



# Patent Insights Infant Health

Report dated 1 June 2021  
Author: Peter Brown, IPSynergy

# CONTENTS

1.INTRODUCTION .....	4
1.1.Executive Summary .....	5
1.2.Purpose and Outputs of this Report.....	6
1.3.Subject Matter Focus of our Patent Landscape .....	6
2.PATENT TRENDS IN INFANT HEALTH.....	7
2.1.Overall Patent Application Trend in Infant Health Landscape (past 20 years) .....	8
2.2.Ranking of Applicants in Infant Health Patent Landscape (past 20 years) .....	9
2.3.Top 10 Valued Infant Health Patents (past 20 years) .....	10
2.4.Countries Generating the Most Patent Filings (past 20 years).....	11
2.5.Top Applicants and Regions (past 12 months) .....	12
2.6.China and Rest of World - Infant health focus (past 12 months) .....	13
2.7.China and Rest of World - Functional Actives (past 12 months) .....	14
2.8.Health outcomes vs Primary Actives (past 12 months).....	15
2.9.Foods seen in the Bull's Eye and Halo Patents (past 12 months) .....	16
2.10.Food Links vs Health Outcomes vs Functional Actives (past 12 months).....	17
3.BULL'S EYE PATENTS .....	18
4.HALO PATENTS.....	22
5.BACKGROUND PATENTS.....	26
6.THE EXTRA STUFF .....	36



6.1.Searching and Refinement Process.....	36
6.2.Author of this Report .....	36

# 1.INTRODUCTION





## 1.1. Executive Summary

We identified 95 newly published patents since our last report of June 2020.

In this report, we focused our analytics for the last 12 months only on 39 Bulls Eye and Halo patents to avoid background noise. However, the background patents are in Section 5.

Immunity-related, Western-style patents dominate the newly published patents over the last 12 months, with a focus on milk oligosaccharides, prebiotics and probiotics. There is less emphasis on technologies targeting the microbiome. Growth, colic, cognition and digestive tract transit continue to be key areas of interest for THM-based patents.

The upward trend of patent filings in this space continues to be observed, with the same multinationals (Nestle, Nutricia, Mead Johnson and Abbott Laboratories) dominating the landscape.



Dairy as a food source dominates the overall landscape this year. When we look closer at the Chinese portfolio, we see dairy and cereals particularly prevalent, with a couple of patents disclosing non-bovine dairy approaches - one relating to camel milk ([CN111213831A](#)), the other to goat milk ([CN111919889A](#)).

Over the past 12 months, Nutricia, Nestle and Evolve Biosystems continue to be the key players in the landscape. [Gnubiotics Sciences](#), a Swiss-based company specialising in the use of glycans to modulate the microbiome, is a new player.

The proportion of patents arising from China appears to have halved this year, but this could be accounted for by the focus of this report on Bull's Eye and Halo patents.

Within the Chinese corpus, innovation from Jiangsu province continues to dominate, but with an increase in applications from Hunan, Hebei and Guangdong.

Chinese filings tend towards the probiotic, prebiotic and phytochemical space.

## 1.2.Purpose and Outputs of this Report

Provided by [HVN's Science of Food Platform](#), the purpose of this report is to provide HVN members with an update outlining patent insights and trends in food based approaches to infant health since the June 2020 report. The outputs of this report are:

- an executive summary;
- patent trends and insights over the past year, and in comparison to the landscape over the past 20 years; and
- trends and insights from the Bulls Eye and Halo patents published over the past 12 months; and
- details and access (through web-links) to each new patent in this review period.

This report should not be taken as specific advice relating to your intellectual property strategy, freedom to operate, commercial or legal matters. You should always seek your own independent advice relating to your situation. IPSynergy is happy to help.

## 1.3.Subject Matter Focus of our Patent Landscape

**Relevant patents** included in this report are those published after 26 May 2020, providing infant health outcomes through oral interventions, with specific emphasis on the weaning period. We excluded patents if they were focused on pharmaceutical drugs, therapeutic treatments of disease states (opposed to preventative approaches of interest), synthetic compounds / molecules, recombinant technology or genetically engineered material, non-human animal treatments, non-oral routes of intervention, and diagnostics.

**Bull's Eye patents** support infant nutrition with an immunity focus through prebiotics targeting the gut microbiome. Bull's Eye patents will typically also be those utilising foods, nutrients or bioactives that have links to New Zealand's food industry.

**Halo patents** are close to that defined as Bull's Eye, but for one reason or another are not deemed of key relevance (e.g. utilising a probiotic rather than a prebiotic, poor scientific data, or the patent is not focused primarily on infant health).

**Background patents** refer generally to infant health but not aligned on HVN focus. These were not included in the 12-month analytics. A full list of the Background patents, which may include many of the traditional herbal medicine patents, is presented in section 5.



## 2. PATENT TRENDS IN INFANT HEALTH

Quick tip: We can interrogate the data generated for this report to answer any specific questions for HVN members beyond the insights shown here. Please get in touch with Peter at IPSynergy ([peter.brown@ipsynergy.co.nz](mailto:peter.brown@ipsynergy.co.nz)) to discuss any burning questions.

IPSynergy has generated the analytics in this report using its access to:

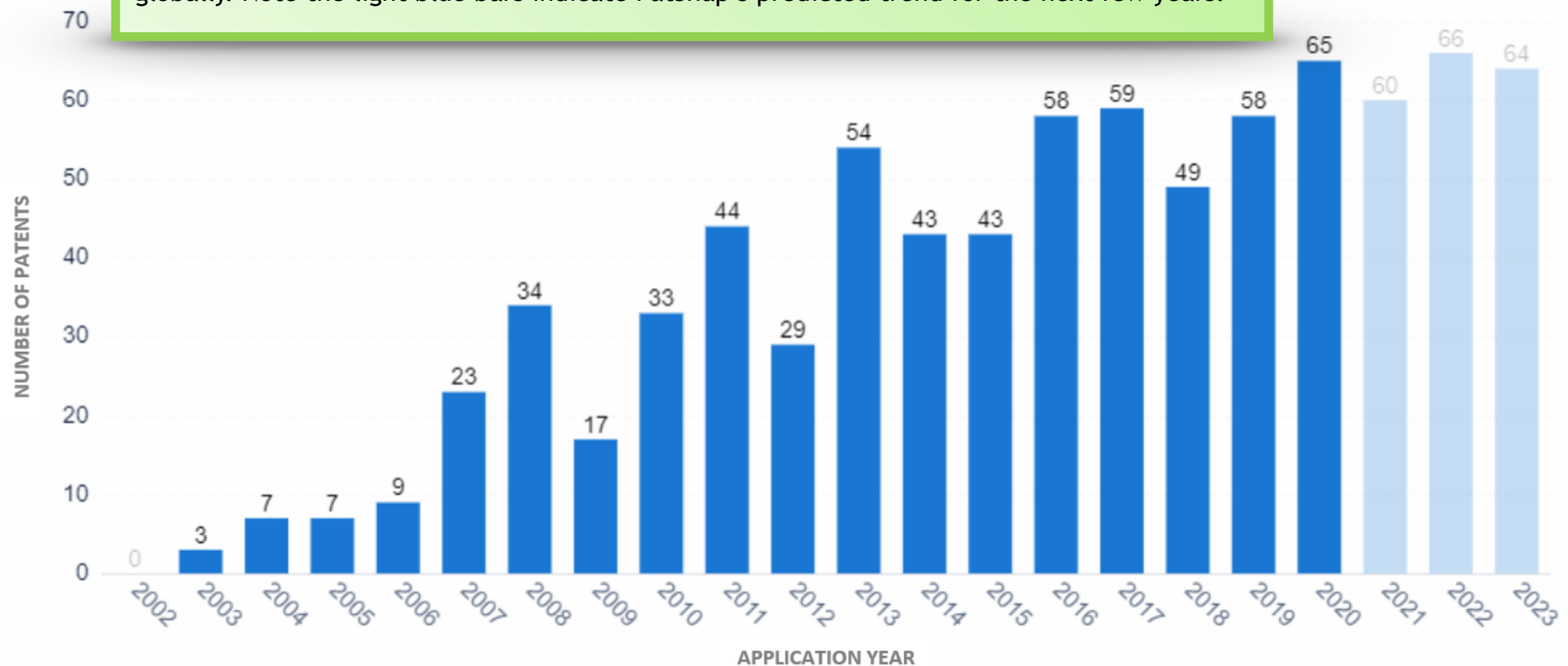
patSnap

discovery



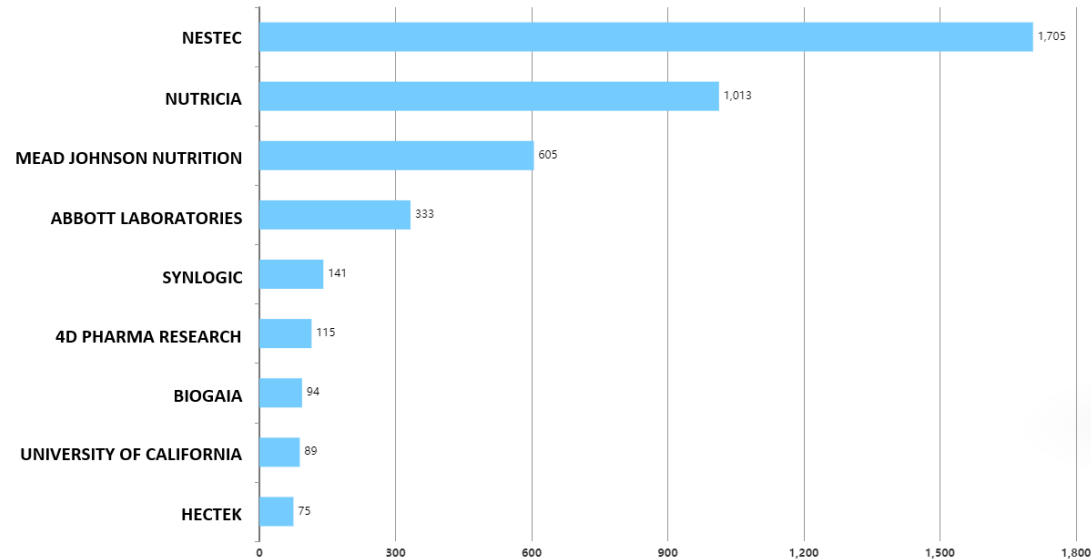
## 2.1.Overall Patent Application Trend in Infant Health Landscape (past 20 years)

In this latest review period, we have found 95 new relevant patent applications relating to infant nutrition. This continues a modest upward trend of new patent filings since about 2013. Whilst the 2018 data shows a dip in filing activity, the data for 2019 indicate a recovery of the upward trend. The data for 2020 may show a further increase in next year's review as patents filed later in the year have not yet been published. Currently, there are only 651 unique patent families in our Infant Health landscape, totalling 7498 patent rights globally. Note the light blue bars indicate PatSnap's predicted trend for the next few years.



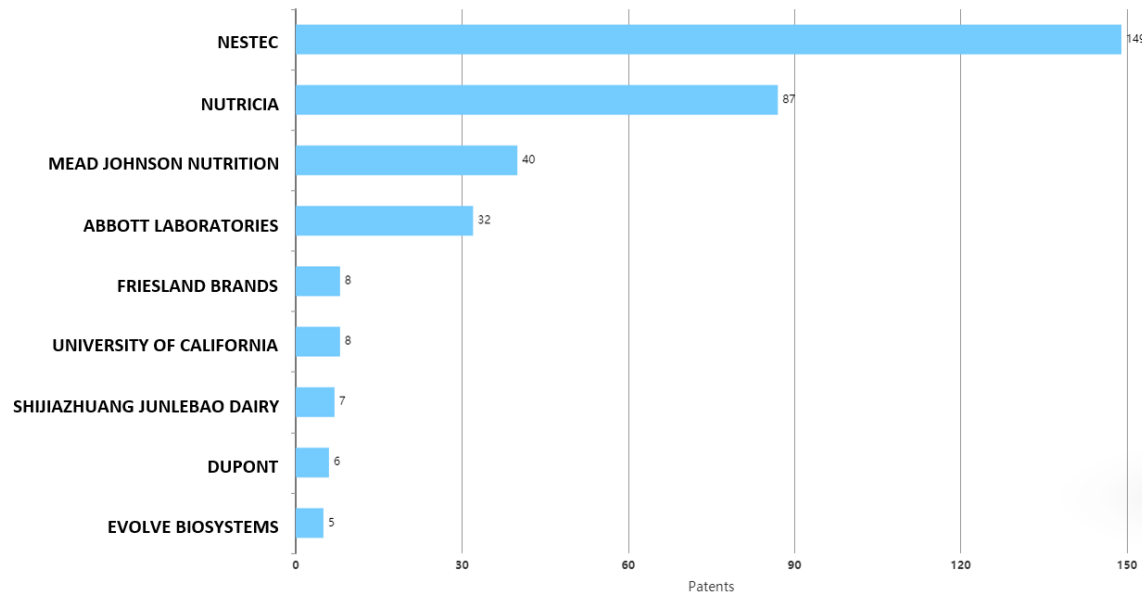


## 2.2. Ranking of Applicants in Infant Health Patent Landscape (past 20 years)



In this graph, we rank companies by **total patents filed** (can include many patents filed globally for the same innovation).

As observed last year, Nestle, Nutricia, Mead Johnson and Abbott Laboratories continue to dominate the landscape.



In this graph, we rank companies by **number of unique patents** (not biased towards large patent families).

As observed last year, we still see the same multinationals dominate when viewed from a big picture 20 year view.

## 2.3. Top 10 Valued Infant Health Patents (past 20 years)

Patent/Title	Std. Current Assignee	Simple Family	IPC Scope ⓘ	Value (USD)	Estimation Lifespan
<a href="#">RU2017142555A3</a> way to STIMULATE THE INTESTINAL FLORA	NUTRICIA	141	4	\$9,040,000	Expiry data unavailable
<a href="#">EP2279672B1</a> Synergism of GOS and polyfructose	NUTRICIA	79	4	\$8,810,000	16yrs <div><div>Application</div><div>Expiry</div></div>
<a href="#">BRPI0920402A2</a> NUTRITIONAL composition TO PROMOTE HEALTHY DEVELOPMENT AND GROWTH.	MEAD JOHNSON NUTRITION	61	3	\$7,200,000	Expiry data unavailable
<a href="#">CA2991450C</a> Use of polydextrose for simulating the functional attributes of human milk oligosaccharides in formula-fed infants	MJN U S HLDG	52	2	\$6,350,000	15yrs <div><div>Application</div><div>Expiry</div></div>
<a href="#">BRPI0710944B1</a> BIOLOGICALLY PURE CULTURE, AND, COMPOSITION AND METHOD TO REDUCE CHILDREN'S COLLIC	BIOGAIA	53	6	\$6,070,000	14yrs <div><div>Application</div><div>Expiry</div></div>
<a href="#">EP3682874A1</a> Nutritional compositions with coated lipid globules	NUTRICIA	42	5	\$5,780,000	Expiry data unavailable
<a href="#">CA2984935C</a> Prebiotic formulations and methods of use	RITTER PHARMA	52	3	\$5,720,000	11yrs <div><div>Application</div><div>Expiry</div></div>
<a href="#">CN106108024B</a> Foods including carbohydrate compositions that are slowly digestible or resistant to digestion	TATE & LYLE INGREDIENTS AMERICAS	45	13	\$5,500,000	14yrs <div><div>Application</div><div>Expiry</div></div>
<a href="#">US20200323927A1</a> Compositions comprising bacterial strains	4D PHARMA	52	4	\$5,280,000	Expiry data unavailable
<a href="#">US10576110B2</a> <i>Lactobacillus johnsonii</i> La1 NCC533 (CNCM I-1225) and immune disorders	SOCIETE DES PROD NESTLE SA	186	6	\$5,210,000	11yrs <div><div>Application</div><div>Expiry</div></div>

We take a look at the highest valued patents in the Infant Health landscape.

PatSnap's algorithm takes into account market coverage, market attractiveness, technology quality, company score and legal score of the patents.

A few interesting take-outs:

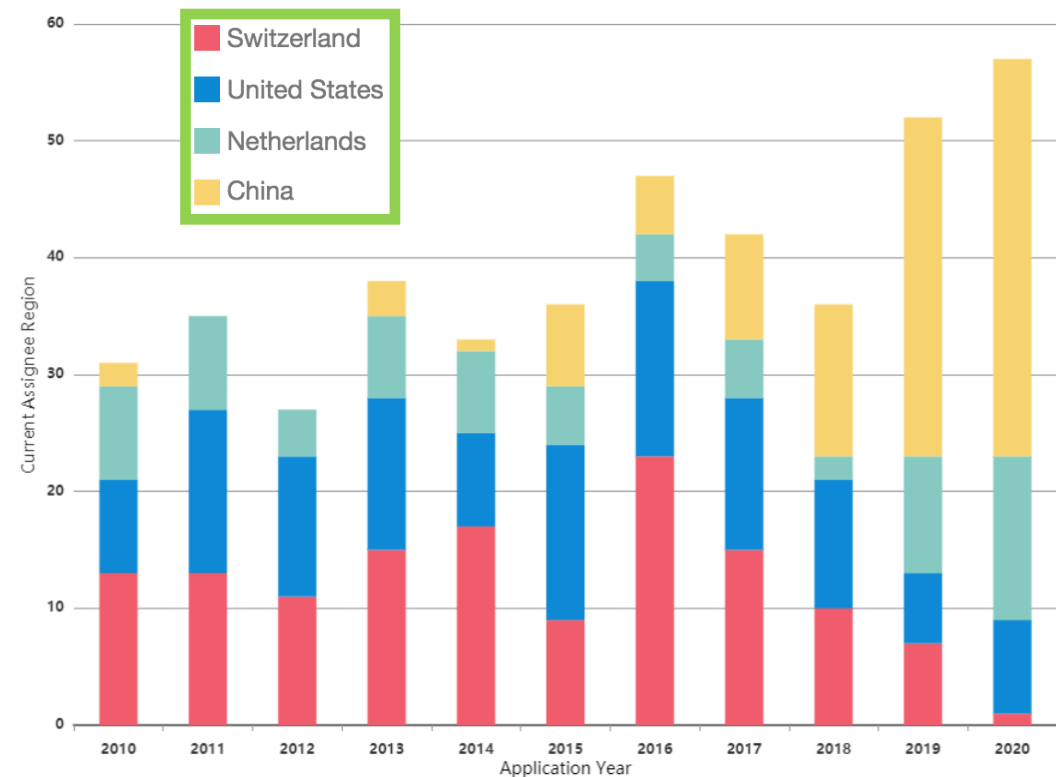
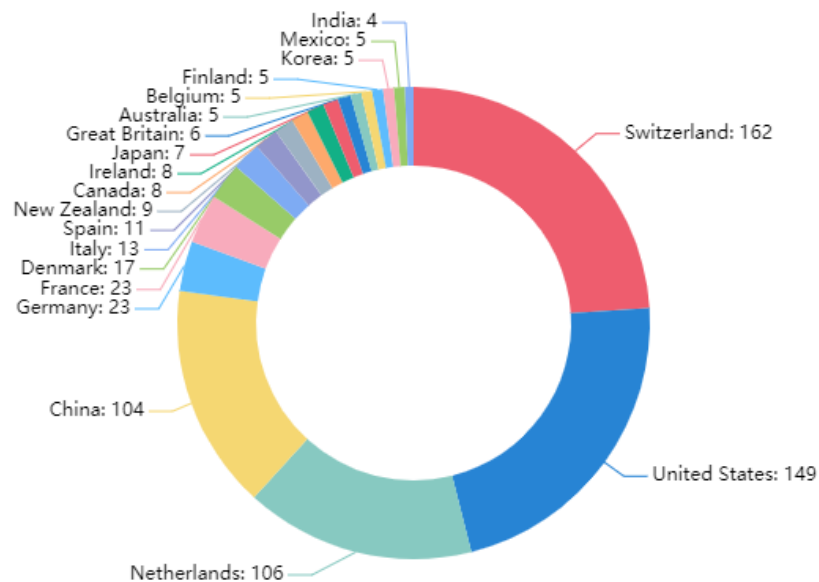
- there is a lean towards prebiotics, 6 out of the top 10 valued patents rely on prebiotic actives.

Unsurprisingly, Nutricia features strongly in the top 10.



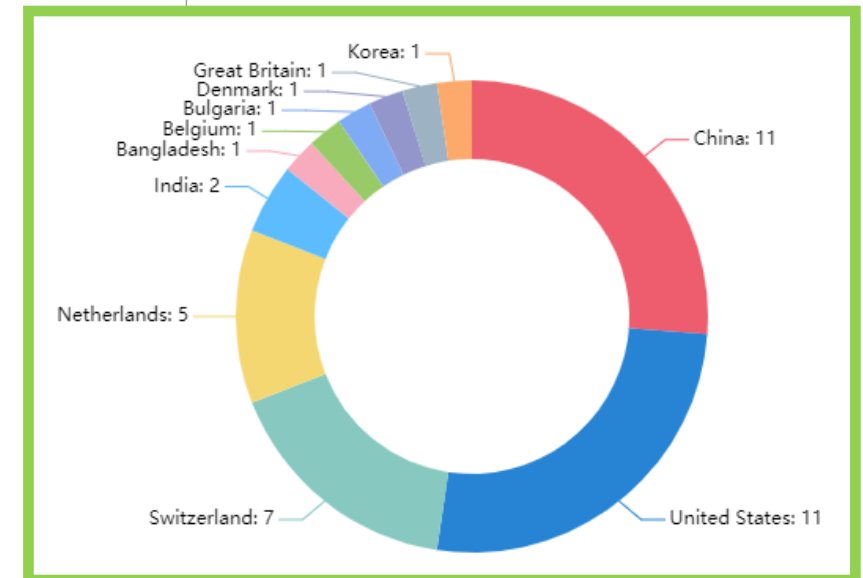
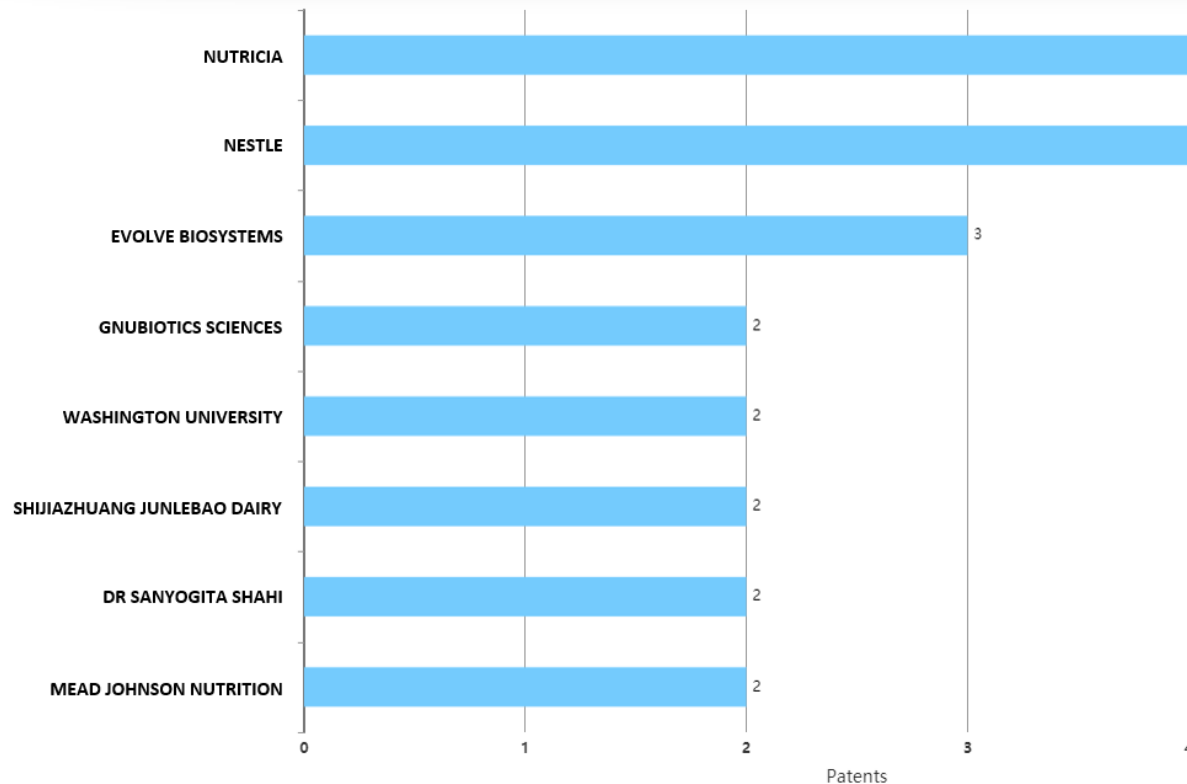
## 2.4. Countries Generating the Most Patent Filings (past 20 years)

The trends reported in last year's report continue, with patents from Switzerland (mainly Nestle), the USA, the Netherlands and China dominating the space. The rise in Chinese patents continue, as the number of Swiss patents reduces. We also begin to see a significant increase in patenting activity from the Netherlands (Nutricia being a strong contributor) now threatening the USA as 2nd place historically, but firmly 2nd place when just looking at the past 24 months.

