



## G&G Information Sheet

### Probiotics Data and how they are manufactured

Probiotics are defined by the World Health Organisation (WHO) as “live microorganisms that, when administered in adequate amounts, confer a health benefit on the host”. These are often referred to as “good bacteria”.

These fall into several categories including, lactic acid bacteria (e.g. *Lactobacillus acidophilus*), bifidobacteria (e.g. *Bifido bifidum*), spore-forming (e.g. *Bacillus coagulans*) and some yeasts (e.g. *Saccharomyces boulardii*).

Everyone has (or should have) bacteria living in the gut, anywhere from 500 to 1000 different species, however most are from only 30-40 species. Probiotics are still being studied as there is, even now, a lack of consensus as to their actions. They help fight toxins, regulate the immune system and create an unfavourable environment for “bad” bacteria. Probiotics can be found in fermented foods and dairy, such as: kefir, yoghurt, kimchi, sauerkraut, miso and sourdough breads.

The widespread and excessive use of antibiotics kills these good bacteria as well as the bad ones they are prescribed for. Replenishment can take time and requires a good diet, to speed this up probiotics in supplement form are a viable option.

So how are they made?

There are four stages:

1. Seeding
2. Growth
3. Harvesting
4. Formulation

Seeding is the starting point. The “seeds” are frozen bacteria stock that are defrosted and fermented to produce a large enough culture batch to start the commercial process.

Growth is the main process, here the starter culture is added to a medium that the bacteria can grow on, this is usually a grain-based substrate (wheat, barley, oats, rice) or can be dairy-based. The fermentation media is always sterilised first, so there are no other microorganisms present. Fermentation takes place in highly controlled conditions in closed stainless steel tanks.

Harvesting is the next stage, where the bacteria are collected from the fermentation media, this is done by centrifugation or microfiltration. Some freshly grown bacteria can also be frozen as “seeds” to be used in future cultures.

The final stage is the formulation, as a lot of probiotics are freeze-dried, which is quite a harsh process, they need to be protected so they have a higher survival rate. This is where things are added to stabilise the bacteria, these are referred to as “cryoprotectants” (cryo-meaning “icy cold”). These are usually mixtures of carbohydrates and peptides which could include: maltodextrin, sucrose, lactose, trehalose, glycerol, glycol, betaine and monosodium



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glutamate (yes – MSG). When it has been dried it can be blended with a carrier like maltodextrin or microcrystalline cellulose ready for sale.

Even if the bacteria are sold on an MCC base (instead of maltodextrin) there is still the possibility that maltodextrin was used in an earlier step (cryoprotectant) and traces may remain.

Bacteria are grown to specific strengths or concentrations, these are designated in CFU/g, which means “colony-forming units per gram”. This means, in simplistic terms, the number of bacteria that are able to multiply and form colonies i.e. they are viable (alive).

Most probiotics are produced in the tens or hundreds of billions of CFU/g, this is because the journey from mouth to gut is perilous for bacteria, stomach acid and other harsh body secretions will prevent many bacteria from making it to the target. This is the “carpet bombing” approach, throw everything you can at it and some will make it.

There are other options to help ensure probiotics get to the desired location, like enteric-coated capsules, acid-resistant or delayed-release capsules. These resist the stomach acid and make it to the small intestine, so more of the dose is delivered unscathed.

Most probiotics are listed as the following example: the genus – Lactobacillus, species – acidophilus and the strain number – DSM24936. The strain number is where it gets interesting. A strain is a genetic variant, similar to cultivars in plants, where it is bred for a specific trait and all offspring will have that same trait.

Most strains are proprietary and trademarked, so they belong to a specific company. A classic example is the DDS-1 strain of L. acidophilus, it was discovered in the 1950s by a doctor at the University of Nebraska, he started a company called Nebraska Cultures and a range of products/strains using the tag DDS (Department of Dairy Science), they are no longer around but the current owners still sell it and it is one of the longest studied strains.

Some strains can be purchased, others cannot. There are generic strains and there are strain “libraries” where manufacturers can buy generic strains. In human nutrition any strain of a probiotic can be used, this is not the case in animal nutrition. There are only a couple of specific strains that are allowed in animal supplements or feed.

Unless a specific strain has been used in clinical trials and has documented evidence of efficacy, that a customer may want to refer to, it may be better (and cheaper) to use a generic strain. I would suggest leaving strain numbers off of any product labels, otherwise you are forever tied to that specific strain.