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Review Article

Exploring the Therapeutic Benefits of *Saccharomyces boulardii* CNCM I-745: A Potent Probiotic Solution

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Abstract

Humans and microbes have a close symbiotic relationship, particularly in the gut, where more than 1000 species contribute to its development and maturation. The gut microbiota is essential for normal physiological development, as it supports the maturation and differentiation of the gut mucosa and its immune system. As an infant's diet evolves, the microbiota becomes more complex, resembling that of an adult by early childhood. Malnutrition can disrupt this balance, leading to dysbiosis, which is characterized by a decrease in beneficial *Bifidobacteria* and an increase in harmful microbes such as *Escherichia coli, Fusobacterium mortiferum, and Streptococcus* spp. Dysbiosis is associated with a higher risk of various gastrointestinal diseases (GIDs), including inflammatory bowel disease, irritable bowel syndrome (IBS), and necrotizing enterocolitis. Probiotics play a crucial role in maintaining a balanced gut microbiota, making probiotic-based therapy a promising approach for preventing and treating GIDs. The mechanisms of action of probiotics include competitive adhesion and exclusion of potential pathogens, stimulation of intestinal epithelial cell proliferation, enhancement of the epithelial barrier, and interactions with the enteric nervous system and immune system. Yeasts offer several advantages as probiotics. They are stable in acidic and bile environments and can adhere to human intestinal cells. *Saccharomyces boulardii* CNCM I 745 is particularly effective in treating multiple gastrointestinal disorders, including traveller's diarrhea, antibiotic-associated diarrhea (AAD), *Clostridium difficile*-associated syndrome, IBS, and Crohn's disease. In addition, *S. boulardii* can survive the competitive environment of the intestinal tract and is naturally resistant to antibiotics and proteolysis, enhancing its effectiveness as a probiotic.

Key words: Acute diarrhea, Dysbiosis, Gut microbiota, Probiotic, *Saccharomyces boulardii*

INTRODUCTION

The symbiotic association between humans and microorganisms is particularly noticeable in the gut, where more than 1000 species are involved in the growth and maturation of the organism.[1] An infant's microbiota is initially simple and becomes complex as food intake varies; by early childhood, microbial diversity approximates that of an adult.[1]

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The gut microbiota plays a crucial role in normal physiological development, aiding in the maturation and differentiation of the gut mucosa and its immune system.[1] It limits the growth of potentially pathogenic microbes by competing with them and inhibiting their ability to invade.[1]

Malnutrition can cause dysbiosis of the gut microbiota, starting with a decrease in *Bifidobacteria* and followed by an increase in harmful microbes such as *Escherichia coli, Fusobacterium mortiferum, and Streptococcus* spp.[1] This dysbiosis can lead to diarrhea and poor nutrient absorption.[1]

These changes in the microbiota provide opportunities to modify the gut microbiota through diet modifications, antibiotics, probiotics, prebiotics, symbiotics, postbiotics,

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or fecal microbiota transplantation to promote proper growth and development.[1]

DEVELOPMENT OF GUT MICROBIOTA AND ASSOCIATED DISEASES

Dysbiosis, an imbalance in the gut microbiota, is linked to a higher risk of various gastrointestinal diseases (GIDs), including inflammatory bowel disease, irritable bowel syndrome (IBS), and necrotizing enterocolitis.[2] It is also associated with allergic diseases, autism spectrum disorder, and sudden infant death syndrome. In addition, dysbiosis has been observed in children with idiopathic nephrotic syndrome and Kawasaki's disease.[2]

INTERVENTIONS FOR DYSBIOSIS IN CHILDREN

Research has focused on preventing and correcting dysbiosis by enhancing the gut microbiota with probiotics.[2] These beneficial microorganisms (probiotics) promote a balanced gut microbiota and can be found in foods such as yogurt, cheese, fermented products, and dietary supplements.[2]

IMPORTANCE OF GUT MICROBIOTA IN HEALTH AND DISEASE

Within the *Enterobacteriaceae* family, many strains of *E. coli* are harmless and are part of the normal gut microbiota. However, the overgrowth of pathogenic strains such as *E. coli* O157 can cause severe GIDs and systemic complications.[3] Another harmful member of this family, *Salmonella,* can cause food poisoning, leading to severe diarrhea and fever. These pathogenic bacteria not only damage the intestinal lining but also release toxins that can severely harm the human body.[3]

Clostridium difficile, a pathogen within the *Firmicutes* phylum, is notorious for causing severe health issues.[3] Although *C. difficile* can exist harmlessly in the gut, its overgrowth, often triggered by the disruption of gut microbiota due to broad-spectrum antibiotics, can lead to debilitating diarrhea and potentially life-threatening colitis.[3]

MECHANISMS OF ACTION OF PROBIOTICS AND HEALTH BENEFITS

Maintaining a healthy diversity of gut microbiota is crucial in the pathophysiology of GIDs.[4] As a result, probiotic-based therapy has become a promising approach for preventing and treating these conditions. While the mechanisms of action of probiotics are complex and may vary by species, several primary pathways have been documented.[4] These include:

a. Competitive adhesion and exclusion of potential pathogens where probiotics produce bacteriocins and biosurfactants, which alter lumen pH and create a hostile environment.[4]
b. Probiotics stimulate the proliferation of intestinal epithelial cells (IECs) and enhance the epithelial barrier. Probiotics control multiple MUC genes to alter IEC-dependent mucin synthesis. Furthermore, probiotics improve tight junctions and epithelial barriers by influencing the signaling pathways for NF-κB, MAPK, PI3K/Akt, and PKCs.[4]
c. Interaction of probiotics and their metabolites (mainly short-chain fatty acids and tryptophane) with the enteric nervous system. Probiotics regulate neurocognitive processes and the equilibrium of the epithelial barrier through the vagus and enteric nerves. They also influence the hypothalamic-pituitary-adrenal axis by regulating the levels of various neurotransmitters, such as CORT and/or ACTH, BDNF, 5-HT, c-Fos, DA, ACh, and GABA.[4]
d. Interaction of probiotics with the immune system: (i) control of the ratio of Th1/Th2 cytokines and stimulation of CD4+ Foxp3+ Treg cells; (ii) elevation of B cell-dependent secretory IgA and a corresponding decrease in IgE levels; (iii) suppression of the NF-κB signaling pathway and consequent suppression of the expression of inflammatory cytokines [Figure 1].[4]