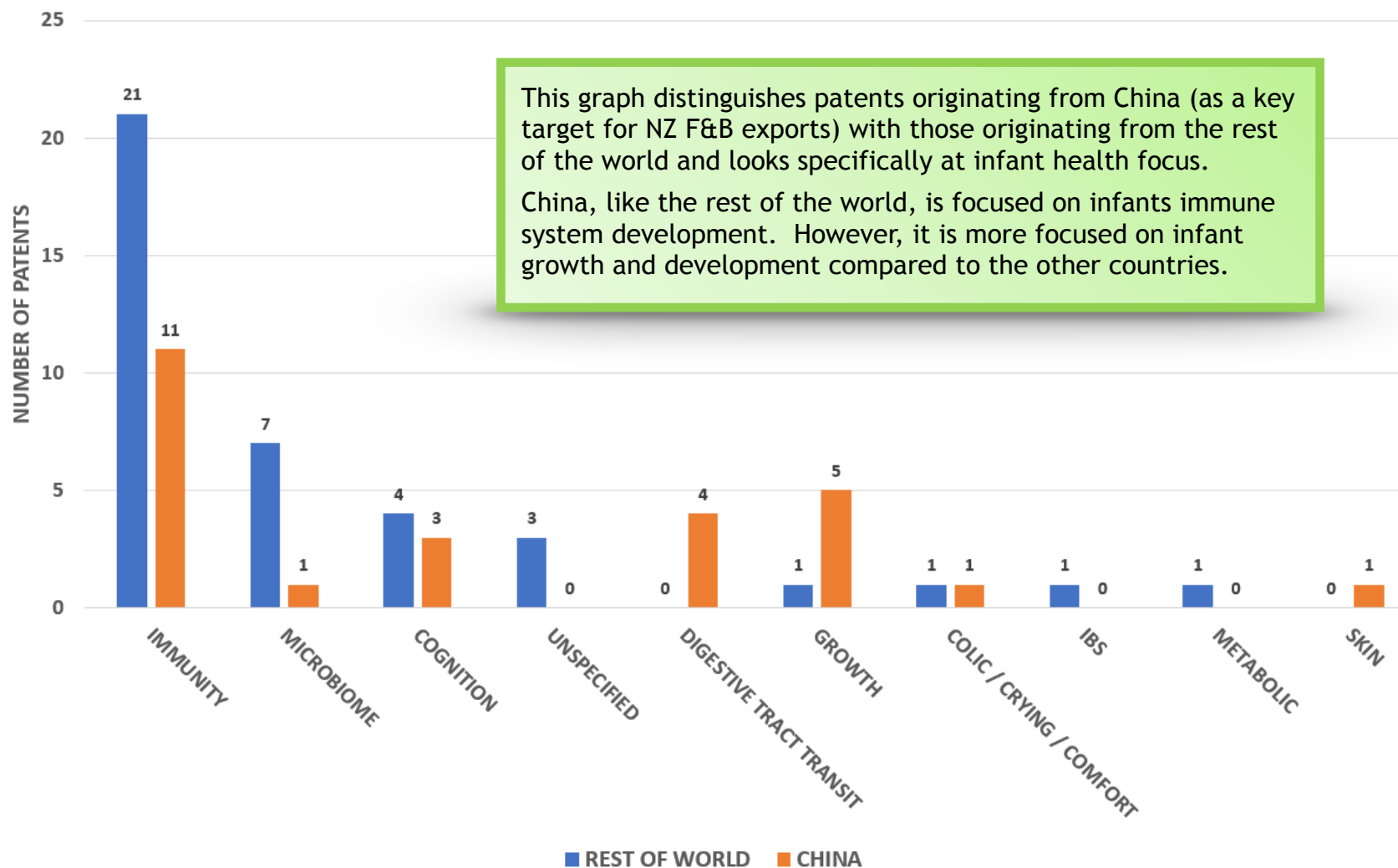


## 2.5. Top Applicants and Regions (past 12 months)

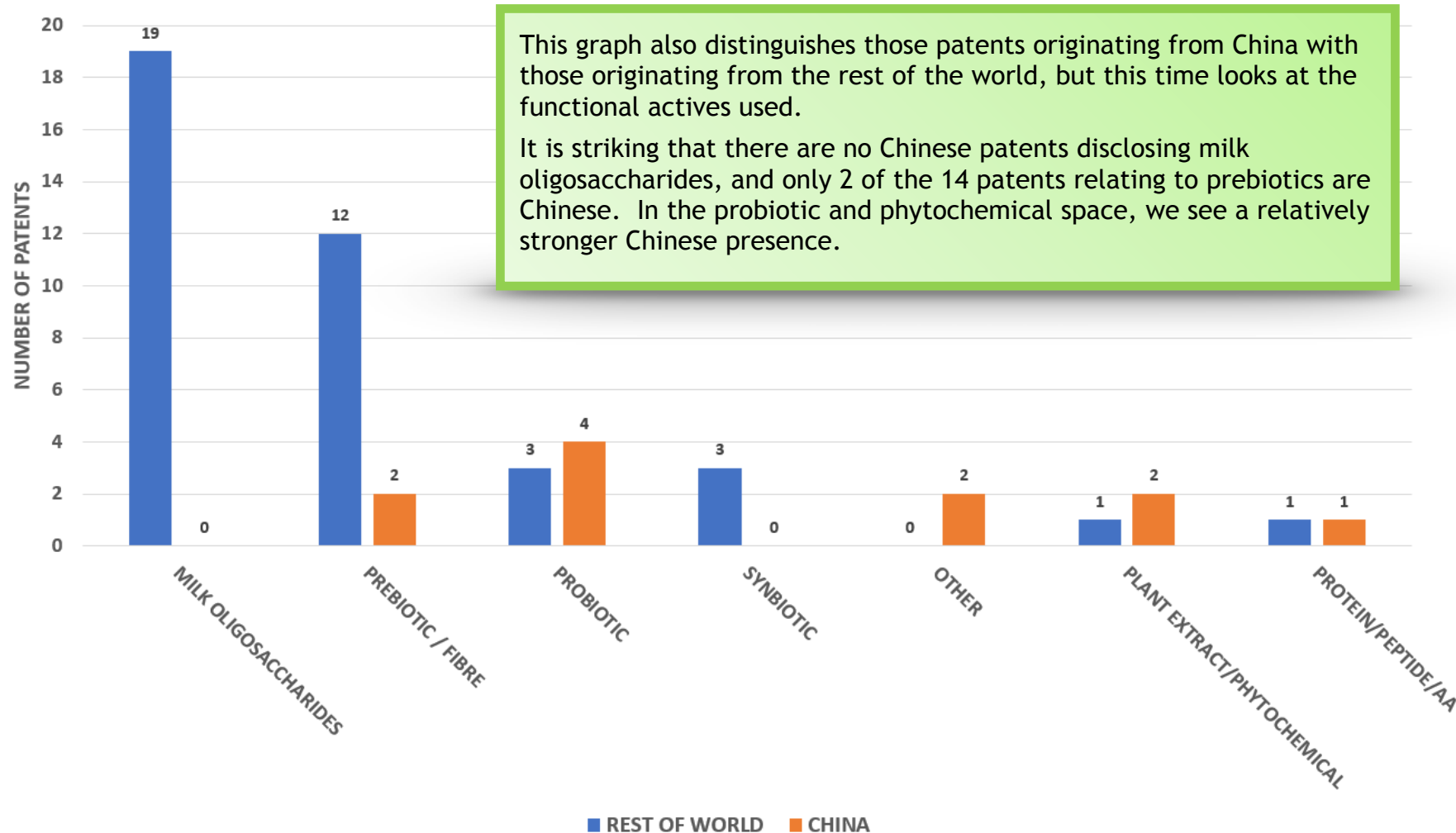
Over the past 12 months, Nutricia, Nestle and Evolve Biosystems continue to be the key players in the landscape. Gnubiotics Sciences (a Swiss-based company specialising in the use of glycans to modulate the microbiome) is a new player. Compared with last year's report, the proportion of patents arising from China appears to have halved, but this could be accounted for by this year's 12-month focus being on Bull's Eye and Halo patents only.



