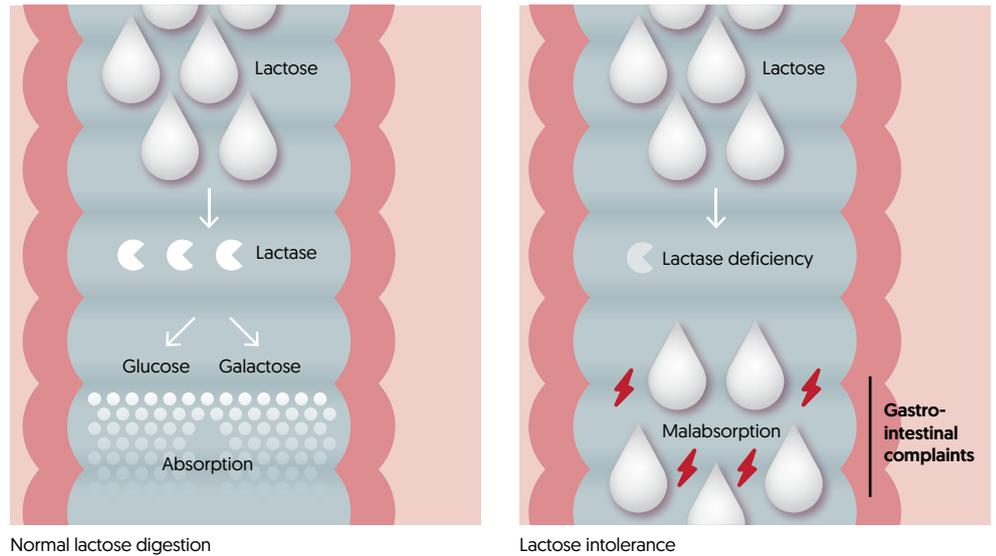


# Managing lactose intolerance

**The prevalence of food allergies and intolerances are on the rise. In Westernized countries up to 20% of the population may suffer from adverse reactions to food of which the largest majority belongs to food intolerances.**

Hypersensitive reactions to food can be separated in two types; allergies and intolerances. The term food allergy is used when an adverse reaction occurs due to an immunologic mechanism. Food intolerances do not involve the immune system and are therefore non-allergic reactions. Food intolerance reactions can include pharmacological, metabolic or gastrointestinal adverse responses to food or food compounds.<sup>1</sup> A common example of food intolerance is lactose intolerance. Individuals with lactose intolerance insufficiently digest lactose due to a lack of the enzyme lactase. Lactose intolerance can lead to complaints such as diarrhea, vomiting, cramps and flatulence.<sup>2,3</sup> Current therapies to prevent or treat food intolerances are elimi-

**Figure 1:** Due to a lack of the enzyme lactase, people with lactose intolerance insufficiently digest lactose leading to gastro-intestinal complaints.



nation diets.<sup>4,6</sup> However, use of probiotics to intervene and alleviate the clinical symptoms of lactose intolerance is gaining worldwide recognition from a growing number of studies. It is also being mentioned as one of the

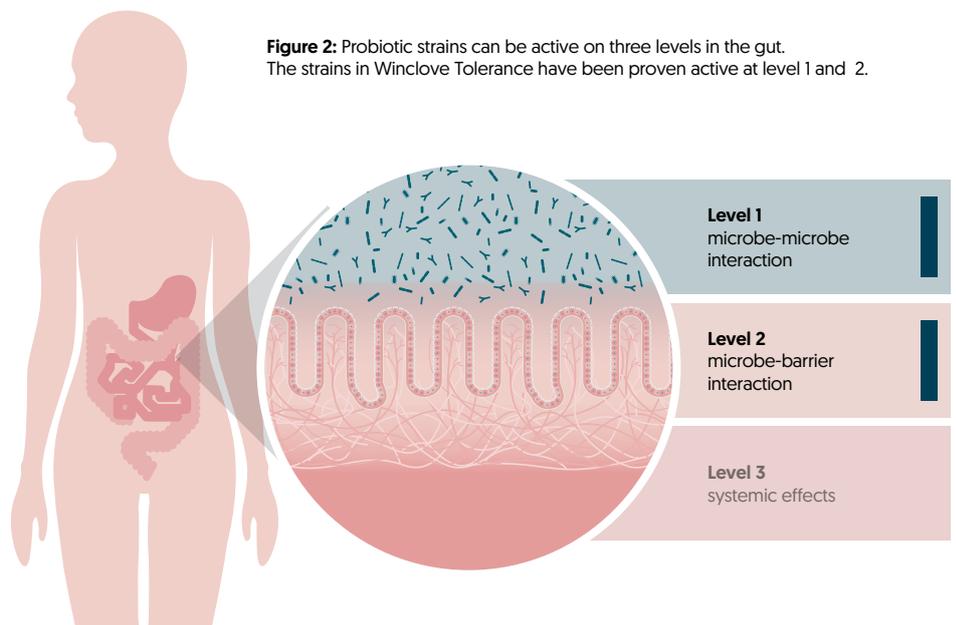
target areas where evidence for probiotics is strongest.<sup>7</sup> With this knowledge, Winlove has developed the multispecies probiotic formulation Winlove Tolerance to support people suffering from lactose intolerance.

