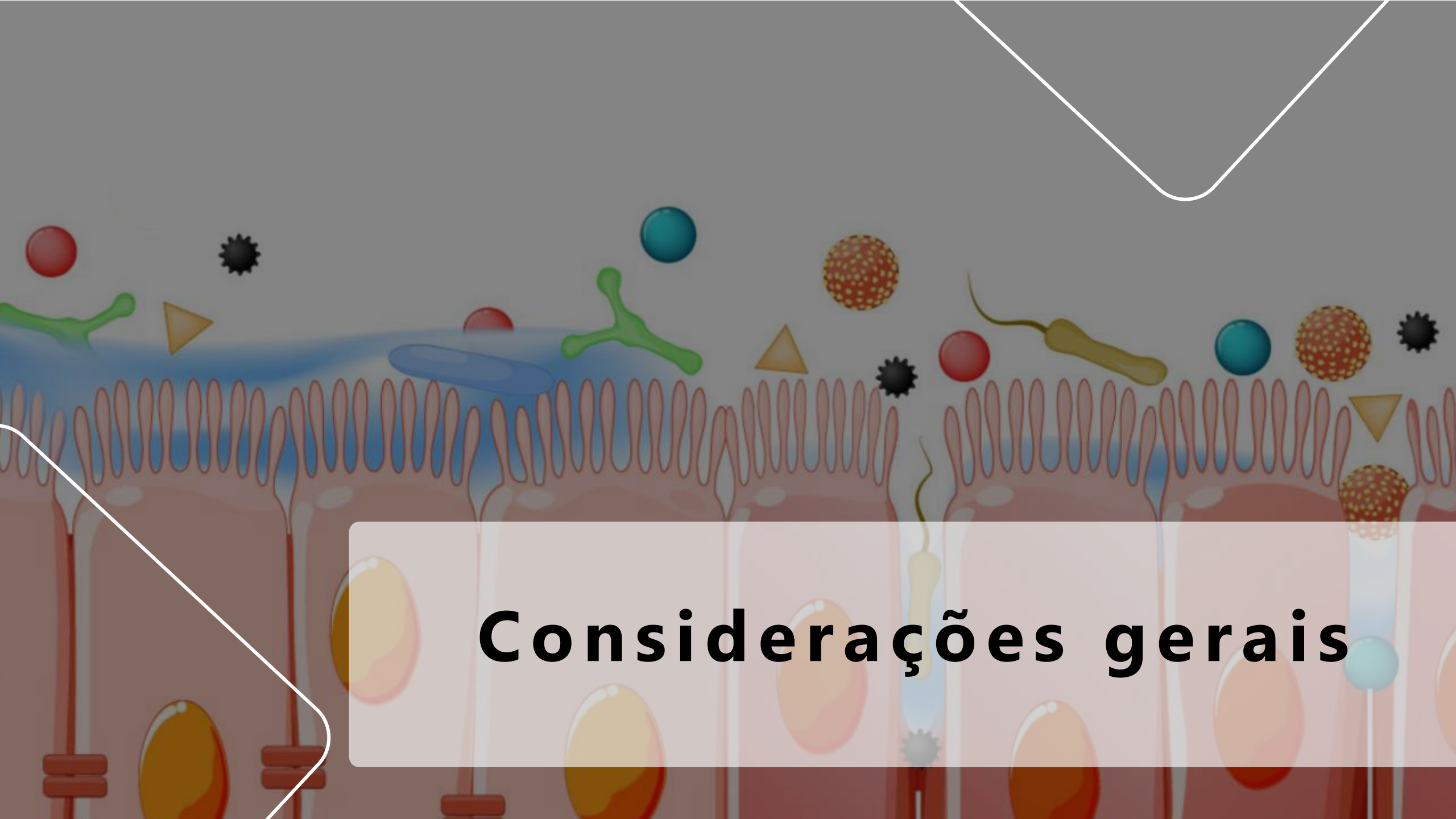
# Agenda

**01** Considerações gerais

**02** Probióticos

**03** Novos probióticos

**04** Considerações finais

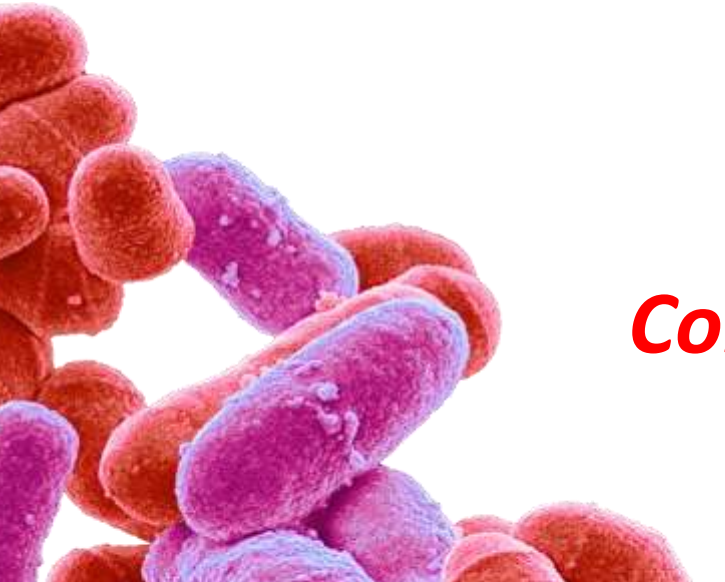


# Considerações gerais

# Definições

## Simbióticos

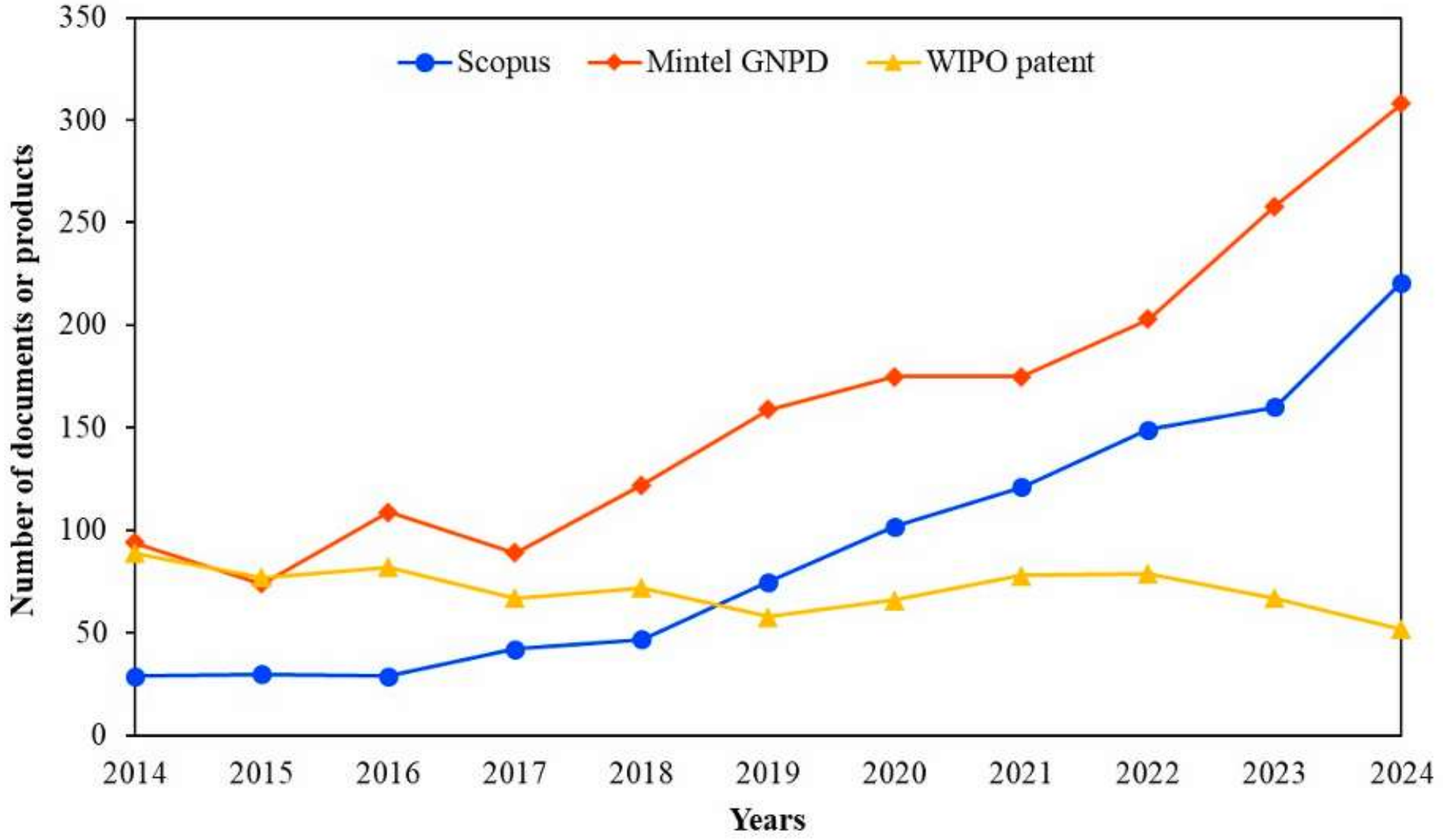
- Prebióticos
- Probióticos
- Posbióticos



***Conferem um efeito benéfico ao hospedeiro***

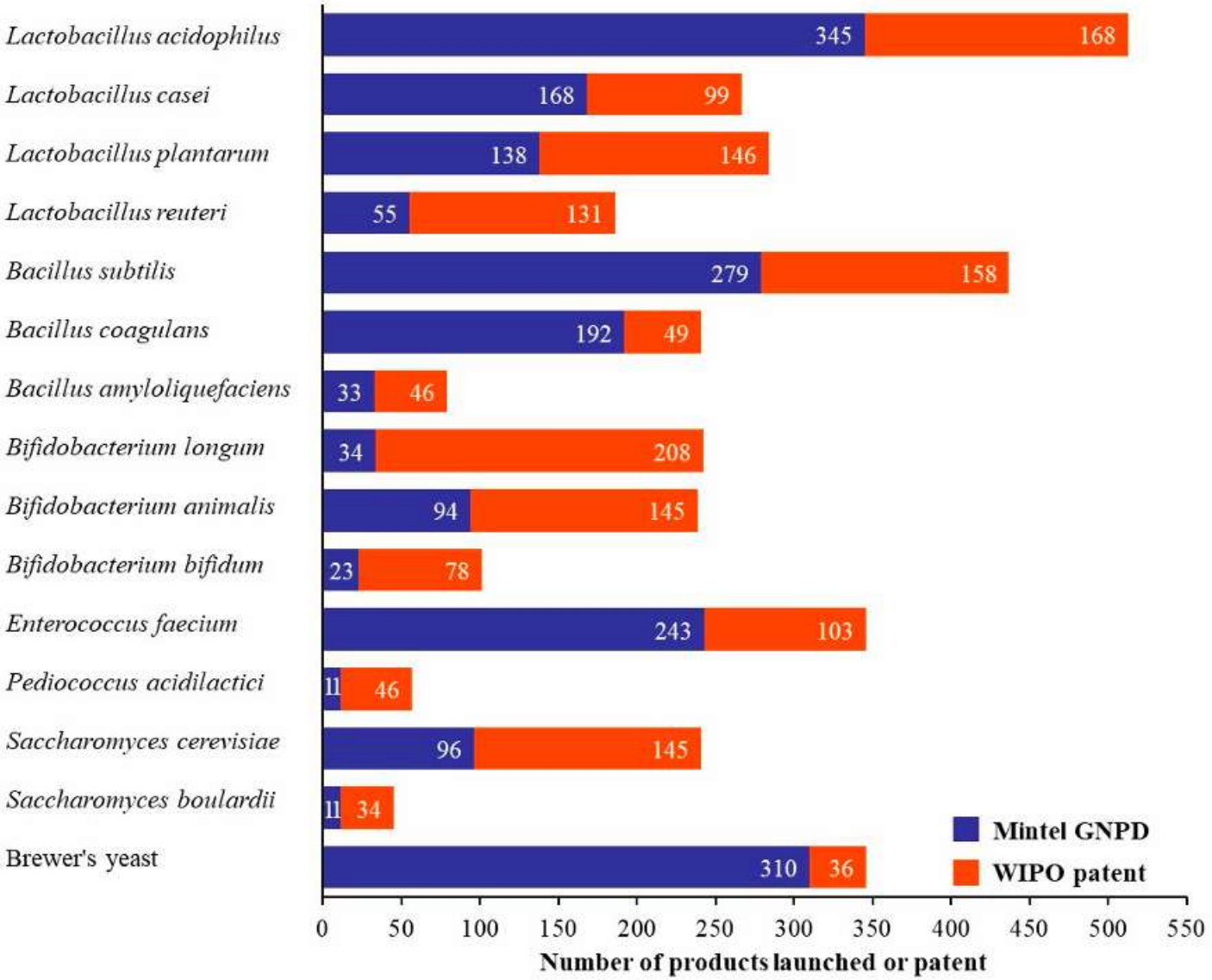
Hill et al. (2014), Gibson et al. (2017), Salminem et al. (2021)

