



What Happens in the Market After an Agrochemical Patent Expires?

The culmination of 16 years of scrutinising patent expiry of agrochemical active ingredients (a.is.), this new report analyses quantitative and qualitative data of 88 a.is. whose patent expiry dates span 2000 to 2017.

With a market value of **US\$ 21 billion**, these **88** a.is. represent 36% of the US\$ 60 billion crop protection market. Most analysts suggest that generic products have captured 25-30% of the **total** crop protection market, yet, for these 88 a.is., generic companies only have on average a 11% market share – why is this? Each a.i. is explored to determine the extent of generic sector activity post expiry of its patent.

This report covers a.is. from blockbusters such as: azoxystrobin, prothioconazole, fipronil, mesotrione, pyraclostrobin and thiamethoxam to more niche market products such as: amicarbazone, spiroadiclofen, spiroxamine and topramezone.

Since the year **2000**, Enigma Marketing Research (EMR) has published eight reports titled “New Off-Patent/Generic Agrochemicals – Post 20XX[®]” (the latest is - Post 2015). These reports profiled active ingredients (a.is.) which would lose patent protection over the subsequent four year period. Over 170 a.is. have been examined in total.

EMR’s new report identifies and profiles 88 a.is. and analyses the success or failure of the generic sector to penetrate the market. (This report **does not** profile the older a.is. with patents expiring pre-2000 such as 2,4-D, glyphosate, chlorpyrifos, glufosinate etc).

Report Outline

Section 1: Post-patent defence strategies

This report analyses the post-patent defence strategies employed by inventor companies for each, a.i. and how successful these have been in defending the market.

In order to analyse how successful the inventor company has been in retaining market share each a.i. profile looks at the strategies employed by the patent holder to protect market share and includes:-

- Intellectual Property Rights (IPR) - patent term extension and supplementary protection certificates (SPCs)
- Mixture product strategy
- Registrations - data protection issues
- Marketing – licensing strategies
- Existence of other non-crop markets

This report therefore identifies where the opportunities are for the generic sector to gain further market share and how vulnerable the inventor company is to generic competition. With a total market value of US \$21 billion the major sectors are:-

- Fungicides total sales of US \$8.8 billion.
- Herbicides total sales of US \$6 billion.
- Insecticides total sales of US \$5.8 billion.

Throughout this study, the importance of mixture products in defending a market from generics is frequently demonstrated and highlights how important the granting of patents for many of these mixtures has helped the inventor companies maintain such a high % market share.

The off-patent/generic sector of the **US \$60 billion** agrochemical crop protection industry has been growing in relative terms, however, much of this is still controlled by the inventor companies and in our analysis of each a.i. we look at the importance of IPR, especially IPR for mixture products, licensing deals and data protection rights provided by registration systems in post-patent defence strategies.

Section 2: Profiles of 88 active ingredients

Each profile includes:

- EU and/or US patent number
- EU patent expiry date (confirmation of SPCs for the active ingredient and mixture products)
- Global sales at farm level of a.i. (including mixture products)
- Global sales of inventor company
- Global sales of major licensee companies
- % share of market taken by generic competition
- Major commercial development milestones pre-patent expiry
- Major commercial development milestones post-patent expiry
- Major crops
- Major markets
- Major mixture products
- Listed manufacturers of the a.i.
- Analysis of where the major opportunities are for generic competition.

List of 88 active ingredients profiled in this report

Active Ingredient
acetamiprid
amicarbazone
azoxystrobin
bensulfuron
benthiavalicarb
bifenazate
bispyribac-sodium
boscalid
carfentrazone-ethyl
chlorfenapyr
clethodim
clodinafop-propargyl
cloransulam-methyl
clothianidin
cyazofamid
cyflufenamid
cyproconazole
cyprodinil
difenoconazole
diflufenican
dimethenamid-P
dimethomorph
dimoxystrobin

Active Ingredient
dinotefuran
emamectin benzoate
epoxiconazole
ethoxysulfuron
etoxazole
famoxadone
fenamidone
fenazaquin
fenhexamid
fenpyroximate
fipronil
flonicamid
florasulam
fluazinam
fludioxonil
flufenacet
flumioxazin
fluoxastrobin
flusilazole
foramsulfuron
fosthiazate
imidacloprid
indoxacarb

Active Ingredient
iodosulfuron-methyl-sodium
iprovalicarb
isoxaben
isoxadifen-ethyl
isoxaflutole
kresoxim-methyl
lufenuron
mefenpyr-diethyl
mesosulfuron-methyl
mesotrione
metalaxyl-M
metconazole
nicosulfuron
novaluron
penoxsulam
penthiopyrad
pethoxamid
picoxystrobin
proquinazid
prothioconazole
pymetrozine
pyraclostrobin
pyridaben

Active Ingredient
pyrimethanil
pyriproxyfen
quinoxifen
rimsulfuron
S-metolachlor
spinosad
spirodiclofen

Active Ingredient
spiromesifen
spirotetramat
spiroxamine
sulfentrazone
tebuconazole
tetraconazole
thiacloprid

Active Ingredient
thiamethoxam
thifensulfuron-methyl
topramezone
trifloxystrobin
trinexapac-ethyl

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Section 2: Active Ingredient Profiles

Active Substance	Page No.
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benthiavalicarb	71
bifenazate	76
bispyribac-sodium	81
boscalid	87
carfentrazone-ethyl	94
chlorfenapyr	100
clethodim	105
clodinafop-propargyl	111
cloransulam-methyl	117
clothianidin	122
cyazofamid	129
cyflufenamid	134
cyproconazole	139
cyprodinil	145
difenoconazole	150
diflufenican	157
dimethenamid-P	163

Active Substance	Page No.
dimethomorph	169
dimoxystrobin	175
dinotefuran	180
emamectin benzoate	186
epoxiconazole	193
ethoxysulfuron	199
etoxazole	204
famoxadone	210
fenamidone	215
fenazaquin	221
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flonicamid	244
florasulam	249
fluazinam	255
fludioxonil	261
flufenacet	267
flumioxazin	273
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Active Substance	Page No.
foramsulfuron	289
fosthiazate	295
imidacloprid	300
indoxacarb	311
iodosulfuron-methyl-sodium	317
iprovalicarb	323
isoxaben	329
isoxadifen-ethyl	334
isoxaflutole	339
kresoxim-methyl	344
lufenuron	351
mefenpyr-diethyl	356
mesosulfuron-methyl	360
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metalaxyl-M	372
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novaluron	391
penoxsulam	396
penthiopyrad	401
pethoxamid	406
picoxystrobin	412
proquinazid	417

Active Substance	Page No.
prothioconazole	422
pymetrozine	428
pyraclostrobin	434
pyridaben	440
pyrimethanil	445
pyriproxyfen	451
quinoxifen	457
rimsulfuron	462
S-metolachlor	468
spinosad	474
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What Happens in the Market After an Agrochemical Patent Expires?

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Definitions

The Report – **What Happens in the Market After an Agrochemical Patent Expires?**

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Whilst every effort has been made to ensure that the patent information given herein is accurate, this report cannot be considered to be an exhaustive review of the patents status of the compound and no guarantee can be given as to its accuracy or completeness.

This report identifies those patents believed to be the basic product patents for the compound in question. However, it is possible that there may be other patents and patent applications, not identified in this report, relating to *inter alia* particular derivatives, salts, isomers, crystalline forms, uses, compositions and processes for the manufacture of the product, and which may be relevant to the commercialisation of the product.

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