



What do we know about the innate potato? A study on the media and online interest and the stakeholders involved

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Abstract

In 2015, the commercial planting of the “Innate” potato, a Genetically Modified (GM) crop, was approved by the United States Food and Drug Administration (FDA). This potato, in contrast with most GM crops, was engineered with the potato’s own genes to have lower levels of sugars and to produce lower levels of acrylamide. This study investigates the international media coverage of this GM product and the online-interest during 2015. The study reveals that the media showed only a slight interest on the crop except during the short period when the decision about the Innate potato’s regulation was under discussion by the FDA authorities. The stakeholders most involved in the discussion came from the financial and economic realms. Online-searches, showed more continuous attention, though with decreasing rates. It is important to understand how media covers food-related events, especially in the light of the New Breeding and Genome Editing techniques.

Keywords: Innate potato, News-media, Online search, Stakeholders, Google trends.

Introduction

According to the International Potato Centre, the potato is the third world’s most important food crop. However, 400 million pounds of potato are wasted every year due to impact and pressure before and after reaching our table.

As for the policy implications, genetically modified potatoes for human consumption have been the center of attention for a couple of reasons. First, potatoes were one of the first genetically modified (GM) crops that were developed to meet consumers, and were developed by the Monsanto company, called NewLeaf in 1995. Second, because of the controversial Pusztai study. The study suggested that the experiment rats being fed with the GM potatoes experienced detrimental effects, because of the GM potatoes. Both varieties did not last long in the market, since their sales were discontinued before 2001, and made long stories in news-media covering the crops. Since then, the policy debates around GM food for human consumption is under extreme scrutiny, and a host of research suggests that the media outrage on the cases like the GM Desiree potatoes, the StarLink maize, or the Flavr Savr has greatly impacted the way that policy makers regulate new cases of GM foods and crops thenceforward. For example, even though GMOs are heavily regulated than any other agricultural technology overwhelming evidence suggests that the mass media has been, and still is, systematically negative on how they see GMOs¹⁻³. The persistent coverage of potential hazards and risks, lead policy regulators to apply safety-enhancing behavior and delay or reject developments on agricultural biotechnologies⁴. At same time, studies show that stringent regulations on new GM events,

lead to enormous missed opportunities that could otherwise be used to improve welfare of society but also bring advancement in the livelihoods of numerous individuals⁵.

The Innate potato was first approved by the United States Department of Agriculture (USDA) in 2014, and then in 2015 the United States Food and Drug Administration (FDA) approved the Innate potato^{6,7}. The Innate potato appeases some of the biggest arguments that the anti-GMO movements put forth when it comes to genetically engineered products, arguments that are tied to the way the product is manufactured, its nutritional value and the company that markets the product. First, in contrast to other GMOs, the Innate potato does not involve the introduction of genes from other species. These GM potatoes are from the varieties of Russet Burbank, Ranger Russet and the Atlantic varieties, and are called innate because they are borrowing genes from the potatoes’ ancestors and contain only elements from the wild potato relatives. For instance, the Russet Burbank is a breed that has been around for more than 143 years and is still the most planted variety. In a world of plant breeding, this is an incredible tenure and “speaks both for good qualities of the variety and the difficulty in developing better cultivars”^{8,9}. The potato was developed by a procedure called “gene silencing,” where genes with adverse effects are phased out and carry about half as much the chemical acrylamide, which is formatted after heating and is considered extremely unhealthy. Second, the newly approved potato was developed by an Idaho-based biotech company, called J.R. Simplot Co. The company has been a long-established company in the potato business. This might appear somewhat irrelevant to biotech product itself, but is important for some consumers, who