# Número de publicações e produtos com probióticos




Klinmalai et al. (2025)

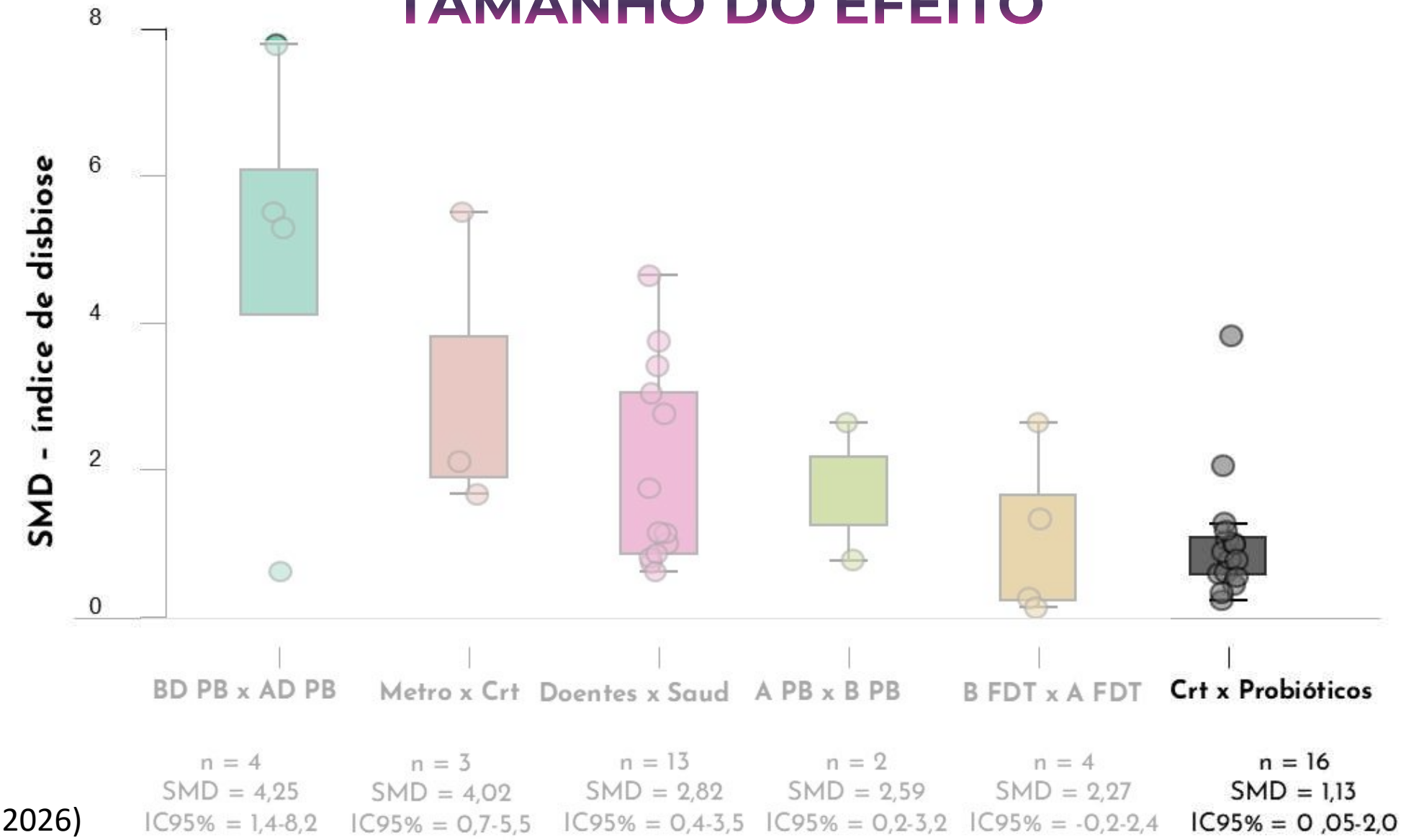
# Principais probióticos




Klinmalai et al. (2025)

# Qual o tamanho do efeito dos probióticos?

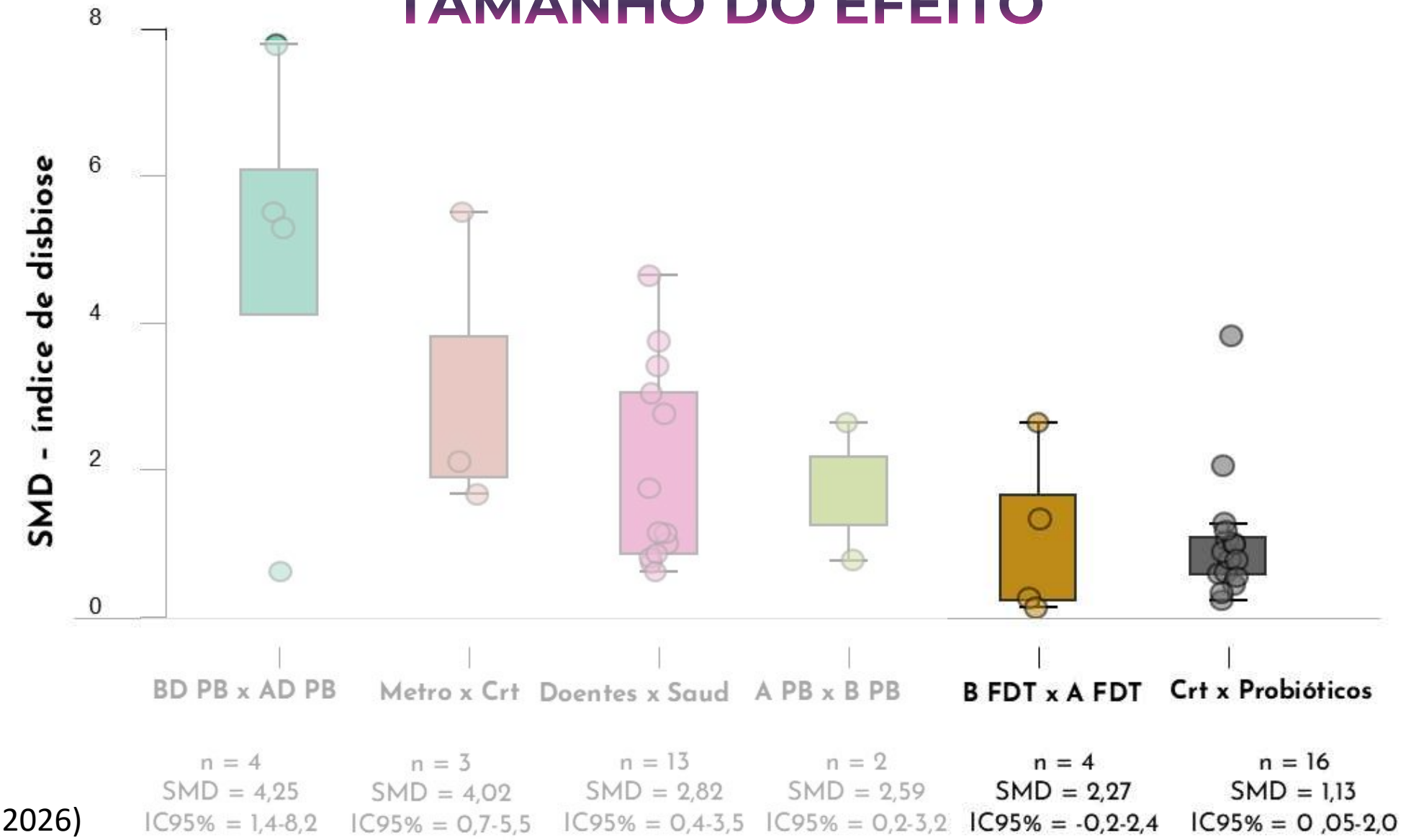
# TAMANHO DO EFEITO




Souza et al. (2026)

Bastos *et al.* (2023); Bastos *et al.* (2024); Timlin *et al.* (2024); Villa *et al.* (2025). Oba *et al.* (2025); Schmidt *et al.* (2018). Jeusette *et al.* (2025); Oba *et al.* (2025); Rudinsky *et al.* (2022). Belchik *et al.* (2024); Pilla *et al.* (2020); Rudinsky *et al.* (2022). AlShawaqfeh *et al.* (2017); Blake *et al.* (2019); Cagnasso *et al.* (2024); Chaitman *et al.* (2020); Chen *et al.* (2025); Galler *et al.* (2022); Giaretta *et al.* (2018); Guard *et al.* (2019); Minamoto *et al.* (2019); Toresson *et al.* (2025); Voudren *et al.* (2024); Werner *et al.* (2020). Bastos *et al.* (2023); Bastos *et al.* (2024); Herstad *et al.* (2022); Lucchetti *et al.* (2021); McAtee *et al.* (2023); Oba *et al.* (2025); Whittemore *et al.* (2021).