ADVANTAGES OF YEASTS AS A PROBIOTIC

According to Gopalan *et al.* (2023), yeasts offer several advantages as probiotics. They remain stable in acidic and bile environments and can adhere to human intestinal cells. In addition, yeasts produce antimicrobial substances and other metabolites that contribute to their antagonistic effects against pathogens.[5] They also demonstrate resistance to antibiotics. Importantly, yeasts are considered safe for consumption, as they are commonly used in fermented foods and beverages. These properties make yeast an effective and reliable probiotic.[5]

PROPERTIES OF *SACCHAROMYCES BOULARDII* CNCM I-745

According to Gopalan *et al.* (2023), *S. boulardii* CNCM I 745 holds a significant place in the scientific community due to its production of various bioactive compounds, making it a valuable tool for managing gut diseases.[5] Clinical evidence

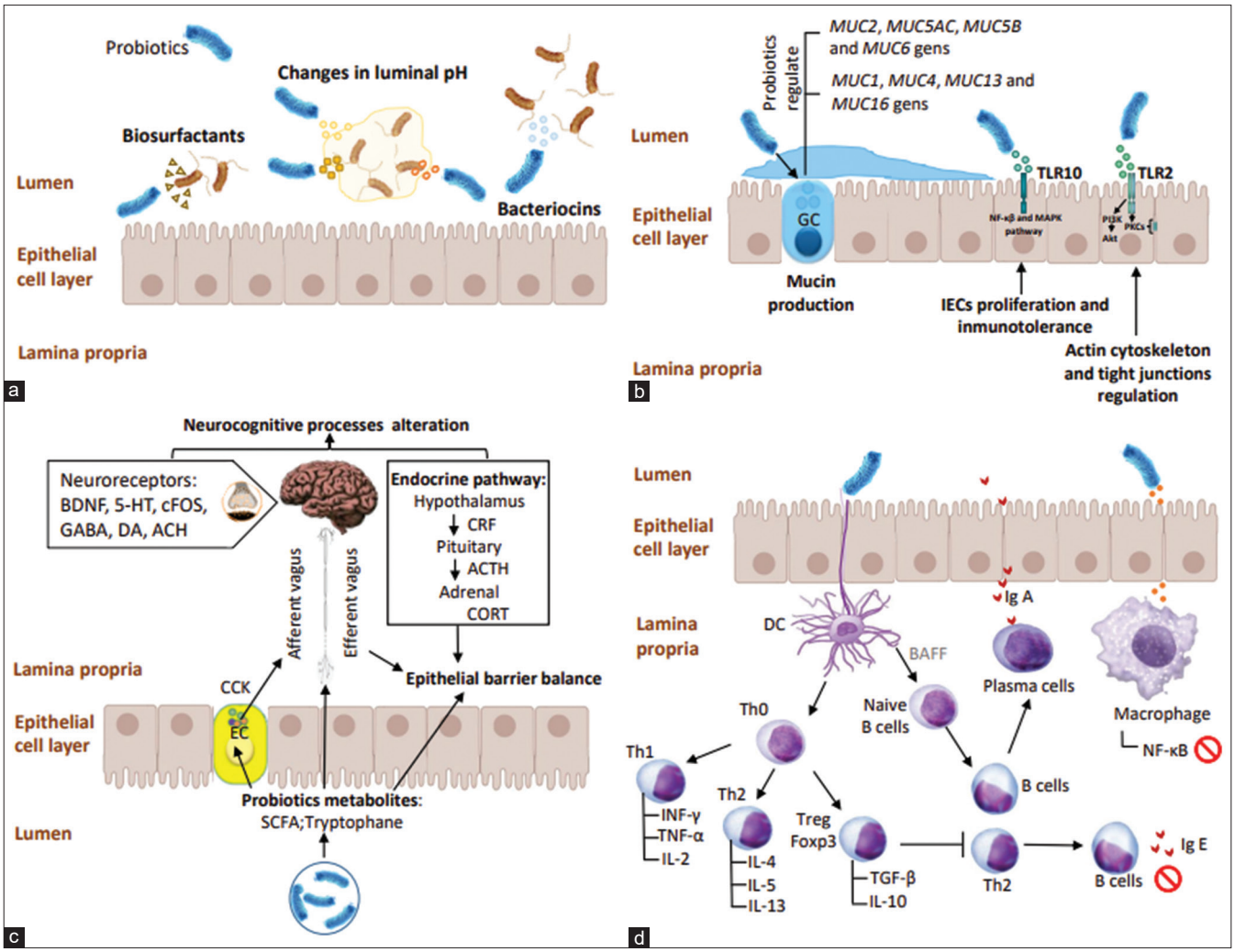

Figure 1: The mechanisms of action of probiotics in restoring gut microbiota homeostasis. (a) Competitive adhesion and exclusion of potential pathogens, (b) Stimulation of intestinal epithelial cell (IEC) proliferation and epithelial barrier enhancement, (c) Interaction of probiotics and their metabolites (mainly short-chain fatty acids [SCFAs] and tryptophane) with the enteric nervous system, (d) Interaction of probiotics with the immune system. 5-HT: 5 hydroxytryptamine; ACH: acetylcholine; ACTH: adrenocorticotropic hormone; BAFF: B cell-activating factor; BDNF: brain-derived neurotrophic factor; CCK: cholecystokinin; CORT: corticosteroid; CRF: corticotropin-releasing factor; DA: dopamine; DC: dendritic cells; EC: enteroendocrine cells; GABA: γ-aminobutyric acid; GC: goblet cell; IgE: immunoglobulin E; IFN-γ: Interferon γ; IgA: immunoglobulin A; IL-10: Interleukin 10; IL-13: Interleukin 13; IL-2: Interleukin 2; IL-4: Interleukin 4; IL-5: Interleukin 5;PI3K: phosphatidylinositol 3-kinase; PKC: protein kinase C; SCFA: short-chain fatty acid; TGF-β: Transforming Growth Factor β; Th0: T Cell Naive; Th1: Type 1 Helper T cell; Th2: Type 2 Helper T cell; TLR: Toll-like receptor; TNF-α: Tumor Necrosis Factor α. *Source:* Adapted from Garcia *et al.* (2023)

indicates that oral administration of *S. boulardii* is effective in treating multiple gastrointestinal disorders, including traveller's diarrhea, antibiotic-associated diarrhea (AAD), *C. difficile*-associated syndrome, IBS, and Crohn's disease.[5]

S. boulardii can survive the acidic and bile conditions of the stomach in its lyophilized form. It is one of the few yeasts that can thrive at body temperature (37°C).[5] Steady-state concentrations of this yeast are achieved within 3 days, and it is eliminated from the body within three to 5 days after discontinuation.[5] Furthermore, *S. boulardii* can survive in the competitive environment of the intestinal tract, particularly in the colon.[5] It is naturally resistant to antibiotics and proteolysis, which increases its effectiveness as a probiotic.[5]

EFFICACY OF *S. BOULARDII*, A YEAST PROBIOTIC