have made a demand for more diversified biotech markets. Third, the Innate potato offers direct benefits for the consumer, both for domestic consumption and for the food-away-from-home consumption. In the past, the FDA sent guidance-suggestions to the stakeholders of the food-related industry concerning the need to decrease the levels of acrylamide that are found in various foodstuffs. Acrylamide is an enzyme that is being released in products like the potato or the coffee, whenever heat-stress is applied on them (after baking or frying). The company that developed the potato varieties says it will focus on sales on fresh potatoes at supermarkets and at the food service companies and potato chip manufacturers. Simplot J. R. is the first supplier of the McDonalds company and is the largest supplier of the fast-food chain. Even though the fast-food industry has not yet made an official statement for accepting the new potato, there is a potential substitution of the ones that are currently served in the fast-food services with the new potato. Also, the potential substitution can come in the field of personal purchases from the store, leading to benefits to consumers too, not just the farmers¹⁰.

Literature review: Most of the studies that examine acceptance of biotech foods focus on how the mass media have covered biotechnology applied to food¹¹⁻¹³. This is mostly because of the relationship between what the media covers on a given topic and how important that topic becomes in the public sphere. The latter is called the agenda setting. On the same line, when studies want to consider the content of the news coverage (i.e. language used) they conduct framing media studies. Most studies examine the agenda setting effects together with the framing of the news media in its reports on genetically modified organisms (GMOs)^{14,15}. This means that by increasing or decreasing the frequency of the stories on specific events, the mass media influence the public agenda¹⁶, and that the content of the stories affects the way that readers process the information given¹⁷. Many of the media studies examine the media attention over agricultural biotechnology (ag-biotech) over the various news channels, but not in combination with the interest of the searches on the Web.

Therefore, there is a hefty body of knowledge on how the media covers the biotech products. The Innate potato is, however, a unique example of a biotech product because it offers multiple direct benefits to the consumer and is not “engineered” by the conventional way. There are only a few other examples of biotech crops that have been developed by the same procedure. As for the time being, the only other crop developed through the same process are apples and are developed by the Canadian “Okanagan Specialty Fruits” company (Arctic Granny Smith and the Arctic Golden Delicious). These apples, just like the potato, are designed to prevent bruising and browning. As the matter of course, no study has been conducted so far that looks at the media interest in combination with the online interest towards such biotech products. The study presents an effort to better understand how the media communicates technology in agriculture and technology in food, especially under the light of

the New Breeding and Genome Editing techniques, used for the crop under study. Especially because of the introduced benefits for consumers that are mentioned above, I wanted to see how the Innate Potato has been covered by the media internationally. Moreover, I looked at the kind of interest that the new crop triggered on the Web during the same time.

Methodology

My interest on studying the Innate potato crop was based on how the media approached the new GM crop. I first investigated how the news-wire media have covered the USDA and FDA approval internationally. Then, I looked at the online searches for the potato that took place during the year of its introduction. For the first part, I searched for the term a) “genetically modified potato” combined with “Innate potato” at the international news database Factiva, which is produced by Dow Jones, Reuters and The Associated Press. This database allows access to current and historical archives of press releases of national, international and regional newspapers, journals, newswires, reports, and others. I then retrieved the coverage-frequency by the news channels for the period of January 2015 through December 2015. Then, I analyzed the articles through the Factiva software for the most cited authors, industry, stakeholders and themes discussed.

For the second part of the study, I looked at the interest for the crop on the Web, and searched for the term “genetically modified potato,” combined with “Innate potato” in the Google Inc. domain. I then used the interest-frequency that the Google Domain offers.

Two things to consider here are that looking at just the online searches by Google is not the most accurate way to sense the overall/general interest of a population, since there are people who do not use the Internet searches to stay informed or the Internet at all, and because there are limitations on how reliable the Google metrics are at showing the real hits. However, even though one cannot determine who is exactly the searcher of the news (consumers, NGOs, producers, journalists, government agencies, etc.), looking at the online search interest might give a tangential sense of interest of population on the topic discussed¹⁸⁻²⁴.

