



# Bayer

## Formulation vs. Generics

**Dr Colin Mumford, Bayer's Technical Manager says there's more to branded chemistry than meets the eye.**

With spending pressures across all business sectors, many turf professionals are looking carefully at fungicide expenditure and there's a clear temptation to opt for low cost generics containing the same active ingredient as a branded treatment. But this approach overlooks the added benefits of a branded formulation.

The efficacy of a treatment relies heavily on the correct formulation technology, to help the active ingredient be as effective as possible, such as by adhering to and being absorbed by the leaf and ensuring the sprayer doesn't become blocked.

An effective turf formulation needs to be developed specifically for the grass sward, and can be adaptable to the growing conditions and the mode of action, which is how the treatment acts (such as by contact or translocated activity). There are however, many other variables to consider, for example, whether the plant has hairy leaf surfaces, waxy cuticles or whether its typical environment and intended use is within a temperate or more humid climate. These are all key considerations for our formulation and product development team.

It is not uncommon for the same active ingredient to feature in different formulations but the presence alone of an active ingredient does not ensure the efficacy of the fungicide for any one situation. For example, an agricultural pesticide designed for wheat will not necessarily bring success when applied to turf. Specificity is key when it comes to formulation technology. The same theory applies for a fungicide formulated to adhere easily to hairy tomato leaves or even smooth apple leaves. It will simply be repelled by turf because of the way it's formulated.

Another factor to consider is that fungi reproduce very frequently and very quickly. If a Turf Manager was to use just one active ingredient for a season, then a significant risk of resistance build-up would occur. To counteract this, our products often have two active ingredients with different working mechanisms in one formulation. We also develop spray programmes and advise on which products should be applied at certain times; this all helps to prevent resistance build-up.



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## **StressGard™ Formulation Technology**

Our team, dedicated to the development of new formulation technology, is made up of over 100 scientists and lab technicians. This includes a group of people who concentrate on testing and improving the absorption of a product by combining the active with co-products, adjuvants and other substances that contribute to the over-all result from the final product.

An example of a finely developed formulation is StressGard™ Formulation Technology which is specifically designed for turf. Formulated products evenly distribute active ingredients over the area of each leaf in order to control damaging fungal diseases. For a fungicide to deliver the active ingredient to where it is required, each droplet needs to be transported via hydrophobic wax crystals that cover the leaf's surface. This ensures the liquid makes contact, where droplets would otherwise simply bounce off the leaf surface.

To make sure the product stays on the leaf is then a further challenge. Scientists add other substances to cushion the impact or reduce the surface tension. This ensures that the spray mist of droplets adheres firmly to the leaves and that by creating large wet areas, the active substance can penetrate quickly.

But beyond the product itself, there are also several other factors that have to be considered. Testing under different climatic conditions needs to be carried out to ensure the product remains stable even if stored for several years. Further testing needs to be undertaken to guarantee that the spray liquid can be prepared easily and that even in mixtures this spray solution remains stable for long periods of time, also the solution needs to be formulated to ensure a smooth delivery through the nozzles to prevent blockages.

With this in mind, we evaluate a large number of adjuvants which affect droplet size and are vital in ensuring the fungicide effectively covers each leaf. There are many substances that are available to put into formulations and many more being discovered. It is therefore a highly skilled job to select the right mixture, at the right concentration and in changing combinations from the thousands of potential substances. Special additives may also enhance leaf penetration by softening the cuticle, or where required by ensuring that the active substance forms insoluble crystals.



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This all goes a long way to delivering quality branded products and shows the number of variables involved in this complex process, where a reliable level of consistency is necessary to ensure every product delivers in exactly the way it should. All of our products undergo this rigorous testing so we know that when a product goes to market, we are confident of its efficacy.

Once a formulation is registered, it can't be changed. For this reason, we ensure the formulation is perfect from an early stage and that it is a standard consistency in every pack. This is something that most generic companies can't offer.

## **New product investment**

When considering branded chemistry it's important to understand that its entire development, from molecule discovery has come from the company concerned.

Bringing a new product, based on new chemistry, to market is a huge task, with the process between discovery and ultimate sale, having the potential to span a decade or more.

The scale of what's involved prior to launching a new fungicide into the professional turf market mustn't be underestimated. It's a long and intensive journey, with the discovery of a new active ingredient being merely the start of the process of getting a product ready for sale.

In the same way that pharmaceuticals have to go through a series of laboratory experiments followed by extensive trials work and regulatory procedures, there is a very strict registration process for fungicide and pesticide products.

A significant quantity of data is necessary to scientifically prove that a product is not only completely new and different, but that it is fit for its intended purpose, and meets all environmental and safety criteria. Refining and re-testing is conducted with meticulous attention to detail, which takes place at the laboratory and right through to field scale conditions.



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## **A worthwhile investment**

Advanced formulation is what really sets the R&D companies apart from those who produce off patent products, but for that advanced depth of knowledge and research, Turf Managers have to expect to pay a bit more. This is sometimes off-putting and adds to the temptation of generics, but the advanced development of the branded product will result in a range of added benefits, including greater coverage on the green and added rainfastness.

Turf Managers who choose formulated products over generics are also buying into an after service that off-patent companies can't offer.