According to Ragavan *et al.* (2020), a retrospective analysis evaluated the efficacy of *S. boulardii* in managing AAD in 160 children, grouped into those who received *S. boulardii* (SB group) and those who did not (non-SB group). The results indicated that the median duration of diarrhea after treatment was significantly shorter in the SB group (3 days)

compared to the non-SB group (4 days), with a reduction in stool frequency post-treatment (1.7 times per day) versus the non-SB group (2.5 times per day).[6]

A review article by Kazmierczak *et al.* (2020) reported that administration of *S. boulardii* CNCMI I-745 during antibiotic therapy has an advantage over bacterial probiotics due to its natural fungal properties, which make it intrinsically resistant to antibiotics and cannot promote the spread of antimicrobial resistance.[7]

In a randomized trial by Salazar-Parra *et al.* (2023), 46 patients with viral acute diarrhea were enrolled to receive standard analgesics (paracetamol) and antispasmodics plus 600 mg of Sb or placebo orally once daily for 8 days. On the 4th day, 70% of patients in the Sb group and 26% in the placebo group reported improvement in acute infectious diarrhea ($P = 0.03$).[8]

Pal *et al.* (2024) evaluated the effectiveness of *S. boulardii* CNCM I-745 in adult patients with diarrhea. The test group with 270 patients was prescribed *S. boulardii* CNCM I-745, while the control group ($n = 1457$) was not prescribed *S. boulardii* CNCM I-745. 77.8% of patients (95% CI 72.34–82.59) in the test group did not complain of diarrhea at follow-up, while 15.8% (95% CI 13.95–17.76) complained of diarrhea in the control group ($P < 0.05$).[9]

Efremova *et al.* (2024) evaluate the effectiveness of the *S. boulardii* probiotic in the treatment of small intestinal bacterial overgrowth (SIBO). After 3 months of treatment, SIBO was absent in 80% of patients in the probiotic-treated group and only 23.1% of patients in the placebo group ($P = 0.002$).[10]

More *et al.* (2018) reported that *S. boulardii* CNCM I-745 synthesizes and secretes polyamines, which have a role in cell differentiation and proliferation. The administration of polyamines, or *S. boulardii* CNCM I-745, enhances the expression of intestinal digestive enzymes as well as nutrient uptake transporters. *S. boulardii* CNCM I-745 secretes certain enzymes, which enhance nutrient attainment for the yeast and the host. The increased availability of digestive enzymes seems to be one of the mechanisms by which *S. boulardii* CNCM I-745 counteracts diarrhea.[11]

CONCLUSION

Both functional and organic GIDs are very common in the pediatric population, and their short- and long-term consequences reveal many challenges for physicians and pediatricians. Probiotics have emerged as a promising strategy for the prevention and treatment of several GIDs. There is growing evidence that probiotic treatment promotes a protective environment for commensal bacteria and generates an interface for immune response, thus improving clinical outcomes in pediatric patients. Furthermore, the safety of the use of probiotics has been well-established in clinical trials.

Let us now consider the empirical evidence and professional opinions of pediatricians regarding the use of *S. boulardii*, a yeast probiotic, in managing dysbiosis.