Results and discussion

Media coverage: Attention on supply side -the media coverage on the Innate potato. The coverage-frequency of the international news media during 2015 accounted for 42 stories in total. The month with the highest coverage was March (22 stories), when the FDA concluded that the Innate Potato was safe for consumption. Similarly, the months that were before and after the approval were slightly high in media attention, accounting for about 80 percent of all coverage. During the months of June and July, the Innate Potato was not found in the news-media stories, while the interest dropped afterwards.

Table-1 shows the five newspapers that covered stories on the Innate Potato the most during 2015 on a worldwide basis. All five top sources of the potato news were authors from American media, including The Wall Street Journal (WSJ), two authors from the Associated Press Newswires, The New York Times (NYT), and the Bloomberg.

Table-1: Top five news-media sources and their authors.

Innate potato		
Top 5	Newspapers	Authors
1	The Wall Street Journal	Tennille Tracy
2	Associated Press Newswires	Keith Ridler
3	Associated Press Newswires	Mary Clare Jalonick
4	The New York Times	Andrew Pollack
5	Bloomberg	Jack Kaskey

The top stakeholders that were associated with the potato were the Simplot Company, a Canadian GM apple producing company (Okanagan) and the USDA (Figure-2).

According to the data on the sources, six out of ten times the private sector companies were associated with the Innate potato.

Themes: The Innate potato was found above all in the context of the financial markets. Most news in the Innate potato articles discussed the impact that the FDA’s and USDA’s approval would bring to both commodity prices and stock prices (Figure-3).

Online search: Attention on demand side—online-search for the Innate potato.

I gathered information for the online-search interest for the Innate potato from Google trends. Google trends is a public domain space, developed and run by Google. Inc. Google trends allows for the researcher to look up how many times an online-search item has been typed by Web users using the google-search. The graph indicates relative interest over time (trends) and the highest numbers refer to the total searches on any topic, regardless the region or the language at that time (Figure-4).

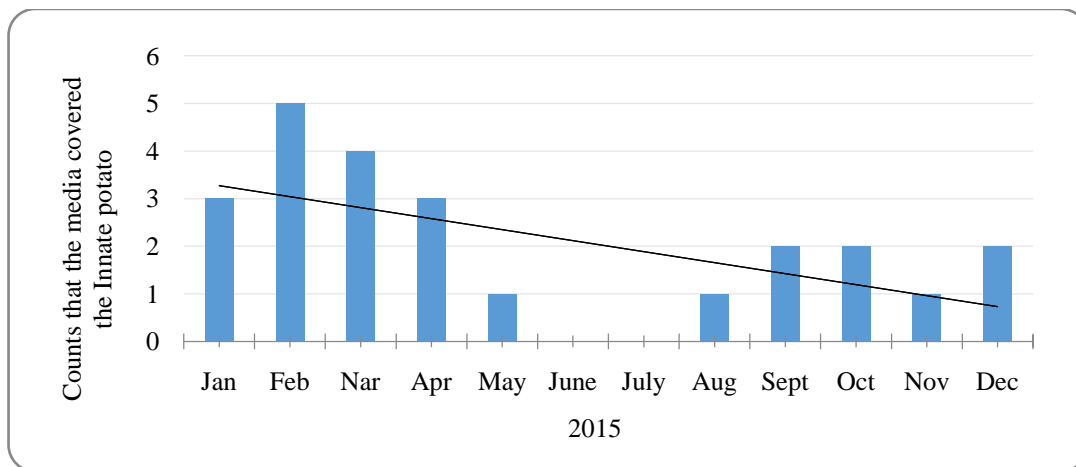


Figure-1: Frequency of media coverage on the Innate potato, counts, n=42.