# TAMANHO DO EFEITO

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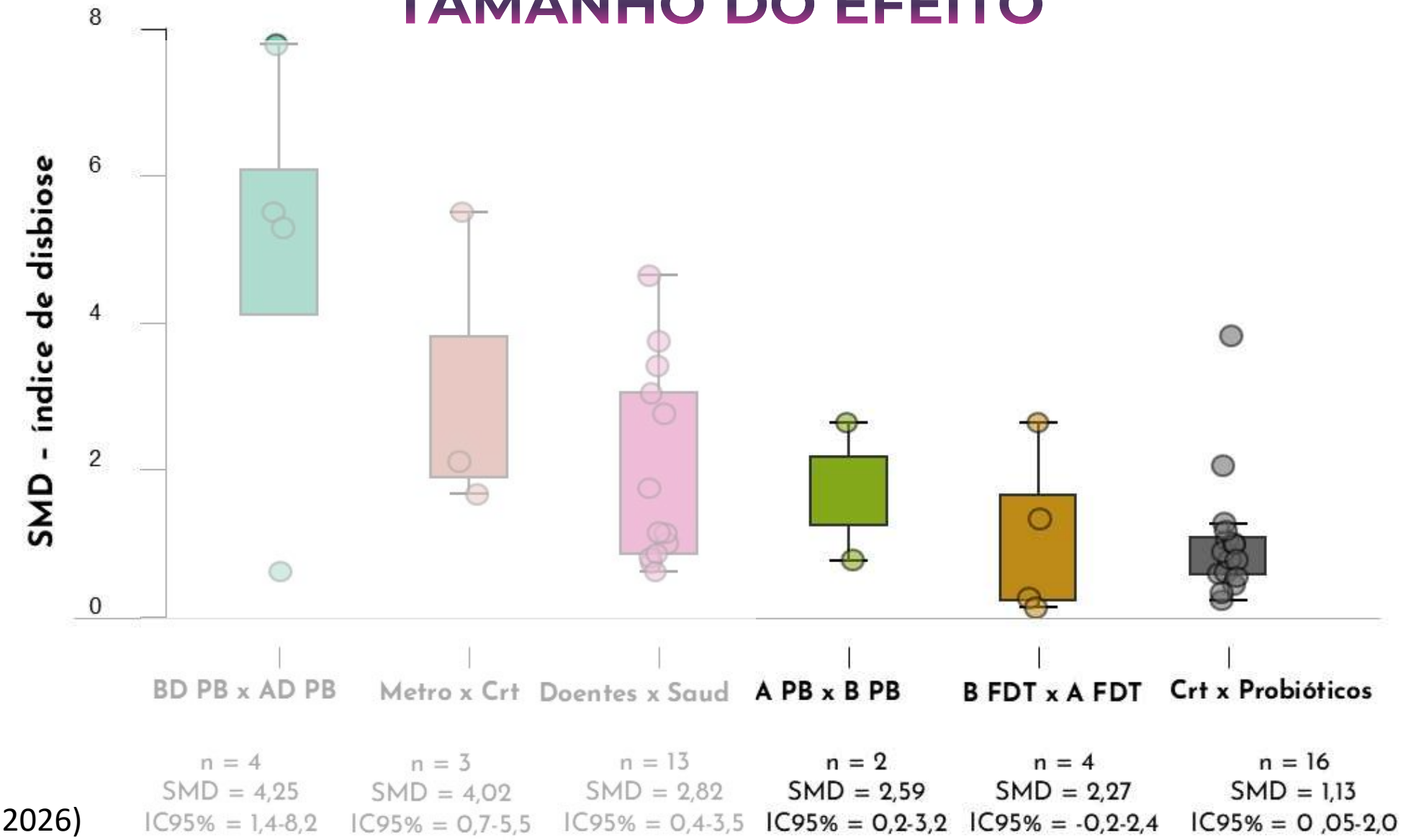
# TAMANHO DO EFEITO




Souza et al. (2026)

Bastos *et al.* (2023); Bastos *et al.* (2024); Timlin *et al.* (2024); Villa *et al.* (2025). Oba *et al.* (2025); Schmidt *et al.* (2018). Jeusette *et al.* (2025); Oba *et al.* (2025); Rudinsky *et al.* (2022). Belchik *et al.* (2024); Pilla *et al.* (2020); Rudinsky *et al.* (2022). AlShawaqfeh *et al.* (2017); Blake *et al.* (2019); Cagnasso *et al.* (2024); Chaitman *et al.* (2020); Chen *et al.* (2025); Galler *et al.* (2022); Giaretta *et al.* (2018); Guard *et al.* (2019); Minamoto *et al.* (2019); Toresson *et al.* (2025); Voudren *et al.* (2024); Werner *et al.* (2020). Bastos *et al.* (2023); Bastos *et al.* (2024); Herstad *et al.* (2022); Lucchetti *et al.* (2021); McAtee *et al.* (2023); Oba *et al.* (2025); Whittemore *et al.* (2021).

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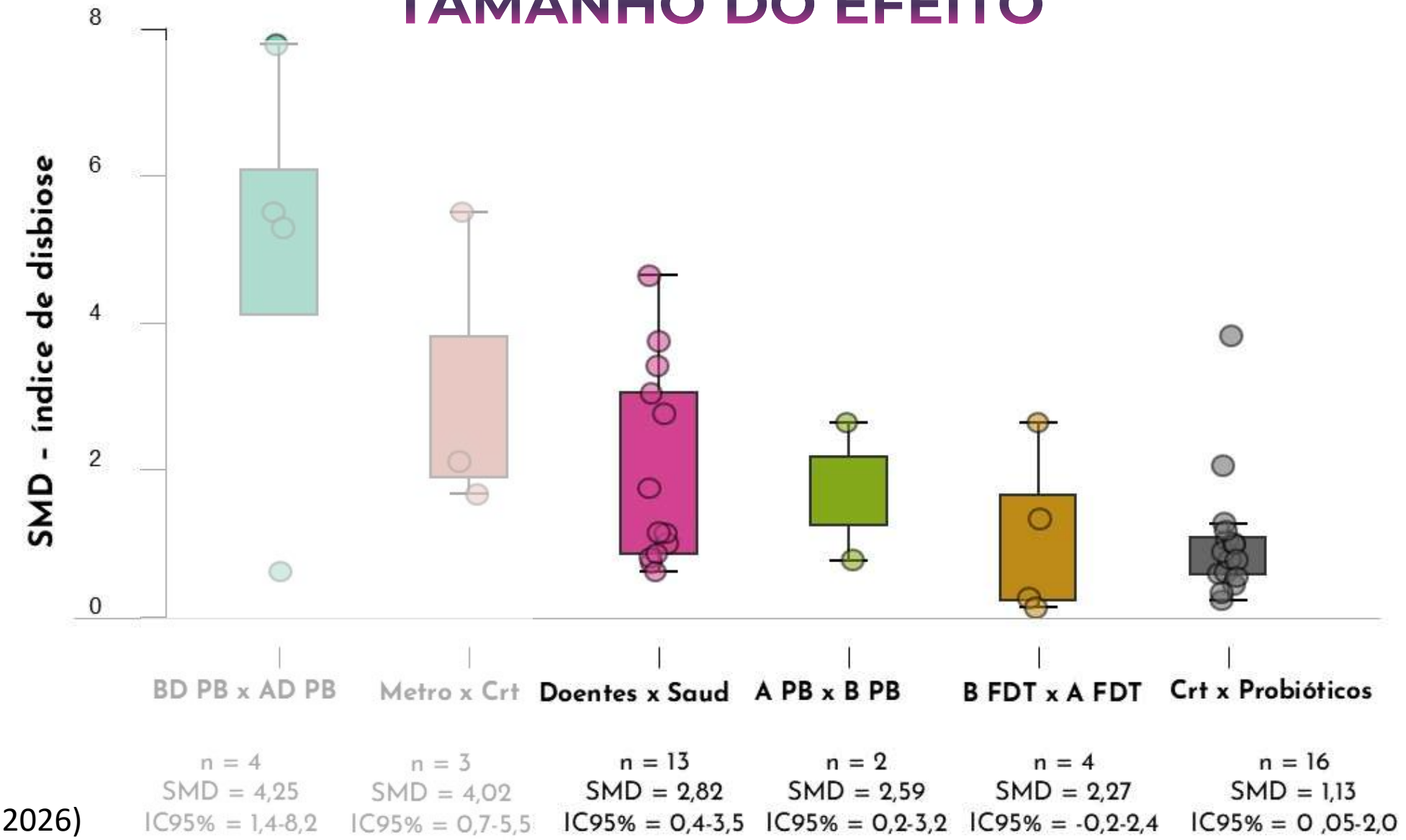


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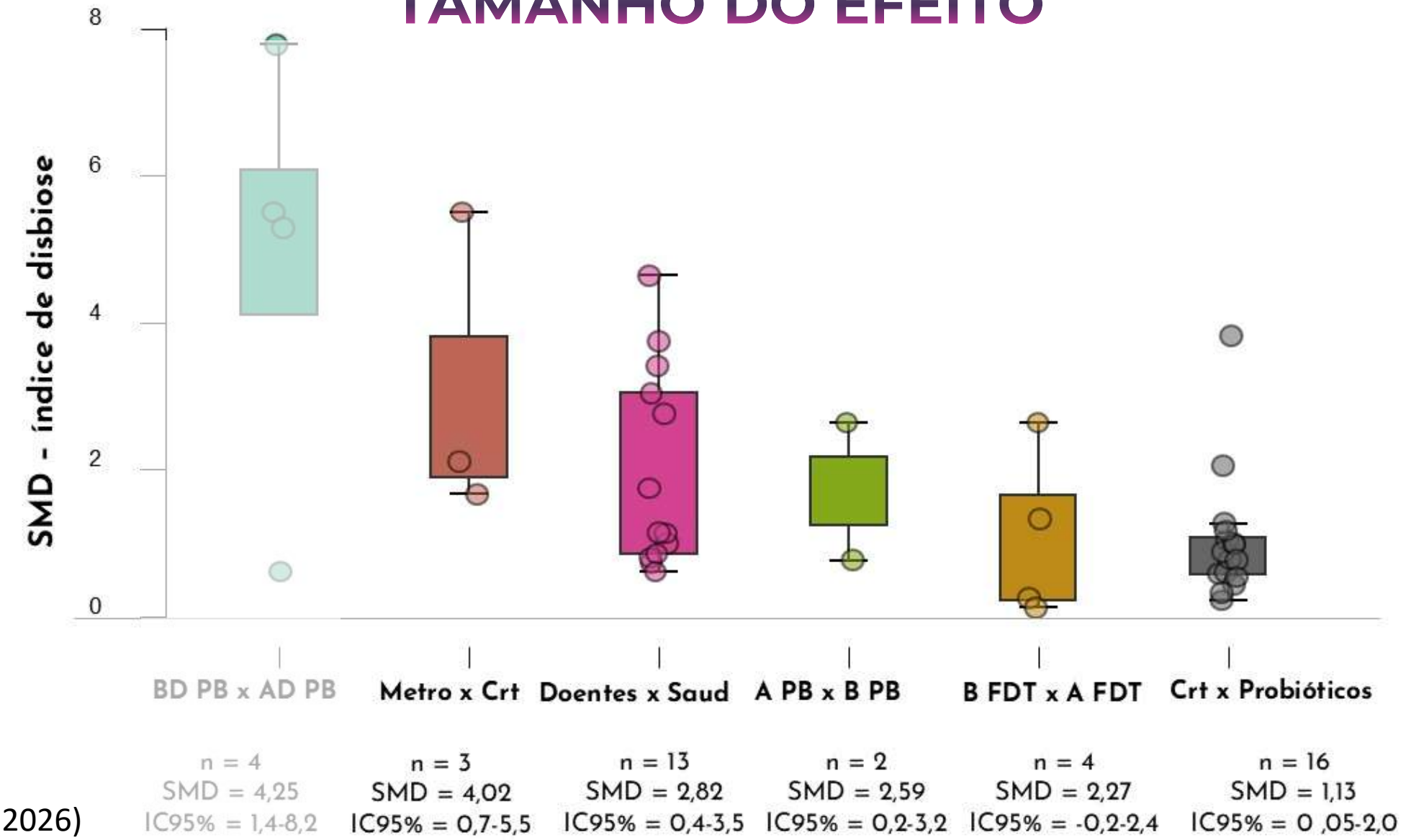


