

Feeding the immune system: Patented food formulations strengthening our body.

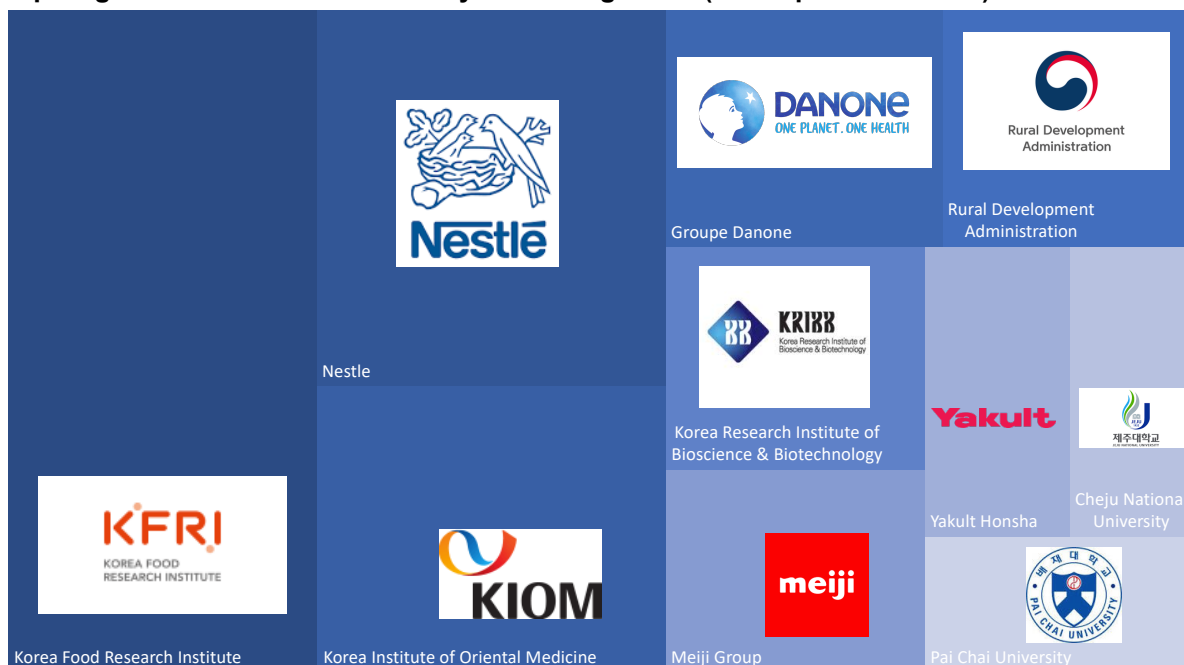
Staying healthy and avoiding infections has never been more important. With a COVID 19 vaccine a long way from being available, we are learning as we go and adopting all sort of measures to protect ourselves, from social distancing to frequent hand washing. But what if we catch an infection? The best defence is to have a robust immune system, the most powerful weapon we have to fight viruses and bacteria. And we have to feed it.

An indisputable fact is that what we eat affects our general health and wellbeing. An increasing volume of research confirms that food plays a key role in supporting specific body functions such as the immune system. Our immune system requires a range of key nutrients to support its function and protection mechanism. The components of the immune system are so diverse that it needs an array of vitamins, minerals and other nutrients to keep it healthy and these nutrients typically work together in a variety of immune-boosting roles.

Consumer demand for healthy choices is accelerating and this is fuelling innovation across a range of products with benefit claims including immune health. Food companies invest large resources to develop ingredient formulations tailored specifically for this health claim, with the objective being to design innovative new combinations of ingredients with the claim of enhanced immune health supported by solid scientific evidence.

Understanding the patent landscape is key in acquiring information on the competition, in particular on who is innovating in what and where. Using Cipher, we have taken a look at patent data specific to food formulation inventions with immune system health claims, to identify key innovators and trending technologies.