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EXPERT OPINION

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1. Which probiotic, yeast, or bacteria is more effective in relieving antibiotic-associated diarrhea?
   More than 96% of experts recommend yeast probiotics, and only 3.7% recommend bacterial probiotics for managing AAD [Figure 2].
2. Are there any side effects following the use of *S. boulardii* in the general population?
   About 88% of specialists stated that using *S. boulardii* has no side effects, while 11% of specialists stated that using *S. boulardii* causes side effects in the general population [Figure 3].
3. In your opinion, can *S. boulardii* CNCM I-745 be used as an adjunct to oral rehydration therapy for the management of acute gastroenteritis?
   About 88% of experts report using *S. boulardii* CNCM I-745 as an adjunct to oral rehydration therapy, and only 11% of doctors said that it cannot be used as an adjunct therapy for the management of acute gastroenteritis [Figure 4].
4. In your opinion, is the probiotic *S. boulardii* CNCM I-745 considered to be a safe probiotic?
   All the expert panellists (100%) considered *S. boulardii* CNCM I-745 as a safe probiotic.
5. Do you think *S. boulardii* CNCM I-745 is one of the preferred choices of probiotics for the management of AAD and PAGE?
   All the experts (100%) agreed that *S. boulardii* CNCM I-745 is one of the preferred probiotics for the management of AAD and PAGE.
6. Can *S. boulardii* be used as a supportive treatment for other infections such as CDI, IBS, and *H. pylori* infection?
   All the experts (100%) agreed that *S. boulardii* can be used as a supportive treatment for other infections such as CDI, IBS, and *H. pylori* infection.

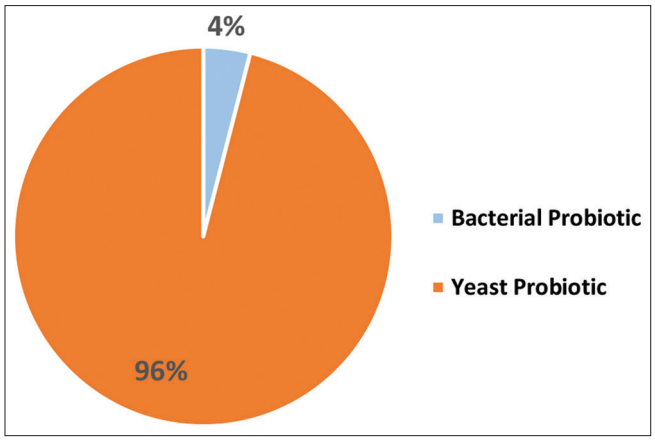

Figure 2: Expert opinion on the effectiveness of probiotics in managing AAD

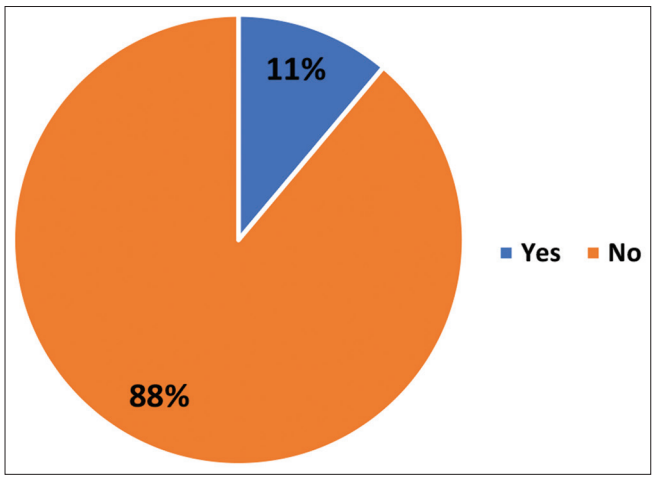

Figure 3: Expert opinion on side effects of *Saccharomyces boulardii*

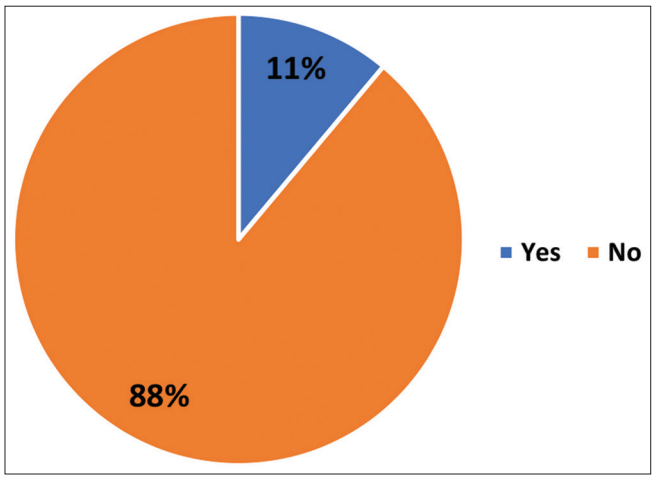

Figure 4: Expert opinion on S. boulardii CNCM I-745 as an adjunct to oral rehydration therapy

7. Do you think that the administration of *S. boulardii* CNCM I-745 can restore the intestinal microbiota faster?

All the experts (100%) reported that *S. boulardii* CNCM I-745 can quickly restore intestinal microbiota as compared to other probiotics.