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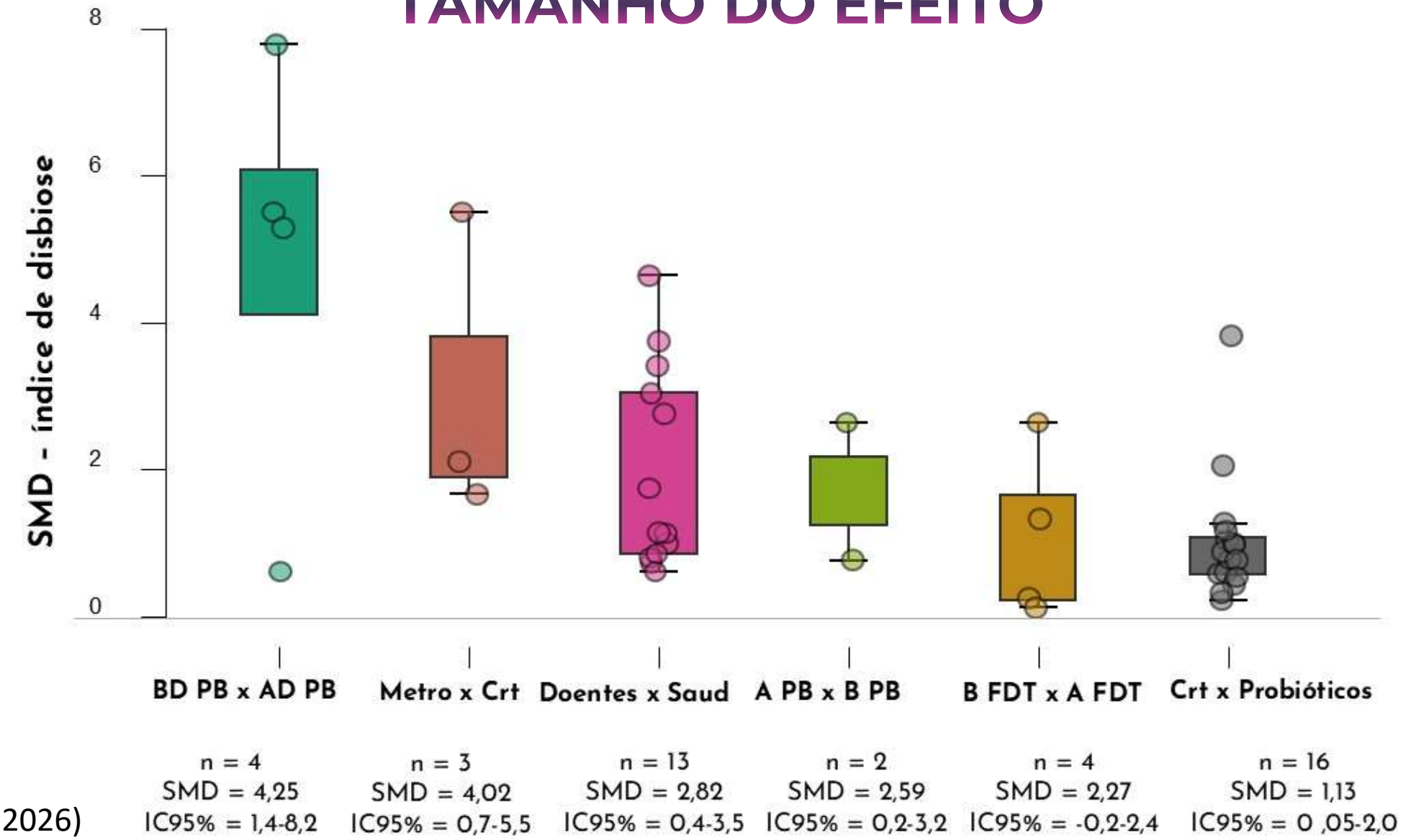
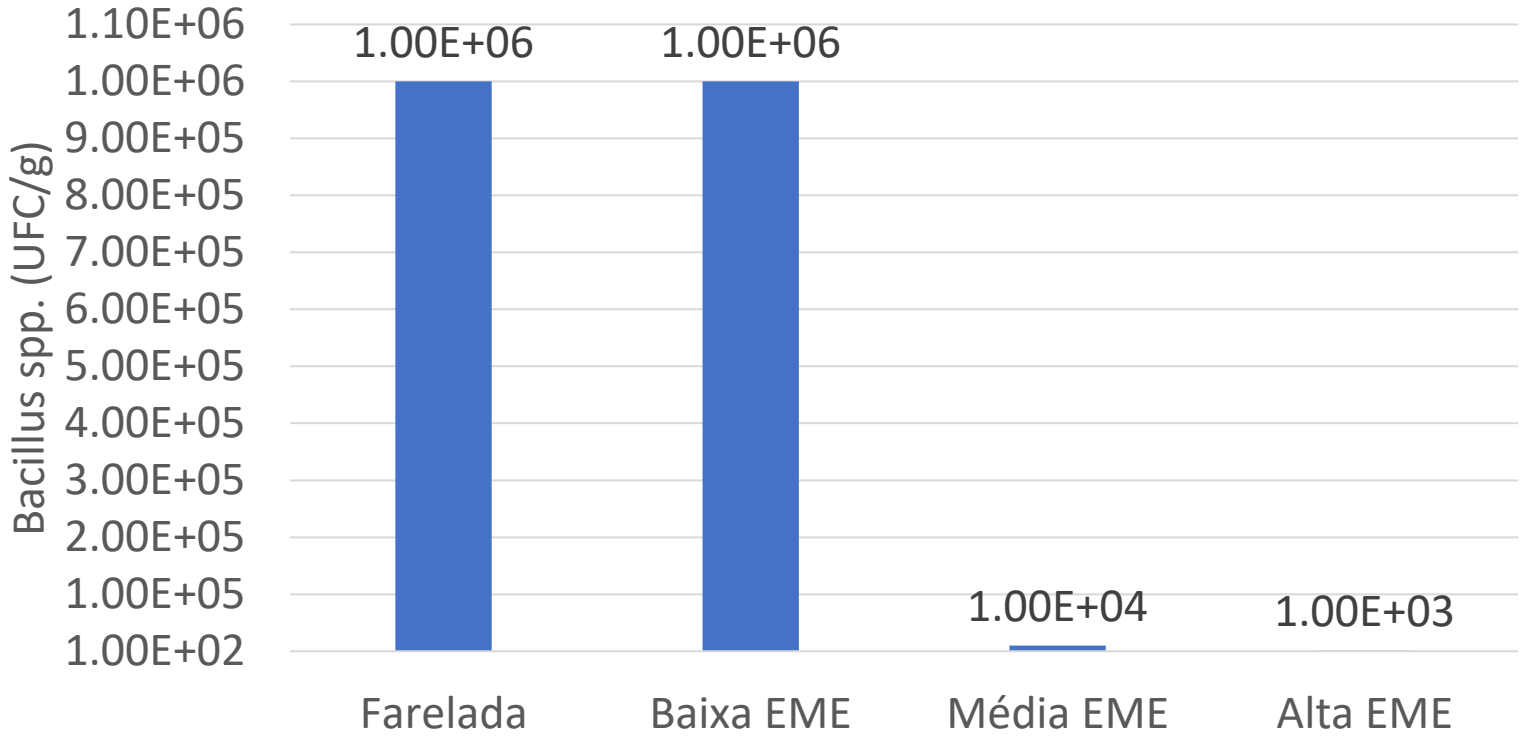



Souza et al. (2026)

Bastos *et al.* (2023); Bastos *et al.* (2024); Timlin *et al.* (2024); Villa *et al.* (2025). Oba *et al.* (2025); Schmidt *et al.* (2018). Jeusette *et al.* (2025); Oba *et al.* (2025); Rudinsky *et al.* (2022). Belchik *et al.* (2024); Pilla *et al.* (2020); Rudinsky *et al.* (2022). AlShawaqfeh *et al.* (2017); Blake *et al.* (2019); Cagnasso *et al.* (2024); Chaitman *et al.* (2020); Chen *et al.* (2025); Galler *et al.* (2022); Giaretta *et al.* (2018); Guard *et al.* (2019); Minamoto *et al.* (2019); Toresson *et al.* (2025); Voudren *et al.* (2024); Werner *et al.* (2020). Bastos *et al.* (2023); Bastos *et al.* (2024); Herstad *et al.* (2022); Lucchetti *et al.* (2021); McAtee *et al.* (2023); Oba *et al.* (2025); Whittemore *et al.* (2021).

# Os probióticos resistem à extrusão?

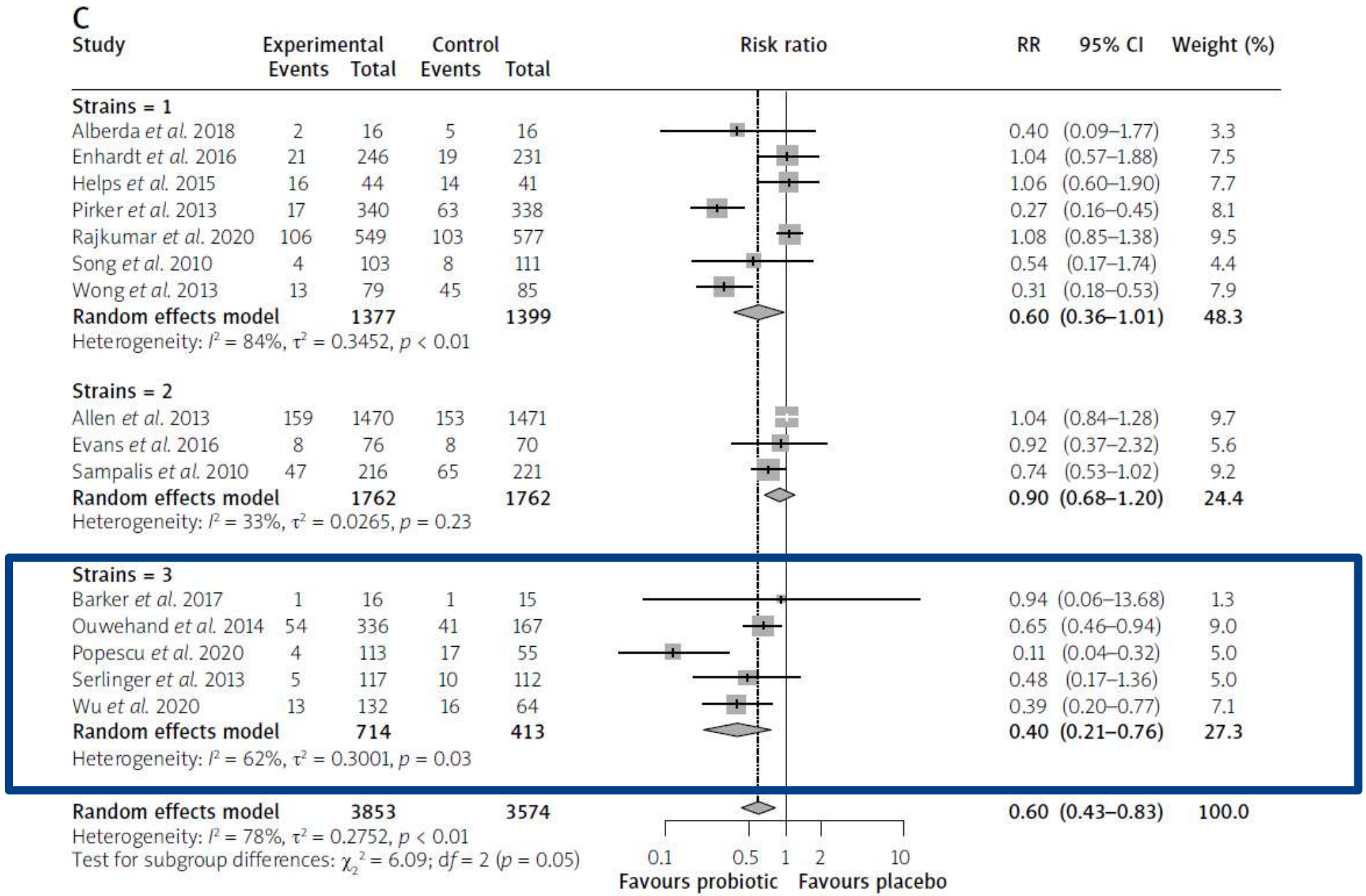
# Extrusão x *Bacillus stearothermophilus*




Acuff et al. (2022)