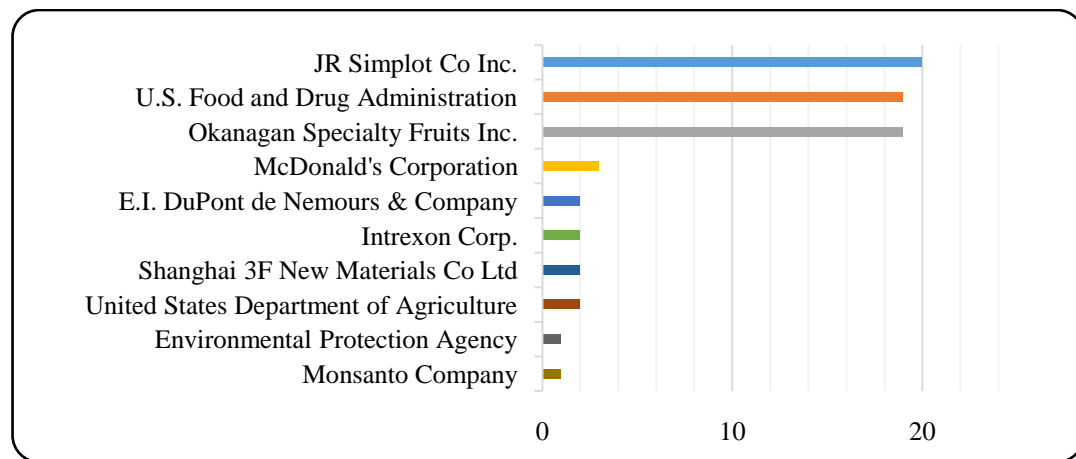


Figure-2: Stakeholders mentioned the most in the mass media for the Innate potato, 2015.

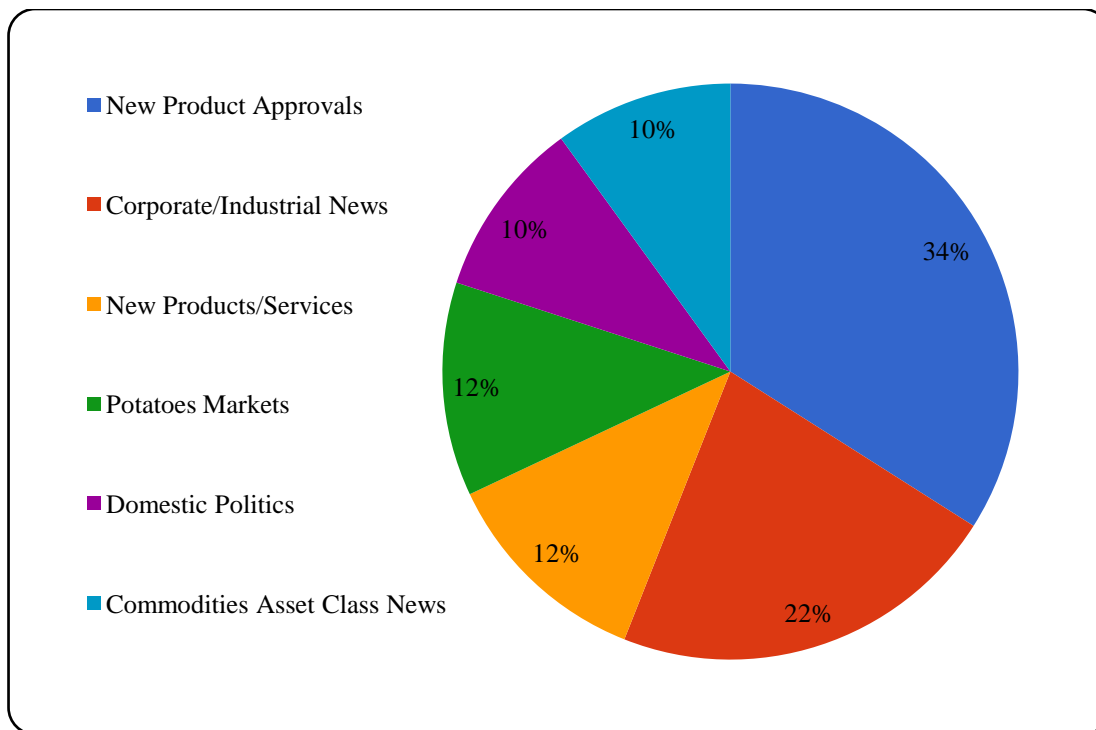


Figure-3: Themes discussed the most for the Innate potato in the media, 2015.