1. **Dr. Anil Kumar T, MBBS,** DCH
Hasitha Children's Hospital, Mancherial, Telangana

I believe that an alteration in the structure and function of the gut microbiota leads to pediatric gut dysbiosis, which can be restored using yeast probiotics. *S. boulardii* CNCM I-745 is uniquely stable across a wide range of pH levels, including acidic conditions, temperatures, bile salts, and gastrointestinal enzymes, making it a safe and effective probiotic with no reported side. This probiotic has demonstrated beneficial effects against infections caused by various bacteria (*Clostridium difficile, Salmonella, Shigella, Escherichia coli*), viruses (Rotavirus), and yeasts (*Candida albicans*). Importantly, *S. boulardii* CNCM I-745 does not cause antibiotic resistance affects the modulation of intestinal flora, and impacts enzyme activity, thereby improving digestive capacity by secreting certain enzymes. The management of AAD is improved with yeast probiotics, making *S. boulardii* CNCM I-745 one of the preferred choices and is an adjunct to oral rehydration therapy for acute gastroenteritis. It provides supportive treatment for other infections such as *Clostridium difficile infection* (CDI), IBS, and *Helicobacter pylori (H. pylori)* infection. Overall, I agree that administering *S. boulardii* is safe and beneficial for children with acute diarrhea.

2. **Dr. Anoop Kumar,** MD Pediatrician
Jaya Bhushan Hospital Pvt Ltd, Hyderabad, Telangana

I prefer to re-establish gut microbiota balance using yeast probiotics, a diet change, and minimizing antibiotic use. *S. boulardii* CNCM I-745 is stable across various conditions and is considered a safe probiotic with no side effects. It effectively combats infections caused by bacteria, viruses, and yeasts and positively impacts intestinal flora and enzyme activity, improving digestive capacity. Its lyophilized form can survive in the bile and gastric secretions. *S. boulardii* CNCM I-745 is preferred for managing AAD and PAGE and can be used as an adjunct to oral rehydration therapy for acute gastroenteritis. It is safe and beneficial for children with acute diarrhea and can quickly restore intestinal microbiota. In addition, it supports the treatment of other infections such as CDI, IBS, and *H. pylori* infection.

3. **Dr. Ashish Sharma,** MD Pediatrician
Sri Krishna Children Hospital, Una, Himachal Pradesh

Variations in the gut microbiota cause pediatric gut dysbiosis, which can be restored with probiotic yeast, diet, and minimizing antibiotic use. *S. boulardii* CNCM I-745 is

a safe and stable probiotic that works effectively across a wide range of pH levels, temperatures, bile salts, and gastrointestinal enzymes, with no side effects. It combats infections from various bacteria, viruses, and yeasts without promoting antibiotic resistance and improves digestive capacity by secreting enzymes and polyamines and increasing nutrient uptake transporters. Its lyophilized form survives bile and gastric acid. *S. boulardii* CNCM I-745 is preferred for managing AAD and PAGE, and it can be used as an adjunct to oral rehydration therapy for acute gastroenteritis. It also supports treating infections such as CDI, IBS, and *H. pylori* and helps revive intestinal microbiota. I agree that *S. boulardii* probiotic is safe and beneficial for children with acute diarrhea.

4. **Dr. Devendar Reddy Katkuri,** MD Pediatrician
Vatsalya Hospital, Jammikunta, Telangana

I believe that pediatric gut dysbiosis is caused by changes in the gut microbiota that can be restored with yeast probiotics, dietary changes, and minimizing antibiotics. *S. boulardii* CNCM I-745 is a stable and safe probiotic, effective across various pH levels, temperatures, bile salts, and gastrointestinal enzymes. It combats infections from bacteria, viruses, and yeasts. *S. boulardii* CNCM I-745 impacts intestinal flora or enzyme activity and does not lead to antibiotic resistance. It enhances digestive capacity by secreting enzymes and polyamines and increasing nutrient uptake transporters. This probiotic is preferred for managing AAD and PAGE and can be used alongside oral rehydration therapy for acute gastroenteritis. *S. boulardii* also supports treatment for infections such as CDI, IBS, and *H. pylori* and helps restore the intestinal microbiota more quickly. I agree that *S. boulardii* is safe and beneficial for children with acute diarrhea.

5. **Dr. Gurkhel Singh Kalsi,** MD Pediatrician
Kalsi Children Hospital, Gurdaspur, Punjab

Pediatric gut dysbiosis is caused by changes in the gut microbiota and can be corrected with probiotic yeast, dietary modifications, and reducing the use of antibiotics. *S. boulardii* CNCM I-745 is a stable and safe probiotic, effective in various pH levels, temperatures, bile salts, and gastrointestinal enzymes, with no side effects. It combats infections from bacteria (*Clostridium difficile, Salmonella, Shigella, Escherichia coli*), viruses (Rotavirus), and yeasts (*Candida albicans*). *S. boulardii* CNCM I-745 positively impacts intestinal flora and enzyme activity. It enhances digestion by secreting enzymes and polyamines and increasing nutrient uptake transporters. This probiotic is preferred for managing AAD and PAGE, and it can be used with oral rehydration therapy for acute gastroenteritis. It also supports treating *H. pylori* infections, CDI, and IBS and helps restore intestinal microbiota faster. I agree that *S. boulardii* is safe and beneficial for children with acute diarrhea.

6. **Dr. Gautam Kamra,** MBBS, DCH
Kamra Hospital Mother and Child Care Centre, Malout, Punjab

I believe changes in gut microbiota cause pediatric gut dysbiosis, which can be restored with probiotic yeast, dietary changes, and minimizing antibiotics. *S. boulardii* CNCM I-745 is stable and safe with no side effects and combats infections from bacteria, viruses, and yeasts. It improves digestion by secreting enzymes and polyamines. Its lyophilized form survives gastric acid and bile secretions. This probiotic is preferred for managing AAD and PAGE, can be used with oral rehydration therapy for acute gastroenteritis, and supports treating infections such as CDI, IBS, and *H. pylori*. It helps restore intestinal microbiota faster and is safe for children with acute diarrhea.