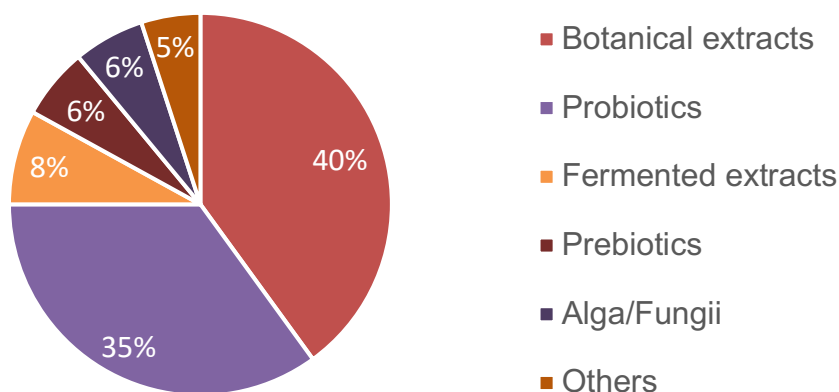
Top 10 global innovators in immunity-enhancing foods (active patent families)



The top tier of organisations owning patents in this technology area includes only 4 consumer product companies: Nestle, Danone, Meiji Group and Yakult Horisha; with the remainder being either public research institutes or universities in South Korea. The leading patent owner is the Korea Food Research Institute (KFRI), established by the Korean government with a primary aim being the research of health and functional foods.

Botanical extracts claiming health benefits have been a part of popular culture in many countries and recent studies are, in some cases, finding solid scientific evidence confirming these claims. We estimate that botanical extracts are associated with 40% of formulation inventions that claim immunity benefits. Probiotics & prebiotics for immunity health remains a central claim in 41% of the patent set, highlighting the established relationship between gut health and the immune system. The remainder includes formulations comprising fermented extracts, algae/fungi and others.

Share % of inventions based on immunity-enhancing ingredients/claims



Source: CIPHER

Almost half of active patents developed by the KFRI focus on vegetable extracts containing active molecules that support the immune system in controlling respiratory disease and inflammation processes such as allergies. Most of these have a mechanism of action around the Th1- and Th2-cytokines. Cytokines are the hormonal messengers responsible for most of the biological effects in the immune system.

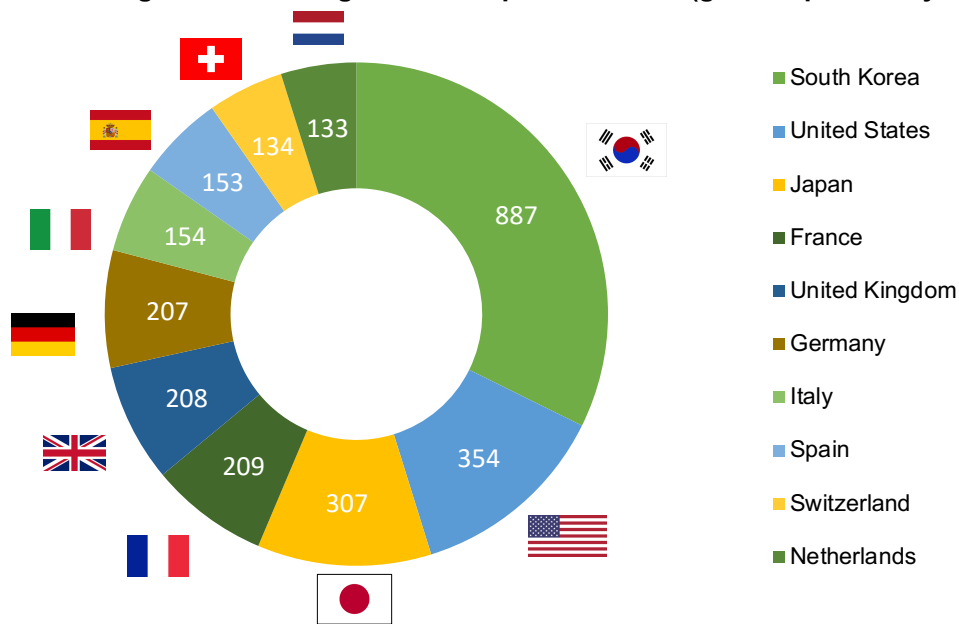
T lymphocytes are a group of cells producing cytokines and two particular subgroups are named Th1 and Th2; the cytokines they produce are known as Th1-type cytokines and Th2-type cytokines. These have opposing effects. The Th1-type cytokines have a pro-inflammatory action to kill intracellular parasites and the Th2-type have an opposite balancing anti-inflammatory effect. In optimal conditions, our body can produce a well-balanced Th1 and Th2 response, suited to the immune challenge. In non-optimal conditions, our immune system can come out of balance resulting in allergic reactions or inflammatory diseases.