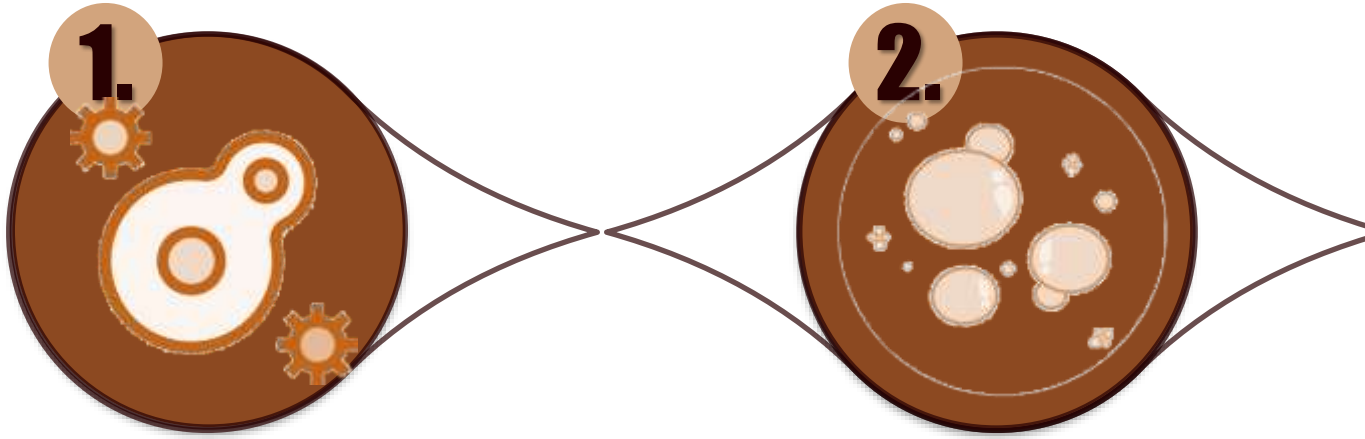
# Probióticos

# Probiótico cepa única ou multicepas?




Wanyama et al. (2025)

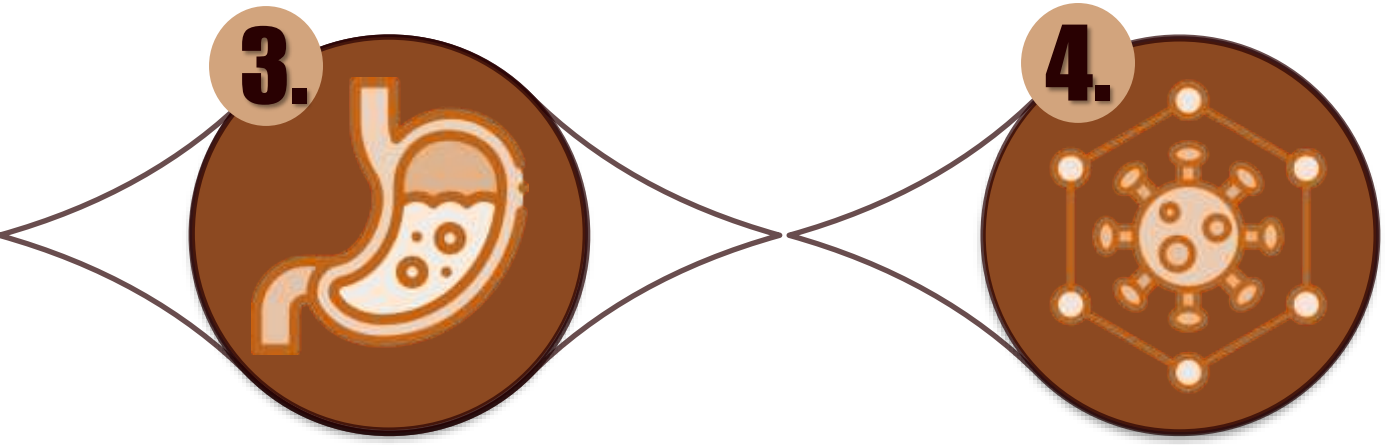

# *Saccharomyces cerevisiae*




MAIOR QUE BACTÉRIAS

RESISTENTE AOS ANTIBIÓTICOS

(Long et al., 2021)

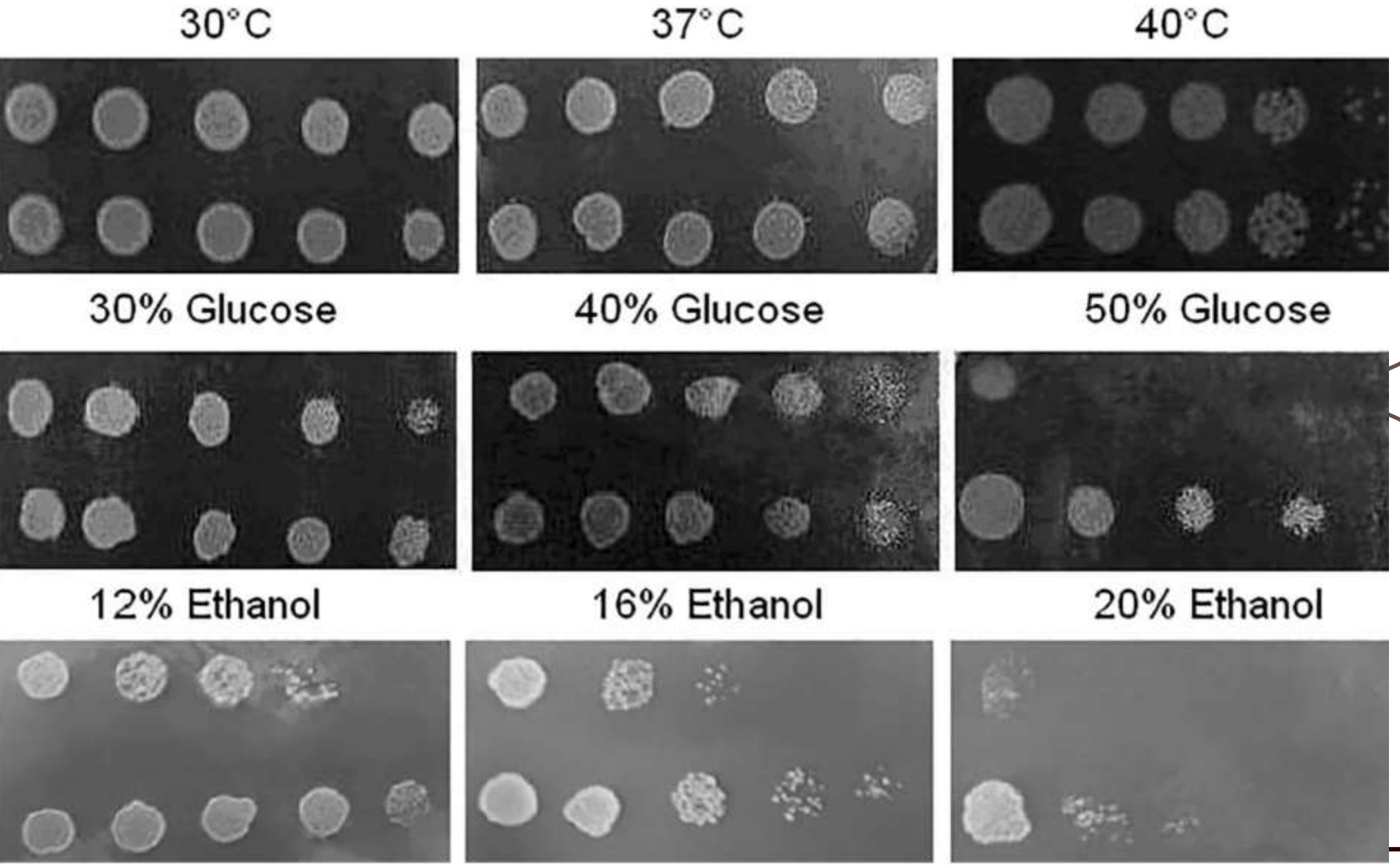


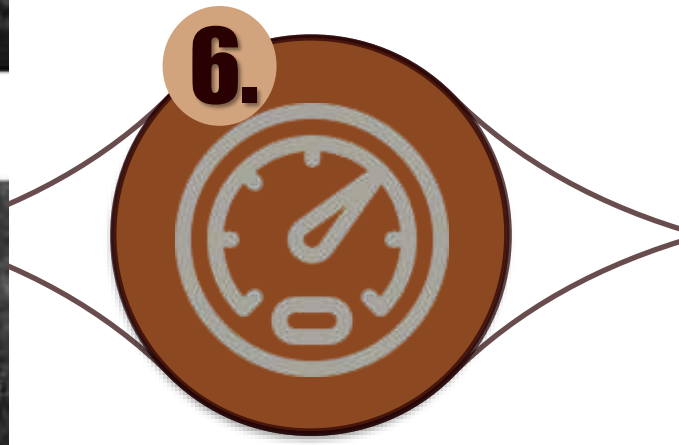

RESISTENTE AO SGI

REDUZ MICOTOXINAS E ENDOTOXINAS

(Lin et al., 2020 ; Martins, 2013)

# *Saccharomyces cerevisiae*

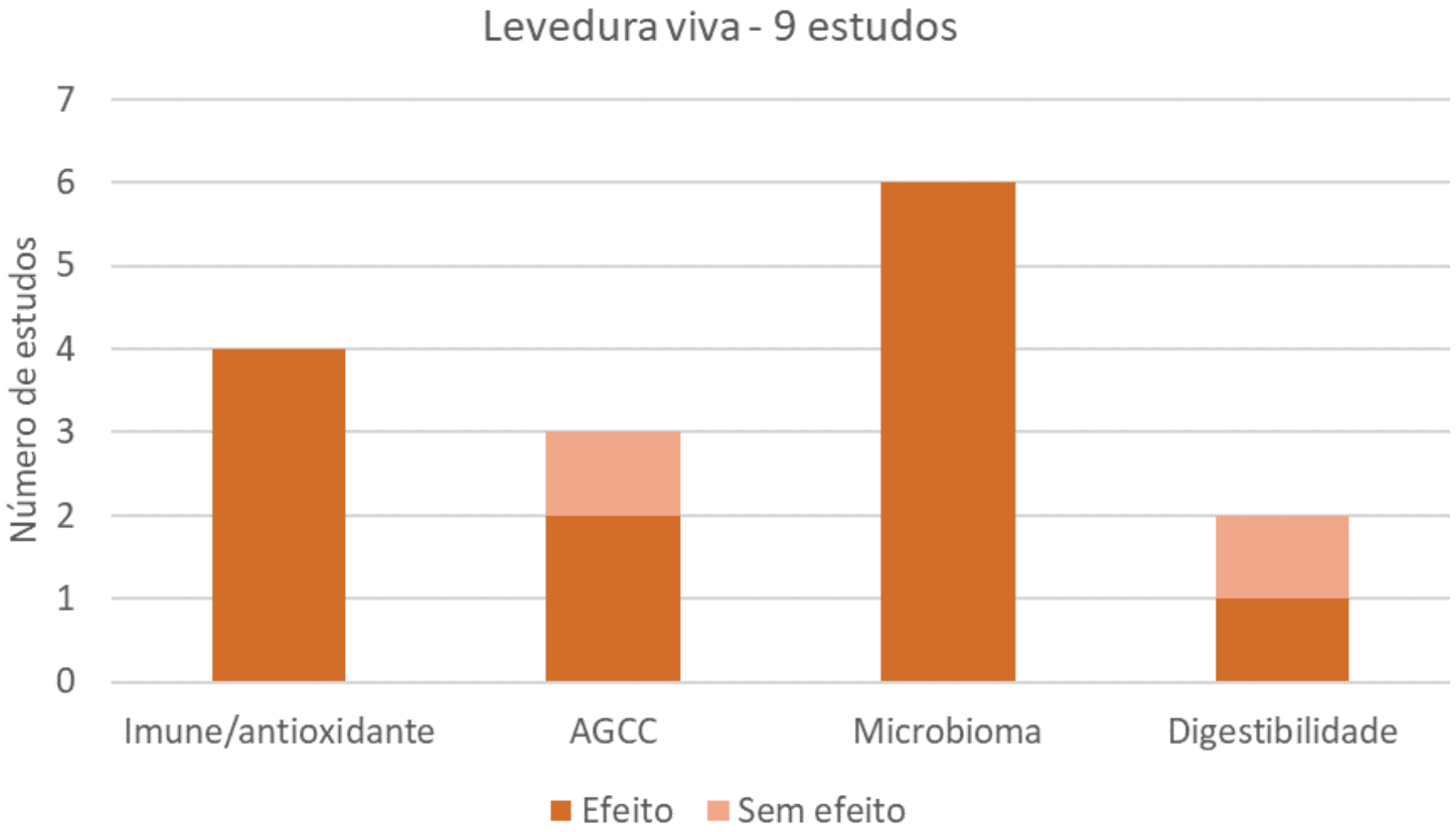



**RESISTENTE AO ESTRESSE**

(Zhang et al., 2019; Long et al., 2021)