7. **Dr. Gopal Sai Prasad,** MD Pediatrician
Sai Prasad Children's Hospital, Nizamabad, Telangana

The alterations in the structure and function of the gut microbiota can lead to pediatric gut dysbiosis. To restore the gut microbial balance, I recommend using probiotic yeast, making dietary changes, and minimizing antibiotic use. *S. boulardii* CNCM I-745 is particularly effective due to its stability across a wide range of pH levels, including acidic conditions, temperatures, bile salts, and gastrointestinal enzymes. This probiotic is considered safe with no reported side effects in the general population. *S. boulardii* has beneficial effects against infections caused by various bacteria, viruses, and yeasts. It impacts intestinal flora modulation and improves digestive capacity by secreting enzymes and polyamines and increasing nutrient uptake transporter expression. In addition, its lyophilized form can survive gastric acid. *S. boulardii* CNCM I-745 is one of the preferred choices for managing AAD and PAGE. However, it should not be used as an adjunct to oral rehydration therapy for acute gastroenteritis. I agree that administering *S. boulardii* is safe and beneficial for children with acute diarrhea. It can also support treating other infections such as CDI, IBS, and *H. pylori* infection. Finally, I believe that *S. boulardii* CNCM I-745 can help restore the intestinal microbiota.

8. **Dr. Gurmeet Singh,** MD Pediatrician
Dr. Gurmeet Singh Clinic, Amritsar, Punjab

I recommend probiotic yeast, dietary changes, and minimizing antibiotic use in pediatric gut dysbiosis caused by alterations in gut microbiota *S. boulardii* CNCM I-745 is a uniquely stable and safe probiotic. In lyophilized form,

it survives bile and gastric acid. It effectively combats infections from bacteria, viruses, and yeasts and improves digestive capacity by secreting enzymes and polyamines and increasing nutrient uptake transporters. Yeast probiotic *S. boulardii* CNCM I-745 is preferred for AAD and PAGE management. However, it should not be used as an adjunct to oral rehydration therapy for acute gastroenteritis. I agree that *S. boulardii* is safe and beneficial for children with acute diarrhea as it rapidly restores intestinal microbiota.

9. **Dr. Jaskaran Singh Bhatti,** MBBS, DCH
Care and Cure Hospital, Kathap Punjab

Alterations in the gut microbiota can lead to pediatric gut dysbiosis. To restore balance, I prefer using probiotic yeast, making dietary changes, and minimizing antibiotics. *S. boulardii* CNCM I-745 is uniquely stable across a range of pH levels, temperatures, bile salts, and gastrointestinal enzymes, making it a safe probiotic without side effects in the general population. It is effective against infections from bacteria, viruses, and yeasts. By secreting enzymes and polyamines and increasing nutrient uptake transporters, it enhances digestion and is preferred for managing AAD and PAGE. It can be used as an adjunct to oral rehydration therapy for acute gastroenteritis. I believe *S. boulardii* is safe and beneficial for children with acute diarrhea and can support treatment for *H. pylori* infection, IBS, and CDI.

10. **Dr. Juned Ahmed,** MD Pediatrician
Niloufer Child Care Hospital, Nizamabad, Telangana

Alterations in the gut microbiota can be restored by yeast probiotics, dietary variations, and curtailing antibiotics. *S. boulardii* CNCM I-745 is stable across various pH levels, temperatures, bile salts, and gastrointestinal enzymes, and is considered safe with minimal side effects. It is effective against infections caused by bacteria, viruses, and yeasts. *S. boulardii* CNCM I-745 affects intestinal flora or enzyme activity and enhances digestion by secreting enzymes and polyamines and by increasing nutrient uptake transporters. It is a preferred choice for AAD and PAGE and adjunct to oral rehydration therapy. I agree that *S. boulardii* is safe for children with acute diarrhea and can also support the treatment of *H. pylori* infections, IBS, and CDI.

11. **Dr. Koneru Sai Sankeerth Rao,** MD Pediatrician
Sai Ayush Children's Hospital, Nizamabad, Telangana

To address pediatric dysbiosis, I recommend probiotics and diet modification. *S. boulardii* CNCM I-745 is stable at varied pH levels, temperatures, bile salts, and gastrointestinal enzymes. It effectively combats bacteria, viruses, and yeast infections. It positively affects the intestinal flora or alters enzyme activity but enhances digestion by secreting certain enzymes. I also prefer it for AAD, PAGE, and adjunct oral rehydration therapy for acute gastroenteritis. I agree that *S. boulardii* is safe and effective for children with acute diarrhea and can restore intestinal microbiota quickly. However, it should not be used as a supportive treatment for *H. pylori* infections, CDI, or IBS.

12. **Dr. Mahipal Reddy Gujjula,** MD Pediatrician
Hema Children Hospital, Karimnagar, Telangana

Alterations in the gut microbiota can cause pediatric dysbiosis. I advocate for restoring balance with probiotic yeast. *S. boulardii* CNCM I-745 remains stable across various pH levels, temperatures, bile salts, and enzymes and is generally safe, though some side effects may occur. It effectively combats bacterial, viral, and yeast infections without promoting antibiotic resistance or altering enzyme activity. It enhances digestion by secreting specific enzymes and survives bile and gastric acid. *S. boulardii* CNCM I-745 is a preferred choice for AAD and PAGE and adjunct oral rehydration therapy for acute gastroenteritis. It is also effective as a supportive treatment for CDI, IBS, and *H. pylori* infections. In addition, it can restore intestinal microbiota more quickly.