## 2.6.China and Rest of World - Infant health focus (past 12 months)



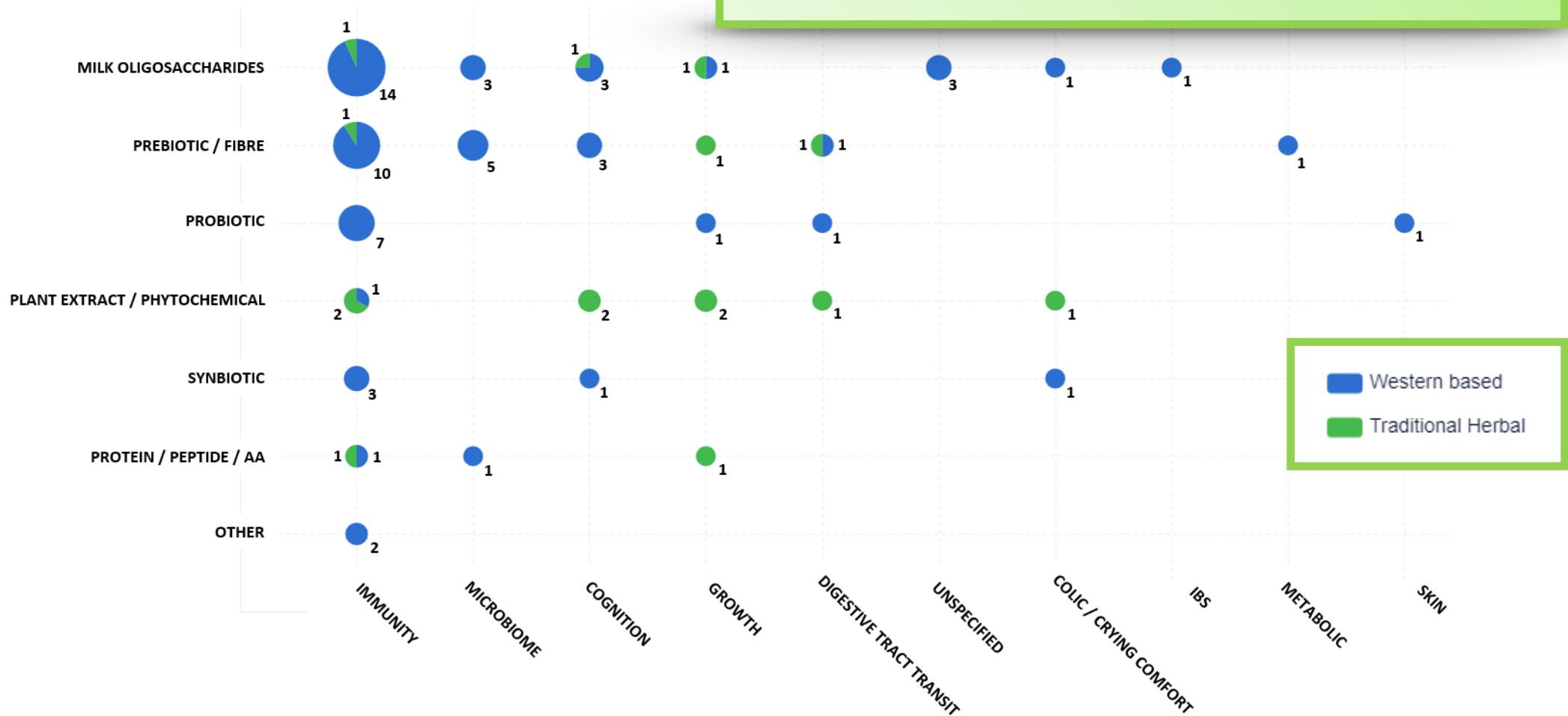
## 2.7.China and Rest of World - Functional Actives (past 12 months)



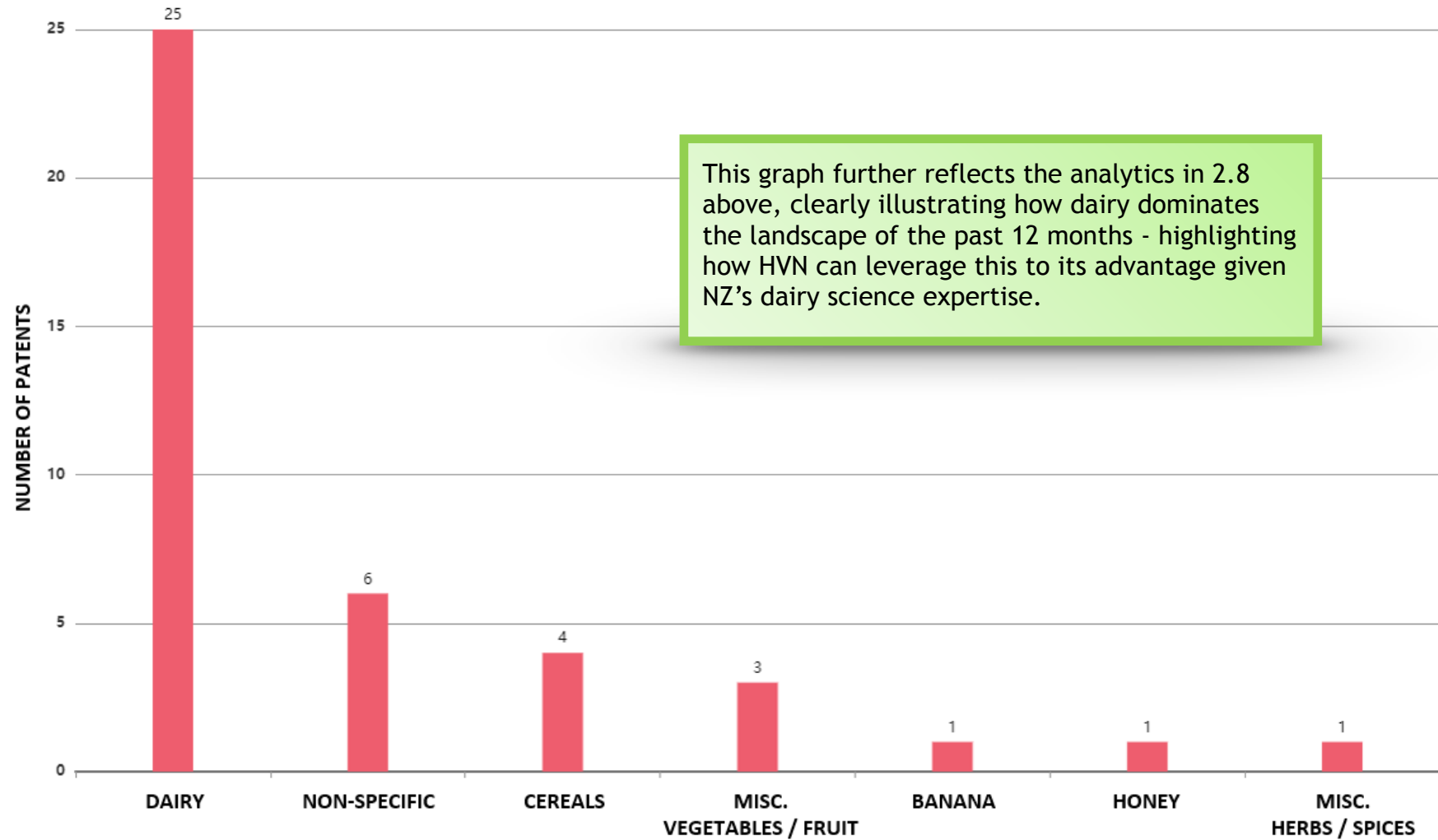


## 2.8. Health outcomes vs Primary Actives (past 12 months)

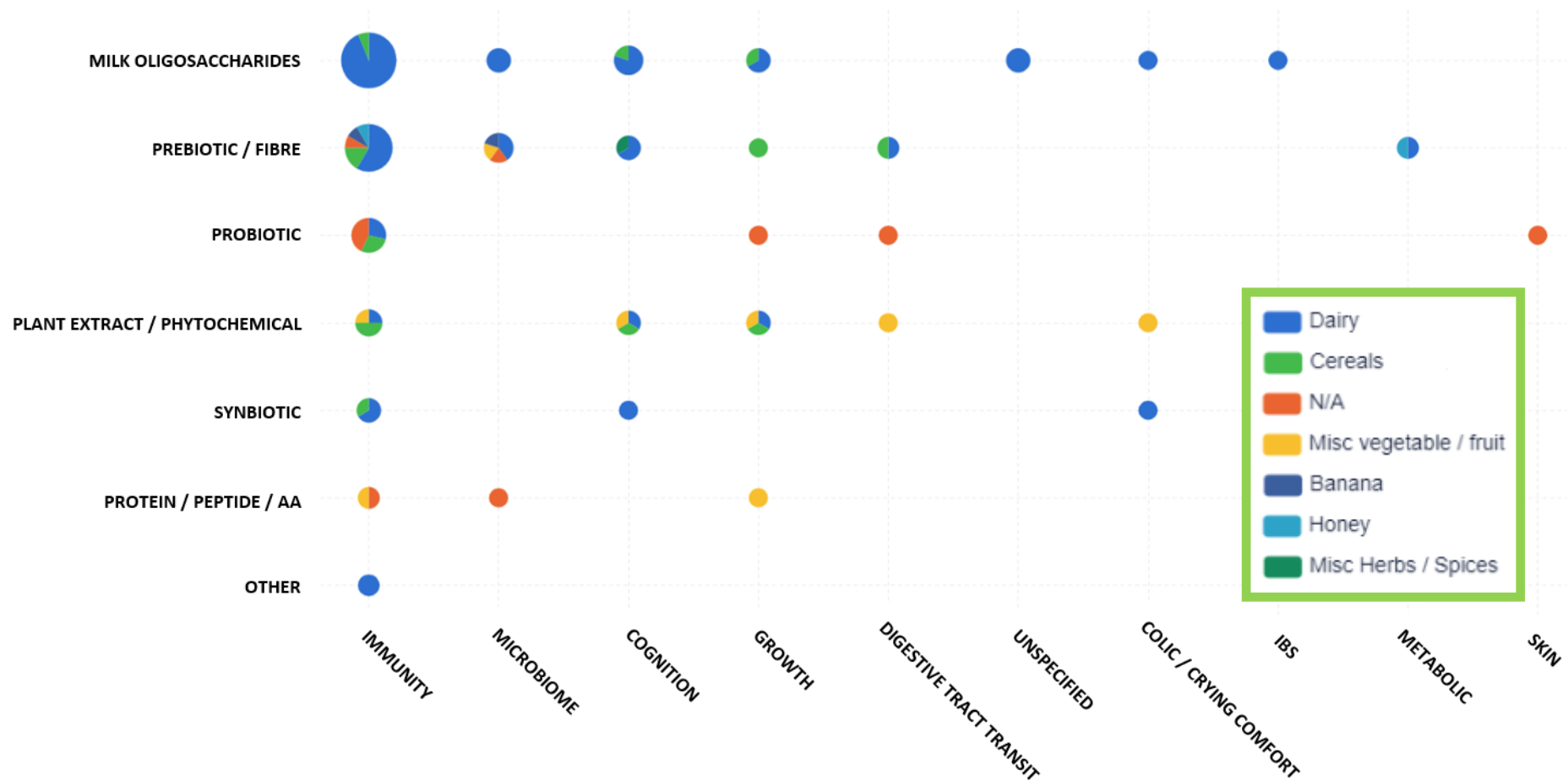
In this year's analysis, an immunity focus is seen dominating the patents found, mainly through milk oligosaccharides, prebiotics and probiotics.