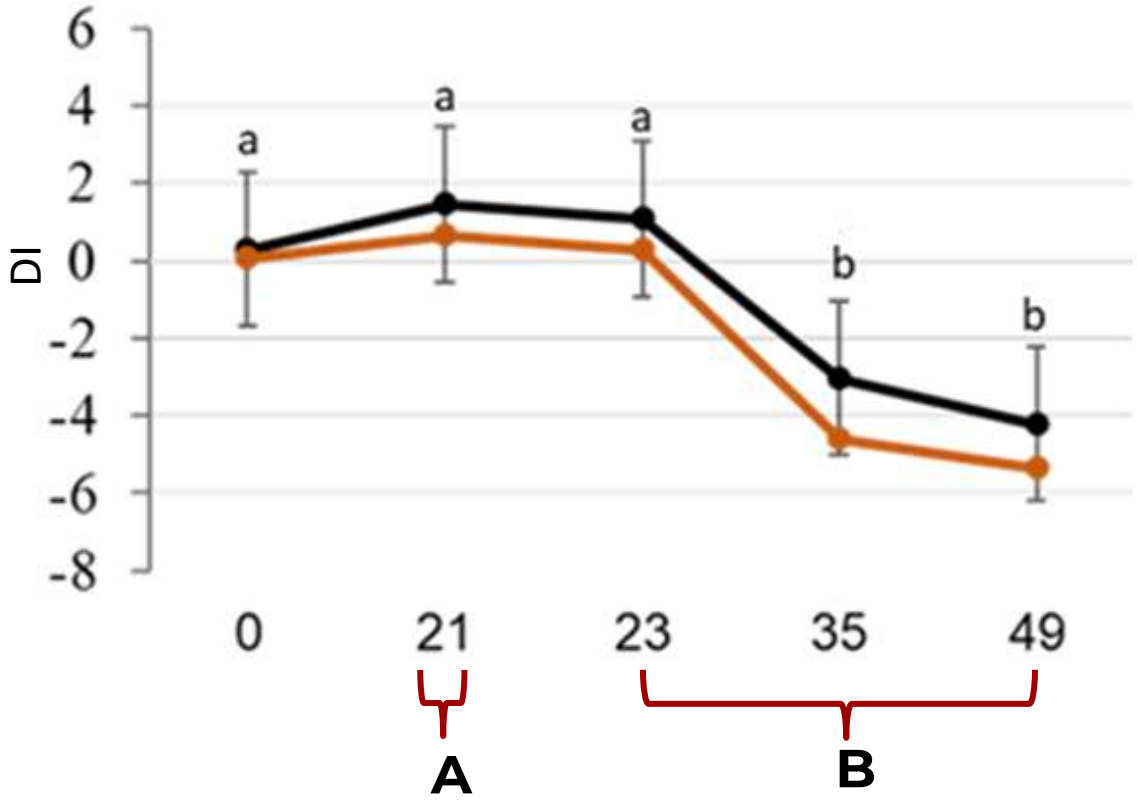
# *S. cerevisiae*




Garrigues et al. (2024), Arghavani et al. (2023), Cui et al. (2024), Meineri et al. (2022), Bastos (2023), Bampidis et al. (2021), Stercova et al. (2016), Dangelo et al. (2018), Aktas et al. (2017)

# *S. cerevisiae*

*Saccharomyces cerevisiae*



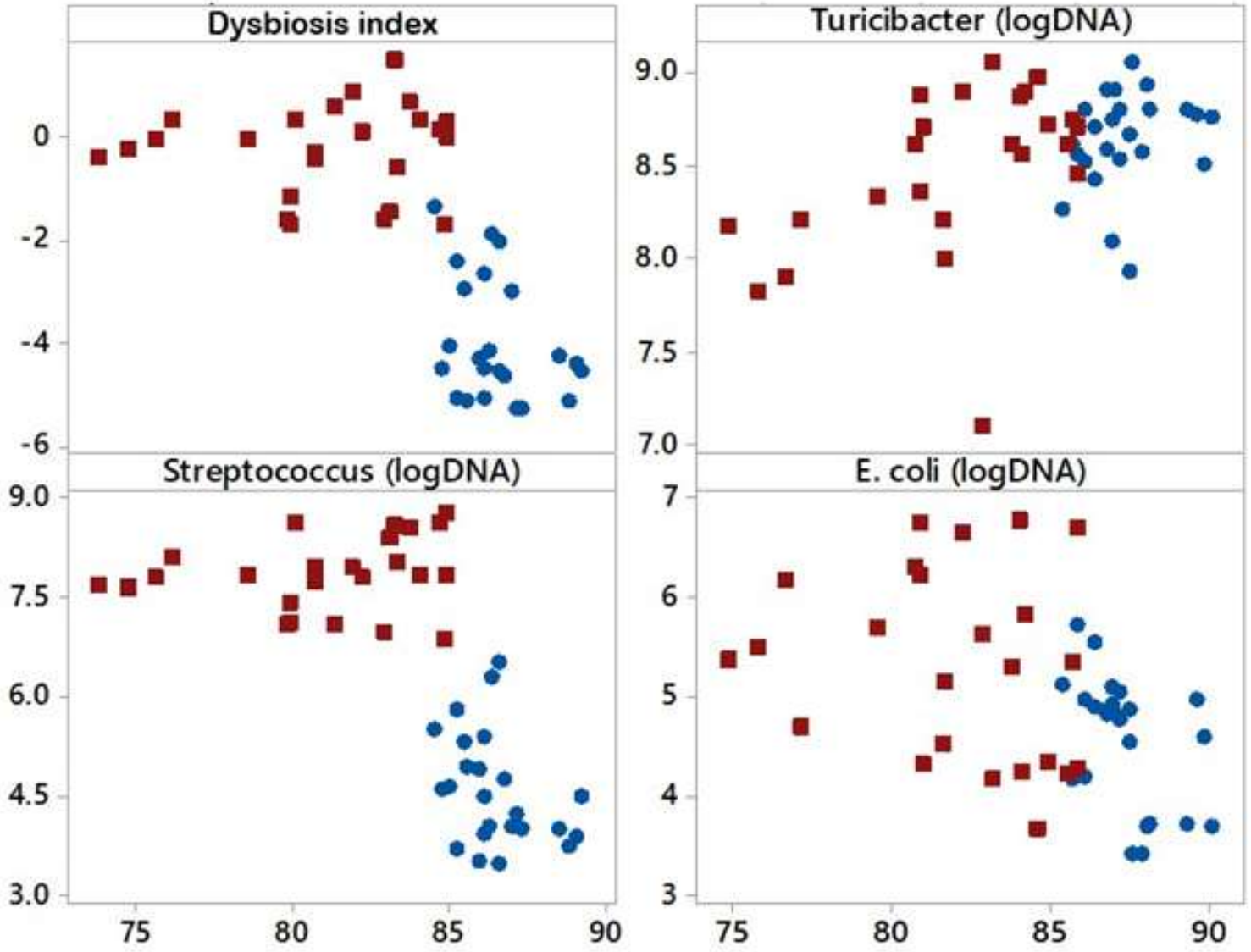

P < 0.05 diets
P < 0.05 probiotic
P = 0.54 D x P

**A**
**CDA PB = 83%**

**B**
**CDA PB = 88%**

Bastos et al. (2023)

# Digestibilidade




**CDA PB = 80,43 ± 2,02%**

**CDA PB = 86,8 ± 0,59%**

Medeiros et al. (2024)

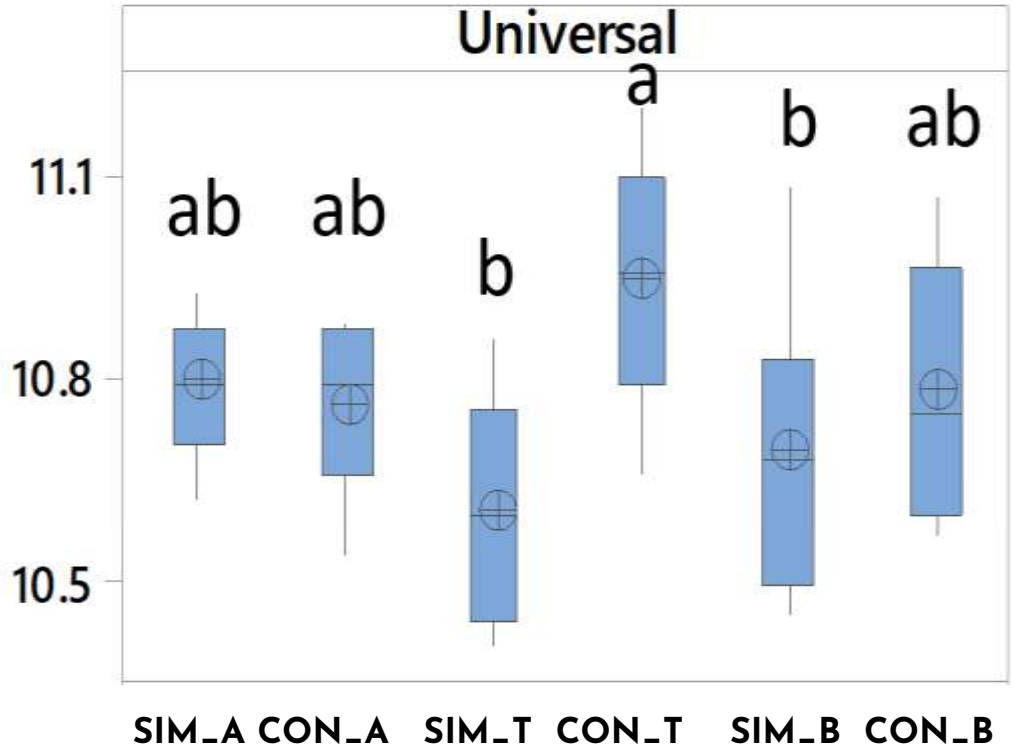
# Simbióticos

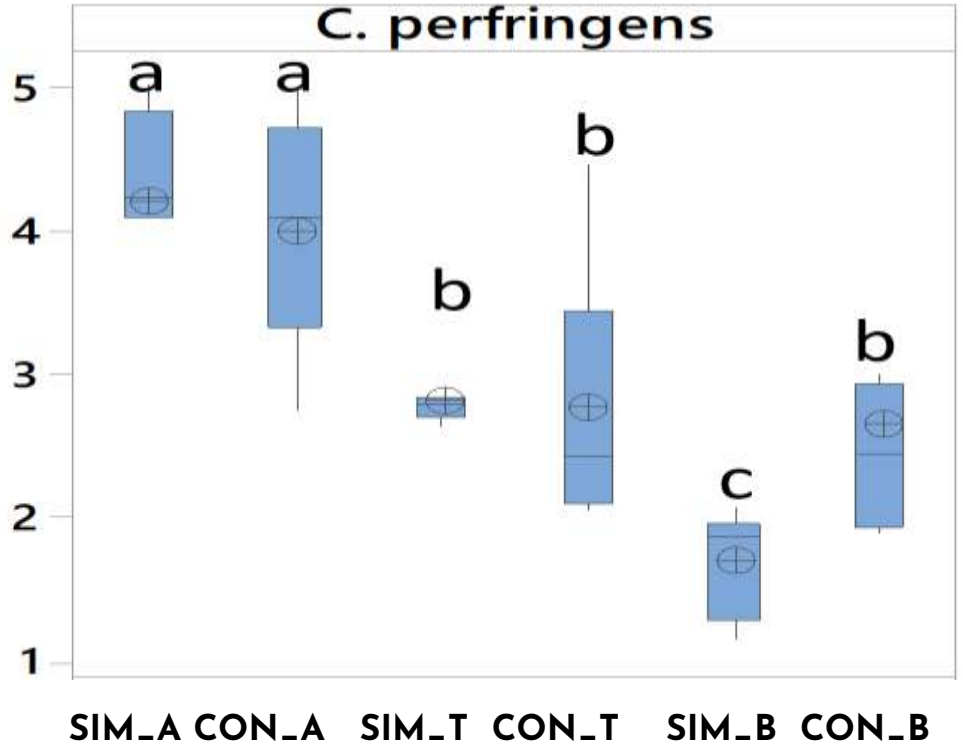
*Article*

## Effects of Synbiotic Supplementation on Fecal Characteristics and Microbiota in Dogs Submitted to an Abrupt Dietary Change