13. **Dr. Mukesh Khetan,** MD Pediatrician
Khetan Children Clinic, Hyderabad, Telangana

Alterations in the gut microbiota can lead to pediatric dysbiosis. I recommend using probiotics (yeast), dietary changes, and avoiding antibiotics to restore gut balance. *S. boulardii* CNCM I-745 is stable across pH and temperature ranges. In lyophilized form, it withstands bile salts and enzymes and is safe with no reported side effects. It is effective against bacterial, viral, and yeast infections and does not promote antibiotic resistance or alter enzyme activity. It enhances digestion through enzyme secretion and survives gastric acid. *S. boulardii* CNCM I-745 is a top choice for managing AAD and PAGE and can be used with oral rehydration therapy. It is also beneficial for CDI, IBS, and *H. pylori* infections and can restore the intestinal microbiota more quickly.

14. **Dr. N Ravinder,** MBBS, DCH, DNB
Child Clinic, Hyderabad, Telangana

To restore microbial balance, I advocate the use of yeast probiotics containing *S. boulardii* CNCM I-745. It is a reliable choice since it is stable in a broad range of pH levels, temperatures, bile salts, and digestive enzymes. It is beneficial against infections by bacteria, viruses, and yeasts and is also considered safe with no side effects. It modulates intestinal flora, enhances enzyme activity, and improves digestion through the secretion of specific enzymes, polyamines, and nutrient-uptake transporters. Evidence

suggests that the management of AAD is more effective with bacterial probiotics, although *S. boulardii* CNCM I-745 can also be used to treat AAD and PAGE and as an adjunct to oral rehydration therapy. Furthermore, *S. boulardii* can support treatment for CDI, IBS, and *H. pylori* infections. Overall, I believe *S. boulardii* CNCM I-745 can facilitate a faster restoration of the intestinal microbiota.

15. **Dr. Paramjit Singh,** MD Pediatrician
Dr. Paramjit Singh Children's Hospital, Batala, Punjab

Alterations in the gut microbiota cause pediatric dysbiosis. I recommend dietary changes, yeast probiotics, and minimal use of antibiotics. *S. boulardii* CNCM I-745 is stable across various pH levels, temperatures, bile salts, gastric acids, and enzymes, and is safe with no side effects. It effectively combats bacterial, viral, and yeast infections without promoting antibiotic resistance or altering enzyme activity. It enhances digestion by secreting enzymes and polyamines and increasing nutrient uptake transporters. It is highly effective for AAD and PAGE and can be used with oral rehydration therapy. It is also beneficial for CDI, IBS, and *H. pylori* infections.

16. **Dr. Pratap Gudi,** MD Pediatrician
Ragavendra Poly Clinic, Hanamkonda, Telangana

Changes in the gut microbiota structure and function can lead to pediatric gut dysbiosis and can be restored using yeast probiotics, changes in diet, and limiting antibiotic use. *S. boulardii* CNCM I-745 is considered safe and stable across various pH levels, temperatures, bile salts, gastric acid, and enzymes. It effectively addresses infections caused by bacteria, viruses, and yeasts. *S. boulardii* CNCM I-745 enhances digestion through enzyme secretion, polyamine production, and increasing nutrient uptake transporters. It is a preferred option for AAD, PAGE, and adjunct therapy for oral rehydration. In addition, it supports treatment for CDI, IBS, and *H. pylori* infections.

17. **Dr. Prem Paul Gulati,** MD Pediatrician
Clinic, Amritsar, Punjab

I advocate dietary changes, limiting antibiotics, and using probiotic yeast to restore gut microbiota. *S. boulardii* CNCM I-745 supports treatment for CDI, IBS, and *H. pylori* infections and helps restore the intestinal microbiota quickly. It is stable across a range of pHs, temperatures, bile salts, and gastrointestinal enzymes and is considered a safe probiotic. It is effective against infections caused by bacteria, viruses, and yeasts. This probiotic enhances digestive function by secreting enzymes and polyamines and increasing nutrient uptake transporters. It is my preferred choice for treating AAD, PAGE, and as an adjunct in oral rehydration therapy.

18. **Dr. Ravi Pallapolu,** MBBS, DCH
Sai Keerthi Children's Hospital, Hyderabad, Telangana

To address gut dysbiosis, I recommend using probiotic yeast, making dietary changes, and avoiding antibiotics. *S. boulardii* CNCM I-745 is resilient across pH levels, temperatures, bile salts, and digestive enzymes and is regarded as a safe option. It responds well against viruses, yeast, and bacterial infections. It supports digestive health by secreting specific enzymes and polyamines and enhancing nutrient uptake. It can assist in treating CDI, IBS, and *H. pylori* infections and is a preferred choice for managing AAD, PAGE, and adjunct oral rehydration therapy.

19. **Dr. Rupanagudi Ramasubba Reddy,** MBBS, DCH, DNB
Sri Vijaya Durga Children's Hospital, Nandikotkur, Andhra Pradesh

I believe in dietary changes, lessening antibiotics, and using probiotic yeast to restore gut microbes. *S. boulardii* CNCM I-745 is safe and stable across various conditions in the human gut. It benefits against bacterial, viral, and yeast infections. This strain improves digestion by secreting enzymes and polyamines and increasing nutrient uptake transporters. Lyophilised *S. boulardii* survives on bile and gastric acid. It is effective for managing AAD and PAGE, oral rehydration therapy, and CDI, IBS, and *H. pylori* infections.