Figure-4 shows how often users of Google search machine entered the term “GM potato” or “Innate potato” relative to the total number of searches globally that occurred on Google search during 2015. The horizontal axis represents the time and the vertical the popularity for the potato. Google calculates these hits relative to the highest point in the time frame of interest. March was the month with the highest hits of searches for the potato (78), which was the time when the discussions about the food-safety of the potato were at their peak, a few weeks before the FDA approval took place.

Discussion: The Innate potato attracted a total of 42 articles during the year 2015. To give a benchmark to the general coverage of GMOs (and not the newly introduced Innate potato), during the same year, the mass media covered an average of about 100 articles on other genetically modified crops, like the GM sugar (findings of the author). Therefore, there is relatively small media supply of articles about this new crop. However, there might be a handful of reasons for the limited coverage. This might be because for the time examined, the Innate was known in the USA where it was developed, and there probably was not enough time for it to make it to the international news. For instance, all five newspapers that covered the Innate potato have a focus on economic-related news, and except for the New York Times (NYT), all five top sources address audiences that are interested in financial news. These newspapers tend to cover more news on the cash crop products (GM or non-GM) and tend to impact how the prices are set and adjusted by the commodity markets on a global scale. Even though all crops are grown mainly to generate revenue, the Innate potato was not primarily developed for its

return for profit, but for other attributes, like the health benefits that it was introducing. This fact might suggest that the financial markets view the GM potato as a product that could offer a potential added-value, and might be reflected in higher GM potato future prices. Moreover, even though the potato is likely to attract international market attention in the future, as the American stakeholders in the media indicate, it takes time for a new biotech crop to be diffused to the international media. This might suggest a reason for why the media were interested in covering stories on the crop, but only during the turn of events around the crop’s regulation and not so much thenceforward.

A similar course of action occurred for the online-search interest. However, in the news that people search online, the interest over the Innate potato seemed to persist a little longer after the FDA decision took place. Just like in the media’s coverage, the peak of interest occurred at the same month as the media’s interest, on March, and the lowest hits of interest also occurred during the summer months. However, the online-searches continued, even though at decreasing rates. To give a comparative perspective, the online searches for another genetically modified crop, the GM sugars, were approximately the same (findings by the author).

Drawing from the results of this study, the media interest and the online-searches inclined and declined following similar trends. Figure-5 shows the two sides of the Innate potato interest picked during the same months, and even though the attention remained high at the online-search side, the general line of attention on both media channels occupy the same positions of interest.