Priscila de Moraes Sanches [1], Renata Bacila Morais dos Santos Souza [1], Heloísa Lara Silva [1], Eduarda Lorena Fernandes [1], Lorenna Nicole Araújo Santos [1], Laiane Silva Lima [1], Laís de Moraes Antunes [1], Adriana Dausen Meyer [2] and Ananda Portella Felix [1,*]

# Simbióticos

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Sanches et al. (2026)

# Os probióticos podem ser combinados com antibióticos?

# Antibióticos (Betalactâmicos)

Neut et al. (2017)

| MIC (mg/mL) | PG | OX | AC | XL | XM | PX | IX |
|---|---|---|---|---|---|---|---|
| Antibiotic breakpoints (mg/L) | 0.25/2 | 0.25/2 | 2/8 | 2/8 | 4/8 | 1/1 | 1/1 |
| Strains | | | | | | | |
| *Lactococcus lactis* LA 103 | 0.094 | 1.5 | 0.047 | 0.047 | 0.064 | | |
| *Lactobacillus reuteri* Protectis DSM 17938 | >32 | >256 | 24 | 12 | 4 | | |
| *Lactobacillus casei* var *rhamnosus* Lcr35 | 0.38 | 6 | 0.5 | 0.75 | 4 | | |
| *Bacillus clausii* N/R Unknown strain | 0.125 | 8 | 0.094 | 0.047 | 24 | 64 | 64 |
| *Bacillus clausii* SIN Unknown strain | 0.38 | 8 | 0.094 | 0.047 | 128 | 128 | >256 |
| *Bacillus clausii* T Unknown strain | 0.19 | 6 | 0.125 | 0.047 | 64 | 64 | 64 |
| *Streptococcus thermophilus* LA 104 | 0.047 | 1 | 0.047 | 0.064 | <0.016 | 0.094 | 0.25 |
| *Bifidobacterium bifidum* Unknown strain | <0.016 | 0.125 | <0.016 | <0.016 | <0.016 | 0.38 | 0.75 |
| *Bifidobacterium lactis* BB12 | 0.032 | 0.38 | 0.047 | 0.032 | 0.125 | 0.5 | 3 |
| *Bifidobacterium longum* LA101 | 0.25 | 2 | 0.25 | 0.19 | 0.75 | 4 | 48 |
| *Saccharomyces boulardii* CNCM I-745 | >32 | >256 | >256 | >256 | >256 | >256 | >256 |

Amoxicilina

PG: benzylpenicillin; OX: oxacillin; AC: amoxicillin; XL: amoxicillin combined with clavulanic acid; XM: cefuroxime; PX: cefpodoxime; IX: cefixime.

# Antibióticos (Outros)

Neut et al. (2017)

| Strains MIC (mg/mL) | AZ | CH | CM | QDA | CI | LE | DC | TS | MZ |
|---|---|---|---|---|---|---|---|---|---|
| Antibiotic breakpoints (mg/L) | 1/2 | 1/2 | 0.25/0.5 | 1/2 | 0.5/1 | 1/2 | 1/2 | 2/4 | 4/4 |
| Strains | | | | | | | | | |
| *Lactococcus lactis* LA 103 | 0.19 | 0.047 | 0.094 | 1 | 1.5 | 0.5 | 0.047 | >32 | >256 |
| *Lactobacillus reuteri* Protectis DSM 17938 | 0.19 | 0.016 | <0.016 | 0.38 | >32 | 6 | >256 | >32 | >256 |
| *Lactobacillus casei* var *rhamnosus* Lcr35 | >256 | >256 | >256 | 0.5 | >32 | 0.75 | 1 | >32 | >256 |
| *Lactobacillus acidophilus* LA-5 | 0.023 | <0.016 | 0.75 | 0.75 | >32 | >32 | 1 | >32 | >256 |
| *Lactobacillus helveticus* LA 102 | <0.016 | <0.016 | 0.032 | 0.19 | >32 | >32 | 0.38 | >32 | >256 |
| *Lactobacillus rhamnosus* LA 801 | 0.25 | 0.19 | 0.25 | 0.5 | >32 | >32 | 1 | >32 | >256 |
| *Lactobacillus rhamnosus* GG ATCC 53103 | 0.38 | 0.125 | 0.047 | 0.25 | 0.5 | 0.75 | 0.25 | >32 | >256 |
| *Lactobacillus paracasei* Unknown strain | >256 | >256 | 0.25 | 0.5 | >32 | 1 | 1 | >32 | >256 |
| *Lactobacillus acidophilus* Unknown strain | 0.25 | 0.023 | 0.19 | 0.19 | >32 | >32 | 0.75 | >32 | >256 |
| *Bacillus clausii* O/C Unknown strain | >256 | >256 | 32 | 1.5 | 0.125 | 0.19 | 0.25 | 0.16 | >256 |
| *Bacillus clausii* N/R Unknown strain | >256 | >256 | 96 | 1.5 | 0.25 | 0.25 | 0.094 | 0.023 | >256 |
| *Bacillus clausii* SIN Unknown strain | >256 | >256 | >256 | 1 | 0.125 | 0.25 | 0.19 | 0.023 | >256 |
| *Bacillus clausii* T Unknown strain | >256 | >256 | >256 | 2 | 0.125 | 0.25 | 0.19 | 0.023 | >256 |
| *Streptococcus thermophilus* LA 104 | 0.064 | <0.016 | <0.016 | 0.032 | 0.75 | 1 | 0.094 | 1.5 | >256 |
| *Bifidobacterium bifidum* Unknown strain | 0.19 | 0.023 | 0.032 | 0.19 | 4 | 0.75 | 0.25 | 0.25 | 1.5 |
| *Bifidobacterium lactis* BB12 | 0.125 | 0.023 | <0.016 | 0.047 | 1.5 | 2 | 3 | <0.002 | 1 |
| *Bifidobacterium longum* LA101 | 0.5 | 0.032 | 0.064 | 0.032 | 3 | 1.5 | 0.5 | 2 | 1 |
| *Saccharomyces boulardii* CNCM I-745 | >256 | >256 | >256 | >32 | >32 | >32 | >256 | >32 | >256 |

AZ: azithromycin; CH: clarithromycin; lincosamide: CM: clindamycin; streptogramin: QDA: quinupristin-dalfopristin analogue of pristinamycin; fluoroquinolones: CI: ciprofloxacin; LE: levofloxacin; miscellaneous: TS: co-trimoxazole (combination of sulfamethoxazole + trimethoprim); DC: doxycycline; MZ: metronidazole.

# Antibióticos

Neut et al. (2017)

| Antibiotic susceptibility | Penicillins | | | | Cephalosporins | | | Macrolides | | | | Fluoro-quinolones | | Other | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Penicillin | Oxacillin | Amoxicillin | Amoxicillin clavulanic acid | Cefuroxime | Cefpodoxime | Cefixime | Azithromycin | Clarithromycin | Clindamycin | Pristinamycin | Ciprofloxacin | Levofloxacin | Doxycycline | Cotrimoxazole | Metronidazole |
| *Lactobacillus reuteri Protectis* DSM17938 | | | | | ■ | | | ■ | ■ | ■ | ■ | | | | | |
| *L. casei var rhamnosus* Lcr35 | ■ | | ■ | ■ | ■ | | | | | | ■ | | ■ | ■ | | |
| *Lactobacillus acidophilus* LA-5 | ■ | | ■ | ■ | ■ | ■ | | ■ | ■ | | ■ | | | ■ | | |
| *Bifidobacterium lactis* BB12/DSM 15954 | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | | ■ | | ■ | ■ |
| *Bifidobacterium longum* LA 101 | ■ | ■ | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ |
| *Lactobacillus helveticus* LA 102 | ■ | ■ | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | | | ■ | | |
| *Lactobacillus lactis* LA 103 | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | | ■ | ■ | | |
| *Saccharomyces boulardii CNCM I-745* | | | | | | | | | | | | | | | | |

# Novos Probióticos


Made with AI

pets

MDPI

*Article*

# A Protocol for Fecal Microbiota Transplantation Using Freeze-Dried Capsules: Dosage and Outcomes in 171 Dogs with Chronic Enteropathy

**Francesca Brugnoli [1,*], Barbara Simionati [1], Ilaria Patuzzi [1], Angiolella Lombardi [1], Maria Cecilia Giron [2], Edoardo Savarino [3], Sonia Facchin [1] and Giada Innocente [1]**

pets

MDPI

*Article*

# A Protocol for Fecal Microbiota Transplantation Using Freeze-Dried Capsules: Dosage and Outcomes in 171 Dogs with Chronic Enteropathy

Francesca Brugnoli [1,*], Barbara Simionati [1], Ilaria Patuzzi [1], Angiolella Lombardi [1], Maria Cecilia Giron [2], Edoardo Savarino [3], Sonia Facchin [1] and Giada Innocente [1]

**Cápsulas (liberação lenta) de fezes liofilizadas (80% de viabilidade)**

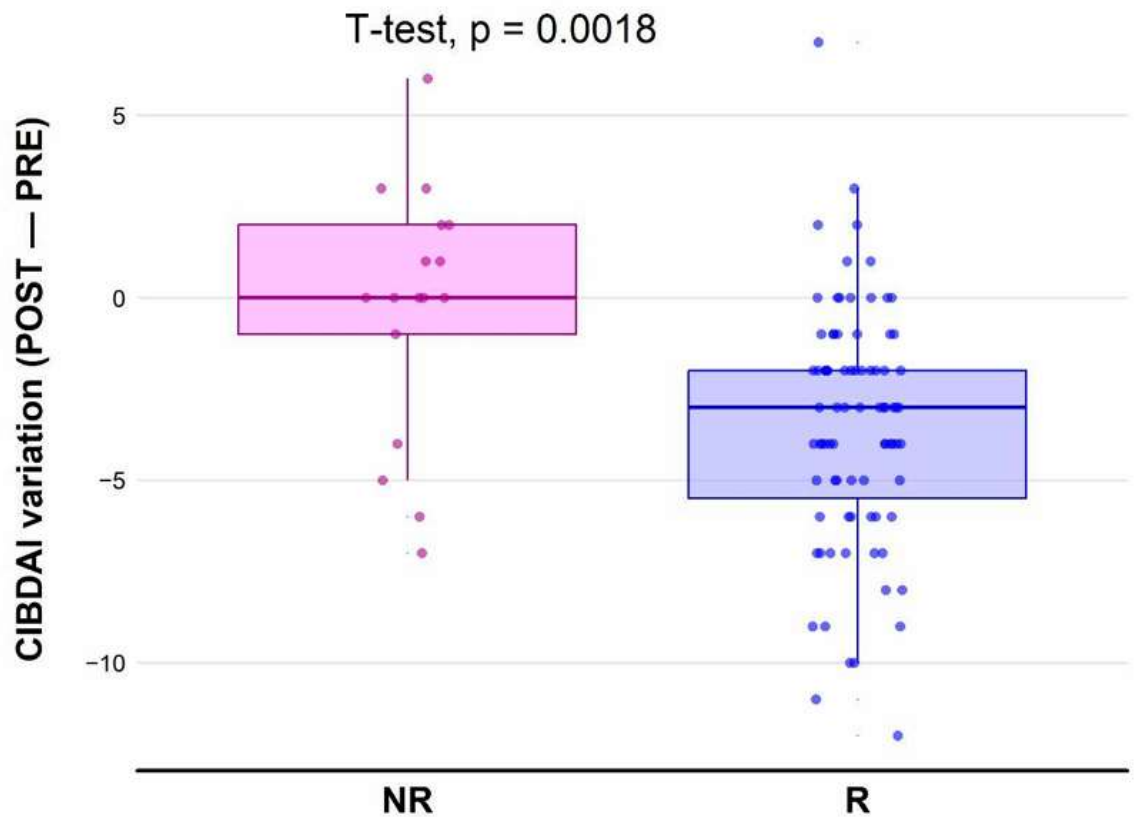
**Cães < 10 kg = 100 mg/dia**
**Cães > 10 kg = 200 mg/dia**