20. **Dr. Sanjay Khetarpal,** MD Pediatrician
Khetarpal Children Hospital, Amritsar, Punjab

I prefer restoring gut microbiota balance through diet and yeast probiotics. *S. boulardii* CNCM I-745, a probiotic that is stable across various conditions, is safe with no side effects and effectively combats infections from bacteria, viruses, and yeasts. It improves digestion by secreting enzymes and polyamines and increasing nutrient uptake. Lyophilised *S. boulardii* survives bile and gastric acid. It is preferred for AAD, PAGE, and oral rehydration therapy. It also supports treatment for infections such as CDI, IBS, and *H. pylori*, and it facilitates a quicker restoration of gut microbiota.

21. **Dr. Surendra Pal Singh Dhingra,** MBBS, DCH
Dhingra Child Care Centre, Ludhiana, Punjab

Alterations in gut microbiota can be restored by balance through dietary variations using yeast probiotics such as *S. boulardii* CNCM I-745, which are stable across various conditions and considered safe with no side effects. *S. boulardii* defends against viral, bacterial, and yeast infections, improves digestion by secreting enzymes and polyamines, and survives bile and gastric acid. It works well in conjunction with oral rehydration therapy and is effective

for PAGE and AAD management. Moreover, it facilitates the faster restoration of intestinal microbiota and aids the treatment of CDI, IBS, and *H. pylori.*

22. **Dr. Srikanth Dappuri,** MBBS, DCH
Sai Balaji Children Clinic, Hyderabad, Telangana

Altered gut microbiota during dysbiosis can be balanced using probiotic yeast such as *S. boulardii* CNCM I-745I and dietary changes. This probiotic is stable under various conditions, considered safe with no side effects, and beneficial against infections from bacteria and viruses. It modulates intestinal flora, enhances digestive capacity, and survives gastric acid. *S. boulardii* is effective for managing AAD and PAGE and is used with oral rehydration therapy. It also supports treatment for CDI, IBS, and *H. pylori* infections.

23. **Dr B. Sugunakar Reddy,** MD Pediatrician
Sunitha Children's Hospital, Hyderabad, Telangana

To restore balance in dysbiosis, I recommend diet modifications and using *S. boulardii* CNCM I-745 yeast probiotic. This probiotic is stable under various conditions, considered safe with no side effects, and beneficial against bacteria, viral, and yeast infections. It modulates the intestinal flora, impacts enzyme activity without promoting antibiotic resistance, enhances digestive capacity, and survives both bile and gastric acid in lyophilized form. It supports treatment for CDI, IBS, and *H. pylori i*nfection and manages AAD and PAGE effectively as an adjunct therapy for oral rehydration that quickly restores the intestinal microbiota.

24. **Dr. Tariq Ahmad,** MBBS
Doctors Clinic, Srinagar, Jammu and Kashmir

Yeast probiotics such as *S. boulardii* CNCM I-745 are stable under various conditions, considered safe with no side effects, and effective against infections from bacteria, viral, and yeast pathogens. It benefits the intestinal flora, impacts enzyme activity, improves digestive capacity by secreting enzymes and polyamines, and enhances nutrient uptake transporter expression. In lyophilized form, it can survive bile and gastric acid and is effective in AAD and PAGE treatment. *S. boulardii* is beneficial for children with acute diarrhea and can support treatments for CDI, IBS, and *H. pylori* infection. It also helps restore the intestinal microbiota faster than other probiotics.

25. **Dr. Venkateshwar Reddy Rondla,** MBBS, DCH, PGPN
Vihaan Children Clinic, Hanamkonda, Telangana

In my practice, I use *S. boulardii* CNCM I-745 yeast probiotic to balance the gut microbiota during dysbiosis, as this probiotic is stable, safe with minimal side effects, and effective against infections from bacteria, viruses, and yeasts. It modulates the intestinal flora and affects enzyme activity. *S. boulardii* enhances digestion by secreting enzymes and polyamines and increasing nutrient uptake transporter expression. Lyophilized *S. boulardii* can withstand gastric acid and bile secretions. It is effective in managing AAD and PAGE, can be used with oral rehydration therapy for acute gastroenteritis, is safe for children with acute diarrhea, and supports treatments for CDI, IBS, and *H. pylori* infection.

26. **Dr. Vineet Sharma,** MD Pediatrician
Sharma Childrens Hospital, Phagwara, Punjab

S. boulardii CNCM I-745 yeast probiotic is stable across a range of pH, temperatures, bile salts, and gastrointestinal enzymes; therefore, it is presented to restore balance in dysbiosis conditions. This probiotic is safe to use and has no side effects in the general population. It is beneficial against infections, manages AAD, PAGE, and oral rehydration therapy, and is safe for children with acute diarrhea. It modulates intestinal flora, impacts enzyme activity, and enhances digestive capacity by secreting enzymes and polyamines and increasing nutrient uptake transporters. The lyophilized *S. boulardii* can survive both bile and gastric acid.

27. **Dr. Y Mallikarjuna Reddy,** MD Pediatrician
Bhavana Hospital, Adoni, Andhra Pradesh

During gut dysbiosis, microbial balance can be restored through dietary changes and yeast probiotics from *S. boulardii* CNCM I-745. This probiotic is stable under various conditions, considered safe, and has no side effects in the general population. It fights infections caused by viruses, yeasts, and bacteria. In addition to increasing enzyme activity and regulating gut flora, it enhances digestion by secreting enzymes and polyamines and boosting nutritional absorption. Gastric acid and bile do not affect the lyophilized *S. boulardii* species. It works well for treating PAGE and AAD. It can be administered in conjunction with oral rehydration therapy for acute gastroenteritis. It quickly restores the intestinal microbiota and is advantageous for various infections, such as *H. pylori,* CDI, and IBS.

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