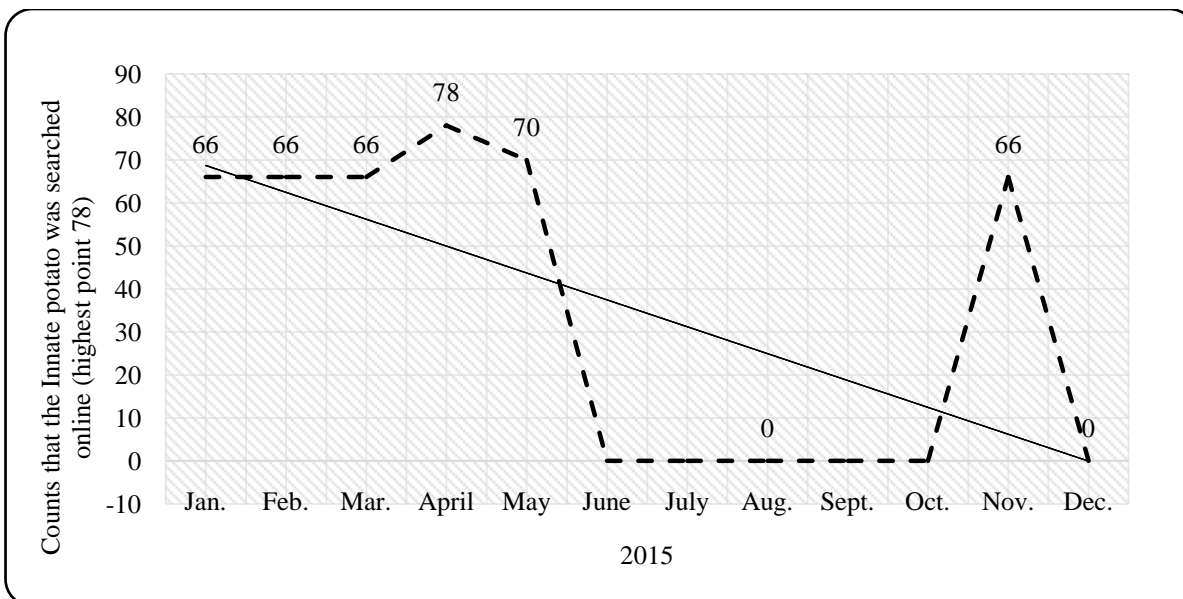


Figure-4: Online searches for the Innate potato during 2015, total number of searches n=412, Google trends domain.

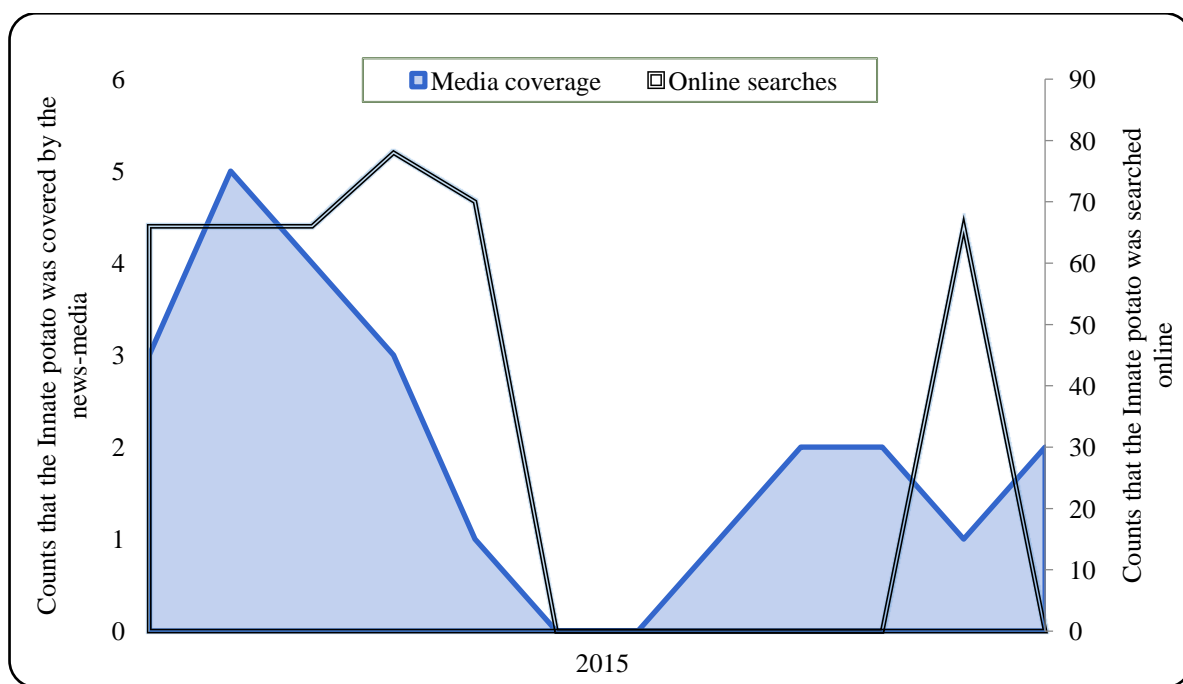


Figure-5: Online searches (n=412) and media coverage (n=24) on the Innate potato, 2015.