## Strain selection

Winlove Tolerance is a multispecies probiotic formulation, developed for managing lactose intolerance. The formulation consists of 4 specifically selected probiotic strains. Probiotic strains can exert health effects at different levels in the gut (see figure 2). The bacterial strains of Winlove Tolerance have been selected for their capacity to influence the mechanisms of action underlying the development of lactose intolerance. The bacterial strains have been screened for their capacity to:

- produce  $\beta$ -galactosidase
- strengthen the intestinal barrier function.

**Figure 2:** Probiotic strains can be active on three levels in the gut. The strains in Winlove Tolerance have been proven active at level 1 and 2.



## In vitro evidence

### • $\beta$ -galactosidase activity

An important mechanism of action for probiotics to be supportive in lactose intolerance is the production of the colonic bacterial enzyme  $\beta$ -galactosidase.  $\beta$ -galactosidase has the same function as lactase, it hydrolyses lactose into galactose and glucose. Strains in Winclove Tolerance have been tested *in vitro* on their  $\beta$ -galactosidase activity, as presented in table 1<sup>8</sup>. The data indicate that the production of  $\beta$ -galactosidase is highly strain-specific. In particular, *L. acidophilus* W22 and *B. lactis* W51 exhibit high levels of  $\beta$ -galactosidase activity.

**Table 1:**  $\beta$ -galactosidase activity:  
+ = little activity,  
++++ = high activity.

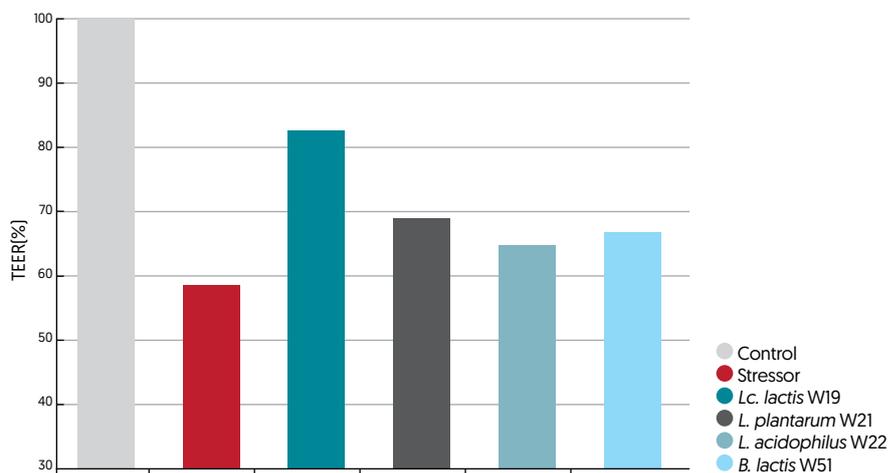
| Strains                              | Activity level |
|--------------------------------------|----------------|
| <i>Bifidobacterium lactis</i> W51    | +++            |
| <i>Lactobacillus acidophilus</i> W22 | +++++          |
| <i>Lactobacillus plantarum</i> W21   | +              |
| <i>Lactococcus lactis</i> W19        | +              |

### • Strengthening the epithelial barrier

Another target for probiotics in food intolerance is strengthening the gut barrier function. Maintenance of the intestinal integrity (defined as low paracellular transport) is critical for essential physiological processes. The bacteria in Winclove Tolerance have

been tested for their capacity to restore the gut barrier function after immunological stress in a Caco-2 TEER model<sup>8</sup>. The data shown in figure 3 indicate highly strain-specific effects, whereby *L. lactis* W19 showed to protect the gut barrier function the best.

**Figure 3:** Capacity of bacteria in Winclove Tolerance to restore the gut barrier function. An increase in %TEER (trans epithelial electric resistance) indicates an improved barrier function.



## Formulation details

|                            |   |
|----------------------------|---|
| Indication                 | Managing lactose intolerance.   |
| Colony forming units [CFU] | 8,0 x 10 <sup>8</sup> CFU/gram.   |
| Bacterial strains          | <i>B. lactis</i> W51 <i>L. acidophilus</i> W22 <i>L. plantarum</i> W21 <i>Lc. lactis</i> W19  |
| PROBIOACT® Technology      | Protective and nutritional ingredients that improve the stability of the formulation, GI survival and metabolic activity of the bacteria.   |
| Recommended daily dosage   | Variable.   |
| Treatment period           | For as long as desired/needed.  |
| Storage and stability      | 2 years stable at room temperature, no refrigeration needed.  |
| Available dosage forms     | Dry powder which can be supplied as bulk, sachets, capsules or fully packed (with your design).   |
| Safety and Quality Profile | All probiotic strains have the Qualified Presumption of Safety (QPS) status <sup>10</sup> . Winclove is a NSF International Certified GMP Facility for manufacturing dietary supplements and is ISO 22000:2005 certified for the development and production of pre- and probiotics. |
| Marketing                  | Private label.  |

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- Besseling-van der Vaart I. et al. 2015. *In vitro* evidence for efficacy in food intolerance for the multispecies probiotic formulations Ecologic® Tolerance (Syngut™). *Beneficial microbes* 7(1);111-118.

This information is intended for business professionals only, not for consumers. The formulations contained herein are concepts, not commercially available and not intended to diagnose, cure or prevent any diseases.

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