The KFRI has identified and isolated molecules from several plants and berry extracts that can re-establish a lost balance between Th1- and Th2-cytokines, strengthen the immune system in the process. Recent patents refer to extracts from *Reynoutria elliptica*, *Euonymus alatus*, *Molokia* leaf, *Poria cocos* bark.

While botanical extracts represent the majority of the active ingredients boosting the immune system discovered by the KFRI, other organisations are investing in formulations including probiotics. The gut-associated immune system and the gut microbiome are the active focus of research demonstrating their interconnected relation. Yakult is developing intellectual property around this aspect, patenting bacterial strains with specific gut microbiome and immune system benefits.

Lactobacillus plantarum HY7717, *Lactobacillus fermentum* HY7301, *Bifidobacterium infantis* HY8401 are all new strains developed by the Japanese company having antioxidant and immune-enhancing activity. These bacteria are responsible for producing metabolites that interact with the intestinal wall and its mucosal coating as well as components of the innate and adaptive immune systems. A specific patent, referring to *Lactobacillus plantarum* HY7717, describes the interaction with the expression of Tumor Necrosis Factor alpha (TNF α), a protein produced during acute inflammation and is responsible for resistance to infection and to cancer.

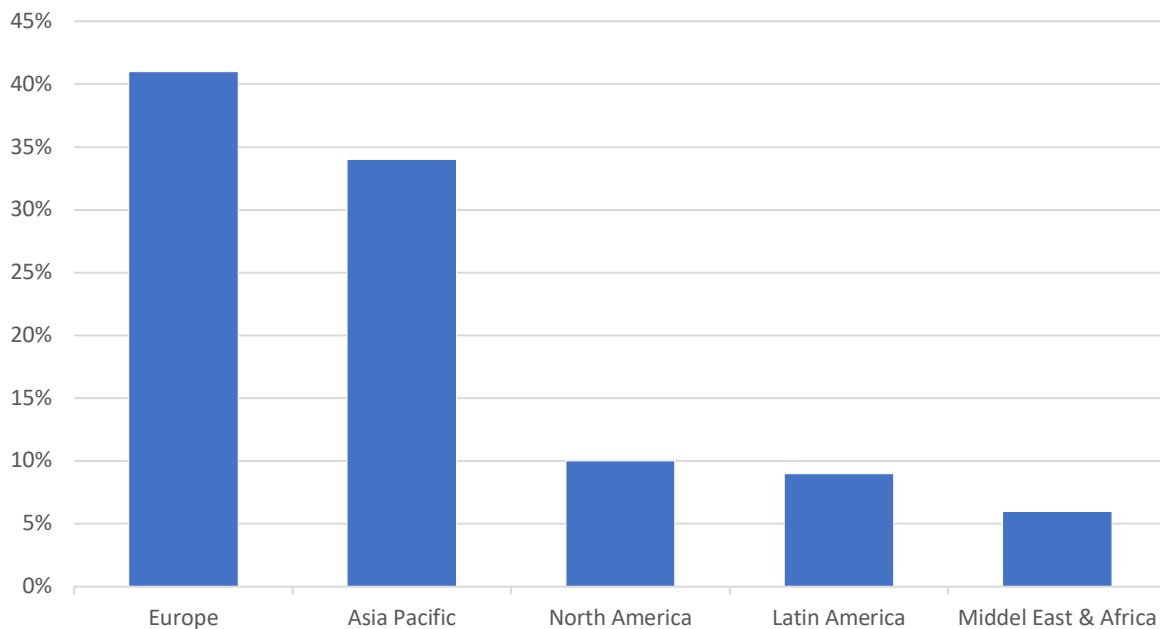
Immune-enhancing food technologies in the top 10 countries (granted patents by country)



Source: CIPHER

No surprise that South Korea is in first place for granted patents (887) associated with immune-enhancing food formulations, followed by the US (354) and Japan (307). The remaining top 10 countries are represented entirely by European nations and account for almost the half of the granted patents. According to Mintel data, European markets are attracting most of the new product launches in the food and drink sector with specific immune health claims. Looking at the period April 2015-March 2020, 41% of new product launches were in Europe, followed by Asia Pacific (34%) and North America (10%).

New Product launches (%) of food formulations with immunity-enhancing health claim, by region (April 2015-March 2020)



Source: Mintel

For more information on who owns what and where in the immunity-boosting food formulations space, access CIPHER via your subscription or if you'd like to understand more about the Food and Drink taxonomy used to run this report in CIPHER, contact us directly at info@cipher.ai