## 2.9. Foods seen in the Bull's Eye and Halo Patents (past 12 months)



## 2.10. Food Links vs Health Outcomes vs Functional Actives (past 12 months)



In this chart, we gain a more in-depth insight into how the foods are distributed within the combined health outcomes and functional actives. In the infant health landscape, we again see dairy playing a significant role particularly through milk oligosaccharides and other prebiotics for a range of infant health outcomes.

### 3.BULL'S EYE PATENTS

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Method for facilitating maturation of the mammalian immune system	<a href="#">HK40007704A</a>	2020-06-05	EVOLVE BIOSYSTEMS, INC.	Immunity Microbiome IBS	Milk oligosaccharides	Dairy	Western based
Compositions derived from gastrointestinal tract mucins	<a href="#">WO2020157321A1</a>	2020-08-06	GNUBIOTICS SCIENCES SA	Immunity Microbiome	Protein/Peptide/AA	N/A	Western based
Microbiota-directed foods to repair a subject's gut microbiota	<a href="#">WO2020252086A1</a>	2020-12-17	WASHINGTON UNIVERSITY INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH	Immunity Microbiome	Prebiotic / fibre	Banana	Western based
Process of preparation of glycan compositions & uses thereof	<a href="#">US20200397861A1</a>	2020-12-24	GNUBIOTICS SCIENCES SA	Immunity	Prebiotic / fibre	N/A	Western based
A nutritional composition comprising a combination of human milk oligosaccharides to improve the gastrointestinal barrier	<a href="#">WO2020126734A1</a>	2020-06-25	NESTLE	Immunity	Milk oligosaccharides	Dairy	Western based



Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Fermented formula with non-digestible oligosaccharides for use in rotavirus induced infection	<a href="#">WO2020148391A</a> <a href="#">1</a>	2020-07-23	NUTRICIA	Immunity	Prebiotic / fibre Milk oligosaccharides	Dairy	Western based
Process for purifying a human milk oligosaccharide and related compositions	<a href="#">WO2020154565A</a> <a href="#">1</a>	2020-07-30	DUPONT NUTRITION BIOSCIENCES APS I DANISCO USA, INC	Immunity	Prebiotic / fibre Milk oligosaccharides	Dairy	Western based
Nutraceutical compositions	<a href="#">WO2020178720A</a> <a href="#">1</a>	2020-09-10	GLAXOSMITHK LINE BIOLOGICALS SA I WASHINGTON UNIVERSITY	Immunity	Prebiotic / fibre Probiotic Synbiotic	Cereals	Western based
Beta-1,3'-galactosyllactose for the treatment of gut barrier function diseases	<a href="#">WO2020229690A</a> <a href="#">1</a>	2020-11-19	NUTRICIA	Immunity	Milk oligosaccharides	Dairy	Western based
Nutritional composition comprising 2'fucosyllactose and 3'galactosyllactose	<a href="#">WO2020245313A</a> <a href="#">1</a>	2020-12-10	NUTRICIA	Immunity	Milk oligosaccharides	Dairy	Western based
Nutritional composition comprising 2'fucosyllactose and dietary butyrate	<a href="#">WO2020245311A</a> <a href="#">3</a>	2021-01-14	NUTRICIA	Immunity	Milk oligosaccharides	Dairy	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Gaddi sheep's milk oligosaccharides; implementation on environment	<a href="#">IN202021051896A</a>	2021-01-01	DR SANYOGITA SHAHI   DR SHIRISH KUMAR SINGH	Immunity	Prebiotic / fibre Milk oligosaccharides	Dairy	Western based
The biological importance of gaddi sheep's milk oligosaccharides	<a href="#">IN202021051972A</a>	2021-01-01	DR SANYOGITA SHAHI   DR SHIRISH KUMAR SINGH	Immunity	Prebiotic / fibre Milk oligosaccharides	Dairy	Western based
Nutritional Composition With Human Milk Oligosaccharides And Uses Thereof	<a href="#">US20200222436A1</a>	2020-07-16	MEAD JOHNSON NUTRITION COMPANY	Immunity Cognition Microbiome	Prebiotic / fibre Milk oligosaccharides	Dairy	Western based
Pediatric nutritional compositions and methods for infants delivered by c-section	<a href="#">EP3790412A1</a>	2021-03-17	MJN U.S. HOLDINGS LLC	Immunity Cognition	Synbiotic Milk oligosaccharides	Dairy	Western based
Novel milk powder and manufacturing method thereof	<a href="#">CN111345351A</a>	2020-06-30	Linxia Zhou Liaoyuan Dairy Co., Ltd.	Immunity Cognition Microbiome Digestive tract transit	Prebiotic / fibre	Dairy	Western based
Non-digestible oligosaccharides for decreased colonic protein fermentation	<a href="#">WO2020239996A1</a>	2020-12-03	NUTRICIA	Immunity Cognition	Milk oligosaccharides	Dairy	Western based
Stable aqueous composition comprising oligosaccharides	<a href="#">WO2020120426A1</a>	2020-06-18	NESTLE	Immunity Growth	Milk oligosaccharides	Dairy	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Rice flour for children and preparation method therefor	<a href="#">CN111642681A</a>	2020-09-11	Jiangxi Poyang Lake Rice Industry Co., Ltd.	Immunity Growth Digestive tract transit	Prebiotic / fibre	Cereals	Traditional Herbal Medicine
Composition of prebiotic gingerbread cookies	<a href="#">BG3747U1</a>	2020-06-15	"TED-IGLIKA" EOOD	Immunity Metabolic	Prebiotic / fibre	Dairy Honey	Western based

## 4. HALO PATENTS

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Methods for improving the microbiome and its systemic effect	<a href="#">US20210077418 A1</a>	2021-03-18	IP SCIENCE LIMITED	Microbiome	Prebiotic / fibre	Misc vegetable / fruit	Western based
Tributylin compositions and methods therefor	<a href="#">WO2020246988A1</a>	2020-12-10	COMPOUND SOLUTIONS, INC.	Microbiome	Prebiotic / fibre	N/A	Western based
A NUTRITIONAL COMPOSITION COMPRISING METABOLITES OF HMOs TO IMPROVE THE GASTROINTESTINAL BARRIER	<a href="#">WO2020126587A1</a>	2020-06-25	NESTLE	Microbiome	Milk oligosaccharides	Dairy	Western based
Grain snack manufacturing method using allergy reducing material and Grain snack manufactured by the method	<a href="#">KR1020200086408A</a>	2020-07-17	Jeollabuk-do Biological Industry Promotion Agency	Immunity	Probiotic Plant extract/ phytochemical	Cereals	Western based
Compositions and methods to promote host defense and stimulate, expand, and/or reset t cell repertoires	<a href="#">SG11202011817WA</a>	2020-12-30	EVOLVE BIOSYSTEMS, INC.	Immunity	Probiotic	Dairy	Western based



Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Application of lactobacillus reuteri from breast milk to regulation of maternal and infant immune functions	<a href="#">CN111265553A</a>	2020-06-12	Hunan Feile Biological Technology Co., Ltd.   Sun Jin   Guangzhou Feile Biological Technology Co., Ltd.	Immunity	Probiotic	Dairy	Western based
Infant formula milk powder capable of optimizing amino acid patterns and improving immunity and preparation method of infant formula milk powder	<a href="#">CN111820284A</a>	2020-10-27	Shijiazhuang Junlebao Dairy Co., Ltd.	Immunity	Other	Dairy	Western based
Breast-milk infant formula goat milk powder capable of improving immunity and preparation method thereof	<a href="#">CN111919889A</a>	2020-11-13	Shijiazhuang Junlebao Dairy Co., Ltd.	Immunity	Other	Dairy	Western based
Nutritional supplements and methods of nutritional supplementation affecting mood and focus in children	<a href="#">WO2021046396A1</a>	2021-03-11	AMARE GLOBAL	Cognition	Prebiotic / fibre	Misc Herbs / Spices	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Composition for improving intelligence, promoting growth, conditioning intestinal tracts and enhancing immunity and preparation method of composition	<a href="#">CN111264872A</a>	2020-06-12	Hangzhou Nubia Medical Technology Co., Ltd.	Immunity Growth Cognition Colic / crying / comfort Digestive tract transit	Plant extract/ phytochemical	Misc vegetable / fruit	Traditional Herbal Medicine
Camel milk fagopyrum esculentum Moench. noodles and manufacture method thereof	<a href="#">CN111213831A</a>	2020-06-02	Baikal	Immunity Growth Cognition	Plant extract/ phytochemical Milk oligosaccharides	Dairy Cereals	Traditional Herbal Medicine
Organic plant protein powder and preparation method thereof	<a href="#">CN111374220A</a>	2020-07-07	Wang Bing	Immunity Growth	Protein/Peptide/ AA	Misc vegetable / fruit	Traditional Herbal Medicine
Flavored low-sugar food and preparation method thereof	<a href="#">CN111938107A</a>	2020-11-17	Institute of Sericulture and Agricultural Products Processing, Guangdong Academy of Agricultural Sciences	Immunity Growth	Probiotic	N/A	Western based
Compositions and method of use for h5 competent bifidobacterium longum subsp. infantis	<a href="#">SG11202011820VA</a>	2020-12-30	EVOLVE BIOSYSTEMS, INC.	Immunity Colic / crying / comfort	Synbiotic Milk oligosaccharides	Dairy	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Probiotic solid beverage and preparation method thereof	<a href="#">CN111296711A</a>	2020-06-19	Guangzhou Newbinle Nutrition Technology Co., Ltd.	Immunity Digestive tract transit	Probiotic	N/A	Western based
Probiotic composition	<a href="#">CN111388510A</a>	2020-07-10	Shanghai Kaida Biotechnology Co., Ltd.	Immunity Skin	Probiotic	N/A	Western based
Synergistic production of butyrate associated with the complexity of hmos blend for use in infants or young children for health purposes	<a href="#">PH12019550171A1</a>	2020-06-01	NESTLE	unspecified	Milk oligosaccharides	Dairy	Western based
Hmos blends for use in infants or young children for health purposes	<a href="#">PH12019550208A1</a>	2020-09-21	NESTLE	unspecified	Milk oligosaccharides	Dairy	Western based
Human milk oligosaccharides for control of dietary response and metabolic phenotype	<a href="#">WO2021011905A1</a>	2021-01-21	THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	unspecified	Milk oligosaccharides	Dairy	Western based

## 5. BACKGROUND PATENTS

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Infant milk powder mate and preparation method thereof	<a href="#">CN111387503A</a>	2020-07-10	Song Peiyang	Microbiome	Probiotic	Dairy	Western based
Yam nutrition noodles for infants and preparation method thereof	<a href="#">CN111802576A</a>	2020-10-23	Tianjin University of Science and Technology	Immunity	Plant extract/ phytochemical	Dairy Meat Misc vegetable / fruit	Traditional Herbal Medicine
Method for producing salting food for infant having antioxidant and immune enhancement function using fermented product by lactic acid bacteria of <i>Scutellaria baicalensis</i> , <i>Gardenia jasminoides</i> and <i>Carthamus tinctorius</i>	<a href="#">KR102199239B1</a>	2021-01-07	Daegu Catholic University Industry-Academic Cooperation Foundation I Agricultural Corporation Damo Co., Ltd.	Immunity	Plant extract/ phytochemical	N/A	Traditional Herbal Medicine
Food or beverage for babies and infants, method for improving intestinal environment of baby or infant, and method for enhancing immunity of baby or infant	<a href="#">WO2020166527A1</a>	2020-08-20	TANAKA MEGUMI I TANAKA TSUNEMARU	Immunity	Other	N/A	Western based



Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Application of dairy products in improving SIgA level of intestinal tracts of infants and young children	<a href="#">CN111227046A</a>	2020-06-05	Inner Mongolia Yili Industrial Group Co., Ltd.	Immunity	Probiotic Lipid/phospholipid Protein/Peptide/ AA	Dairy	Western based
Lactobacillus plantarum BF_15 derived from breast milk-fed babies and application of lactobacillus plantarum BF_15	<a href="#">CN111235070A</a>	2020-06-05	Hebei Agricultural University	Immunity	Probiotic	N/A	Western based
Probiotic stachyose and preparation process thereof	<a href="#">CN111840336A</a>	2020-10-30	Xi'an Little Angel Life Nutrition Science and Health Research Institute Co., Ltd.	Immunity	Probiotic	N/A	Western based
Nutritional composition comprising milk fat and immunoglobulin	<a href="#">WO2021013862A1</a>	2021-01-28	FRIESLANDC AMPINA NEDERLAND B.V.	Immunity	Protein/Peptide/ AA	Dairy	Western based
Nutritional compositions, their use in reducing metabolic stress and method of reducing metabolic stress	<a href="#">AU2019370713A1</a>	2021-04-01	NESTLE	Immunity Growth Metabolic	Lipid/phospholipid	N/A	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Formula milk powder for promoting stature growth and brain development of children	<a href="#">CN111296585A</a>	2020-06-19	Li Songlin	Immunity Growth Cognition Digestive tract transit	Protein/Peptide/AA	Dairy	Western based
Formula yak milk powder for promoting height increase and brain development of children	<a href="#">CN111296584A</a>	2020-06-19	Li Songlin	Immunity Growth Cognition Digestive tract transit	Protein/Peptide/AA	Dairy	Western based
Child formula milk powder beneficial to intestinal health and preparation method thereof	<a href="#">CN111264633A</a>	2020-06-12	Qingdao Suokang Food Co., Ltd.	Immunity Growth Cognition	Probiotic Protein/Peptide/AA	Dairy	Western based
Formula milk powder for promoting comprehensive development of children and application of formula powder milk	<a href="#">CN111937964A</a>	2020-11-17	Hunan Obijia Nutritional Food Co., Ltd.	Immunity Cognition	Other	Dairy	Western based
Native whey protein for reducing allergy	<a href="#">WO2019160416A8</a>	2020-09-17	NUTRICIA	Immunity Skin	Protein/Peptide/AA	Dairy	Western based
Breast milk source lactobacillus plantarum and application thereof	<a href="#">CN111778180A</a>	2020-10-16	Beijing Sanyuan Food Co., Ltd.	Immunity Digestive tract transit	Probiotic	Dairy	Western based
Methods of promoting healthy catch-up growth	<a href="#">WO2020113048A1</a>	2020-06-04	ABBOTT LABORATORIES	Growth	Other	N/A	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Formula milk powder capable of promoting height growth and development and preparation method thereof	<a href="#">CN111357822A</a>	2020-07-03	Wu Shanyan	Growth	Lipid/phospholipid Protein/Peptide/ AA Milk oligosaccharides	Dairy	Western based
Fermented formula for improving intestinal development	<a href="#">WO2020229689A1</a>	2020-11-19	NUTRICIA	Growth	Other	Dairy	Western based
Milk powder for improving sleep quality of children and preparation method thereof	<a href="#">CN111802476A</a>	2020-10-23	Hunan Yibei Biological Technology Co., Ltd.	Growth	Other	Dairy	Western based
Rice flour capable of invigorating stomach and promoting digestion	<a href="#">CN111513240A</a>	2020-08-11	Jiangxi Gaomeigao Health Food Co., Ltd.	Growth Digestive tract transit	Plant extract/ phytochemical	Cereals	Traditional Herbal Medicine
Rice noodles capable of moistening intestines and relaxing bowels	<a href="#">CN111513242A</a>	2020-08-11	Jiangxi Gaomeigao Health Food Co., Ltd.	Growth Digestive tract transit	Plant extract/ phytochemical	Cereals	Traditional Herbal Medicine
Additive-free fruit bar and preparation method thereof	<a href="#">CN111406918A</a>	2020-07-14	St. Heos Health Industry Co., Ltd.	Growth Digestive tract transit	Plant extract/ phytochemical	Misc vegetable / fruit	Western based
Milk powder suitable for infants with flatulence and preparation method thereof	<a href="#">CN111820285A</a>	2020-10-27	Shijiazhuang Junlebao Dairy Co., Ltd.	Growth Digestive tract transit	Other	Dairy	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Method for adjusting components of fatty acid composition in microbial oil of mortierella	<a href="#">EP3795691A1</a>	2021-03-24	LIANG, YUN	Cognition	Lipid/phospholipid	N/A	Western based
Sialic acid-containing infant formula food and preparation method thereof	<a href="#">CN111587923A</a>	2020-08-28	Guangzhou Funuo Nutrition Technology Co., Ltd.	Cognition	Other	Dairy	Western based
Dairy product and process	<a href="#">US20200306277 A1</a>	2020-10-01	FONTERRA CO-OPERATIVE GROUP LIMITED	Cognition	Milk oligosaccharides	Dairy	Western based
Milk powder for young children and preparation method thereof	<a href="#">AU2020101887A 4</a>	2020-09-24	LITTLE UMBRELLA LIMITED	Cognition	Other	Dairy	Western based
Milk powder for children and preparation method thereof	<a href="#">CN111937967A</a>	2020-11-17	Yu Jie	Cognition	Other	Dairy	Western based
A nutritional composition comprising 6'sl and Int in combination to improve the gastrointestinal barrier function	<a href="#">WO2020126542A 1</a>	2020-06-25	NESTLE	Digestive tract transit	Other	Dairy	Western based



Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Walnut-based infant edible rice flour and preparation method thereof	<a href="#">CN111374268A</a>	2020-07-07	Anhui Shunxin Shengyuan Biological Food Co., Ltd.	Digestive tract transit	Other	N/A	Western based
Nutritional compositions showing phase separation under gastric conditions and methods for preparing the same	<a href="#">WO2020200989A1</a>	2020-10-08	FRIESLANDC AMPINA NEDERLAND B.V.	Digestive tract transit	Lipid/phospholipid Protein/Peptide/ AA	Dairy	Western based
Constipation-prevention infant formula milk powder and preparation method thereof	<a href="#">CN111820283A</a>	2020-10-27	Shijiazhuang Junlebao Dairy Co., Ltd.	Digestive tract transit	Probiotic	Dairy	Western based
Composition and beverage for gastrointestinal conditioning and appetite promotion, and preparation method of composition and beverage	<a href="#">CN111700198A</a>	2020-09-25	Heilongjiang Renhetang Pharmaceutica I Co., Ltd.	Digestive tract transit	Plant extract/ phytochemical	N/A	Traditional Herbal Medicine
Application of pomfret oil or its fractions in preparing breast milk substitute fat	<a href="#">CN112369472A</a>	2021-02-19	Jiangnan University	Digestive tract transit	Lipid/phospholipid	Seafood / Marine	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Eggfruit swimming bladder barrier, preparation method thereof and application of eggfruit swimming bladder barrier in health care products	<a href="#">CN111264803A</a>	2020-06-12	Shandong Normal University	Colic / crying / comfort Digestive tract transit	Plant extract/ phytochemical	Seafood / Marine Misc vegetable / fruit	Traditional Herbal Medicine
A composition comprising simethicone and sucrose esters and use thereof as an antifoam agent	<a href="#">WO2021014426A1</a>	2021-01-28	S.I.I.T. S.R.L. - SERVIZIO INTERNAZIONALE IMBALLAGGI TERMOSALDANTI	Colic / crying / comfort IBS	Other	N/A	Western based
Formula with specific beta-lactoglobulin peptides	<a href="#">WO2019212331A8</a>	2020-12-03	NUTRICIA	Allergies	Protein/Peptide/ AA	Dairy	Western based
Formula with a specific beta-lactoglobulin peptide	<a href="#">EP3787419A1</a>	2021-03-10	NUTRICIA	Allergies	Protein/Peptide/ AA	Dairy	Western based
Methods and Compositions for Treating or Preventing Gut Barrier Dysfunction	<a href="#">US20210069267A1</a>	2021-03-11	DUPONT NUTRITION BIOSCIENCES APS	IBS	Probiotic Milk oligosaccharides	Dairy	Western based
Native whey protein for treating and/or preventing intestinal infection	<a href="#">WO2020159372A1</a>	2020-08-06	NUTRICIA	IBS	Protein/Peptide/ AA	Dairy	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Fat composition and nutritional composition based thereon	<a href="#">WO2020178108A1</a>	2020-09-10	FRIESLANDC AMPINA NEDERLAND B.V.	IBS	Lipid/phospholipid	Dairy Misc vegetable / fruit	Western based
Anti-inflammatory factors	<a href="#">WO2021011481A1</a>	2021-01-21	THE GENERAL HOSPITAL CORPORATION	IBS	Other	N/A	Western based
Process for the purification of l-fucose from a fermentation broth	<a href="#">US20200354760A1</a>	2020-11-12	JENNEWEIN BIOTECHNOLOGIE GMBH	unspecified	Other	N/A	Western based
Dietary butyrate	<a href="#">AU2019275902A1</a>	2020-10-22	NESTLE	unspecified	Lipid/phospholipid	Dairy	Western based
Process for manufacturing an infant formula product with hydrolysed protein	<a href="#">WO2020251350A1</a>	2020-12-17	NUTRICIA	unspecified	Protein/Peptide/AA	N/A	Western based
Process for manufacturing a substantially lactose-free infant formula product	<a href="#">WO2020251353A1</a>	2020-12-17	NUTRICIA	unspecified	Protein/Peptide/AA	N/A	Western based
Extrusion process for making infant formula with large lipid globules	<a href="#">WO2020251354A1</a>	2020-12-17	NUTRICIA	unspecified	Lipid/phospholipid	N/A	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Process for manufacturing a fermented infant formula product	<a href="#">WO2020251351A1</a>	2020-12-17	NUTRICIA	unspecified	Protein/Peptide/AA	N/A	Western based
Protein compositions with high isoelectric proteins	<a href="#">WO2020130821A1</a>	2020-06-25	NUTRICIA	unspecified	Protein/Peptide/AA	Dairy	Western based
Native whey protein for improving intestinal maturation	<a href="#">WO2020159373A1</a>	2020-08-06	NUTRICIA	unspecified	Protein/Peptide/AA	Dairy	Western based
Fermented formula with non digestible oligosaccharides for sleep improvement	<a href="#">WO2020161113A1</a>	2020-08-13	NUTRICIA	unspecified	Milk oligosaccharides	Dairy	Western based
Methods and systems for generating a sterilized human milk product	<a href="#">HK40013325A</a>	2020-08-07	IMB INC.	unspecified	Milk oligosaccharides	Dairy	Western based
Milk powder for improving children sleep disorders and preparation method thereof	<a href="#">CN111631265A</a>	2020-09-08	Shijiazhuang Junlebao Dairy Co., Ltd.	unspecified	Other	Dairy	Western based
Gas-injection extrusion for producing infant formula products	<a href="#">WO2020251360A1</a>	2020-12-17	NUTRICIA	unspecified	Protein/Peptide/AA Other	Dairy	Western based
Method of preparing a fruit-containing product	<a href="#">WO2021028597A1</a>	2021-02-18	NUTRICIA	unspecified	Other	Misc vegetable / fruit	Western based

Title	Publication Number	Publication Date	Owner	Health Focus	Primary actives	HVN Food link	THM or Western based?
Methods for producing probiotics fortified avian eggs and egg products and formulations thereof	<a href="#">WO2021062250A1</a>	2021-04-01	TALL GOODS, LLC	unspecified	Probiotic	N/A	Western based

## 6. THE EXTRA STUFF

### 6.1. Searching and Refinement Process

The search and refinement process was carried out in the following steps:

- Preparation of search criteria including key words and International Patent Classifications (IPCs) to target subject matter of interest, testing and refining to ensure relevant subject matter found. Searching using Boolean search criteria within PatSnap software accessing over 130 million published patents globally, to develop an initial raw dataset of patent families. The search and the results of this report captures new patents published between 26 May 2020 to 6 April 2021, and with a priority date after 6 April 2018.
- From a total of 432 raw search results, we filtered these down to 95 patent families that we deemed relevant to HVN's Infant Health platform.
- We then further classified each “relevant” patent by the health target(s), type of active(s), relevance to HVN interest foods, and as traditional herbal medicine based or Western based patents. Each relevant patent was then classed as Bull's Eye, Halo or Background as previously defined in section 1.3. The list of all relevant patents and links to the full text are provided in Sections 3-5.

### 6.2. Author of this Report

This updated report was prepared by Dr. Peter Brown, Director of IPSynergy ([www.IPSynergy.co.nz](http://www.IPSynergy.co.nz)). Peter is a registered patent attorney in NZ and Australia, holds a PhD in protein biochemistry and has substantial commercial experience dealing with food science, innovation and IP strategies. If you have any questions regarding this report, please feel free to contact Peter ([peter.brown@ipsynergy.co.nz](mailto:peter.brown@ipsynergy.co.nz)).