Why is the interest of the media declining after the FDA made the decision to regulate the Innate potato, while the interest over the internet remains high for longer? One could argue that the reason can abide behind the nature of the two type of news-channels: the news mass media and the news search on the Web. The news media make stories on news that are interesting, new, and abstain from news stories that are not news-worthy or controversial²⁵. The online search for information, on the other hand, it not necessarily driven by the same principles.

Lastly, the two type of channels (the news mass media and the news searches on the web) do indicate some similar trends (decline), but a different span of attention. This finding could suggest that the two media channels have a different news-life span, as the study of Cacciatore et al. suggested²⁶. The authors, conducting volume & thematic media analysis on nanotechnology, found that online and print media coverage was different, with the Google News and Google Blogs to be about three times greater than the press news on nanotechnology.

Limitations and future research: Time period: Moreover, the study went only through one year of coverage. My data set is certainly small, and the conclusions might have been different were the duration of the study longer.

Type of study: Studying the people's interest by looking at Google searches offers a convenient way to get unbiased results of what the consumer interest is by avoiding loaded questions and might be a better approach than the social media exploration. This type of approach would be better especially since the way you phrase a GMO-question might lead to different responses. However, assuming better resources and time, future studies examining the consumer interest could look at the Innate potato in comparison with the conventional potato and see the differences, both in media attention and the online attention. The near future will offer a lot of interesting realms for such studies.

Implications for policy making: Research and experience teach us that science and media are not autonomous. It was in 2000 when we experienced vividly how the media attention can be both selective and imbalanced. The StarLink maize was met by immense media outrage and then was withdrawn from the market, after the Genetic Engineering Food Alert coalition of NGOs' allegations on allergenic effect of the Bt protein. And even though we cannot estimate the exact costs to the society from this incident, we do know that there have been numerous other, unseen, cases of delayed products or projects that never started because of the regulatory stringency or GM regulatory asynchronies around the globe. While USDA and FDA were in the process of approving the Innate potato in 2015, which was developed by its own non-foreign potato genes, an alliance of 8 NGOs sent an open letter to the Commission imploring the regulators in Brussels to be more stringent on the way they approach these new, commercially valuable, genetic breeding techniques. The new breeding techniques (NBT) and other genome-editing techniques (i.e. herbicide resistant canola or maize with no foreign material), which are by many interpreted as an answer to the request for increase in marketability of the GM crops, are already being framed by multiple NGOs as "genetic engineering on steroids" or "extreme genetic engineering"^{27,28}. Accounting for the economic implications of whether policy makers see these new breeding techniques as opportunities or threats is, however, not enough, and the benefits of letting society advance depend on public perceptions of what we perceive as a risk or a blessing, and the media adjudicates for both.

Conclusion

I examined how much the international news-media showed interest in covering the Innate potato during the year 2015- the year it was approved by the FDA for consumer consumption. This concluded the supply side of attention. I then looked at the demand side of attention, studying the interest trends of the online news-searches on the Web related to the Innate potato.

Both the supply and demand side of the media sowed only a faint interest in the crop, except for the short period when the regulation about the Innate potato was under discussion. However, the online news-interest over the Web, were found to be generally at higher levels and more spread out. The stakeholders found to be more involved in the discussion were from the financial and economic realms. Overall, regardless of the channel, and if the several hubs of interest were removed—both the media interest and the interest from the online-search side were slim for the Innate potato.

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