**171 cães com CE**
**30 dias**

*Article*

# A Protocol for Fecal Microbiota Transplantation Using Freeze-Dried Capsules: Dosage and Outcomes in 171 Dogs with Chronic Enteropathy

**Francesca Brugnoli [1,*], Barbara Simionati [1], Ilaria Patuzzi [1], Angiolella Lombardi [1], Maria Cecilia Giron [2], Edoardo Savarino [3], Sonia Facchin [1] and Giada Innocente [1]**



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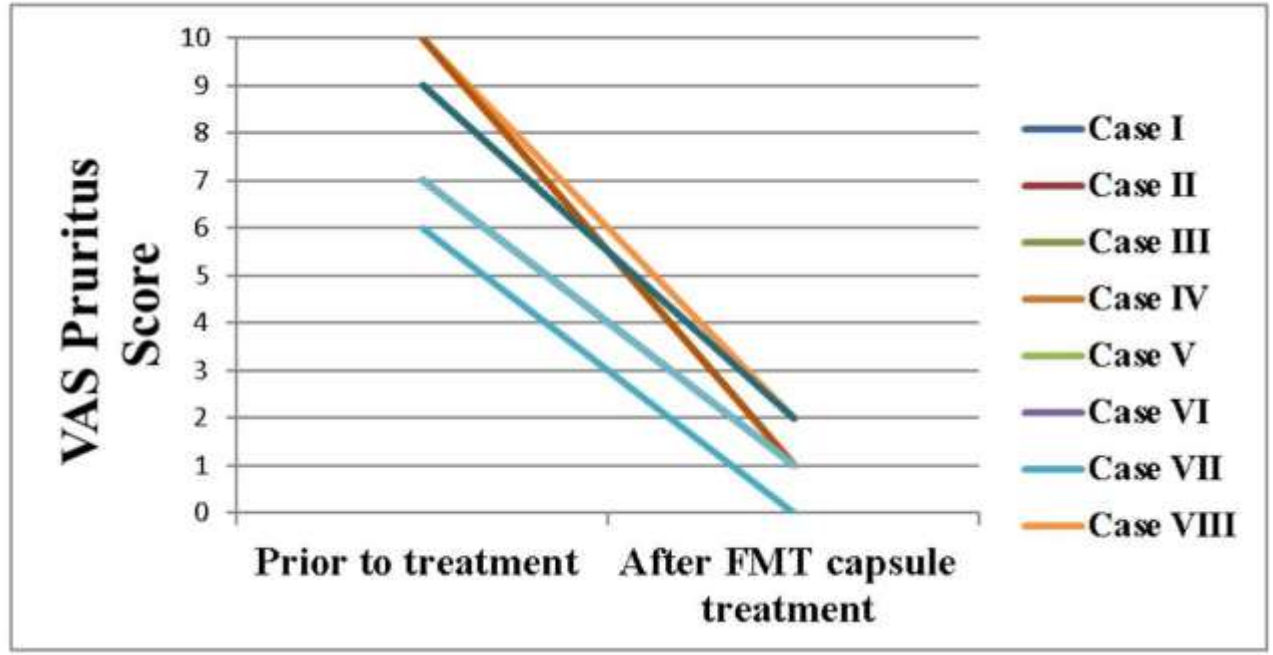
# Fecal microbiota transplantation capsule therapy via oral route for combatting atopic dermatitis in dogs

**Kerem URAL**

Aydın Adnan Menderes University, Faculty of Veterinary Medicine, Department of Internal Medicine, Aydın, TURKEY
ORCID: 0000-0003-1867-7143


VAS Pruritus Score
10
9
8
7
6
5
4
3
2
1
0
Prior to treatment
After FMT capsule treatment
Case I
Case II
Case III
Case IV
Case V
Case VI
Case VII
Case VIII

Ural (2022)

frontiers | Frontiers in Veterinary Science

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EDITED BY
María-Aránzazu Martínez,
Complutense University of Madrid, Spain

REVIEWED BY
Leon Cantas,
PrivateVET Small Animal Clinic, Norway
Pavlos G. Doulidis,
University of Veterinary Medicine Vienna, Austria

*CORRESPONDENCE
Jessi Doshier
jessi.doshier@gmail.com

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# Pilot study evaluating tolerability and changes in fecal microbiota associated with novel probiotic administration to dogs with diarrhea

Jessi Doshier[1]*, Brooke Anderson[2], Fan Yang[2], Samuel D. Stewart[3], Kayla A. Calapa[2], Rachel Cooper[3,4], Heather Wilson-Robles[3], Mallory Embree[2] and Chand Khanna[3]

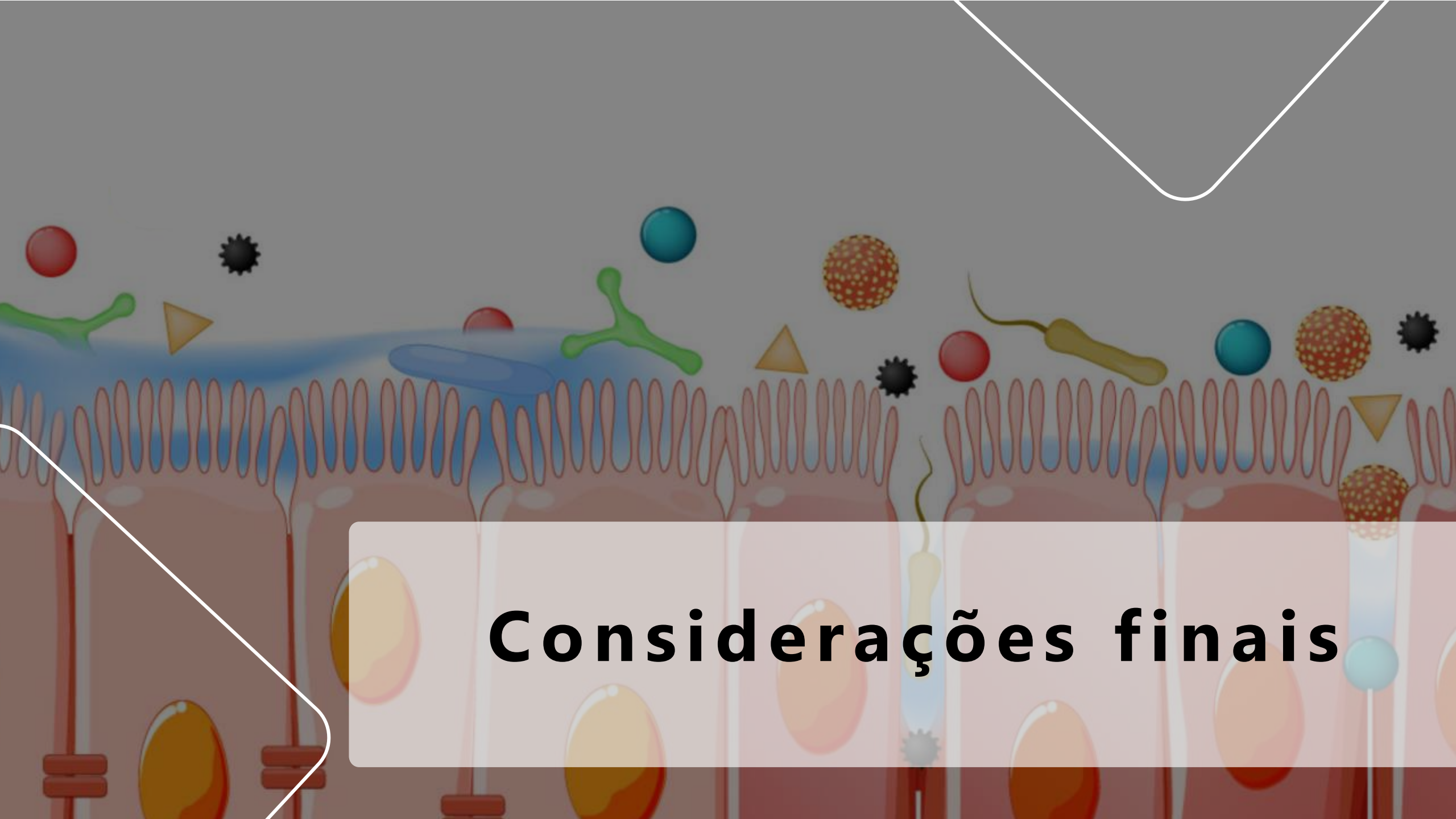
***Peptacetobacter hiranonis, Megamonas funiformis, Enterococcus faecium***

TABLE 2 Purina fecal scores of enrolled dogs on the day of screening, separated by response group, starting day 7.

| Day of study | Median purina fecal score (range) | | Number patients | |
|---|---|---|---|---|
| Screening | 7 (4–7) | | 11 | |
| | Non-responder | Responder | NON-responder | responder |
| 7 | 5 (4–6.5) | 3 (2–3.5) | 4 | 7 |
| 14 | 2* | 2 (2–4) | 1 | 7 |
| 28 | 3* | 2 (2–3) | 1 | 7 |
| 56 | 3* | 2 (2–3) | 1 | 7 |

* No ranges are reported because $n = 1$ for non-responders beyond day 7.

Doshier et al. (2026)



# Considerações finais

# Considerações finais

Os probióticos podem contribuir com a saúde intestinal de cães e gatos, mas é fundamental que outros fatores sejam controlados.

**Inovações e oportunidades:**

Probióticos para saúde oral e pele.

Probióticos termorresistentes (*Bacillus* spp.).

Novos probióticos parecem promissores (TMF?).

# Laboratório de Estudos em Nutrição Canina - LENUCAN

Universidade Federal do Parana


**Prof. Ananda P. Félix**

apfelix@ufpr.br


### Alunos de pós-graduação

Renata Bacila

Laiane Lima

Heloísa Silva

Bruna Ariely

Danieli Cypriano

Laís Antunes

Vanessa Olszewski

Bruna Steil

### Alunos de graduação

Júlia Pereira

Hyane Issler

Helena Bravo

Isabelly Morais

Olivia Kaminski

Thainá Medeiros

Luana Massirer

Sarah Moreira

Yasmim Oliveira

Isabelly Alves

### Professores e Técnicos

Ananda P. Félix

Simone G. de Oliveira

Alex Maiorka

Ana Vitória F. Silva

Chayane da Rocha

Leandro N. Kuritza

Priscila