

Patty patents: Canadian courtroom grilling in the works?

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There is a new beef in the plant-based meat market, but you won't find this one on the shelves of your local grocery store. As the market for improved plant-based and other meat substitutes matures, with improved technology and increased consumer adoption, incumbents have turned to intellectual property to protect their market share and overcome competitive threats.

Heme-protein patent dispute: *Impossible Foods v. Motif Food Works*

Impossible Foods, a plant-based meat producer with products in grocery stores and fast-food chains, recently initiated a U.S. patent infringement action against Motif Foods Works Inc., a food technology company that started out producing plant-based ingredients and has recently moved into the plant-based meat market. In the action, Impossible Foods claims that Motif's Hemami ingredient infringes their patent covering a "heme-containing meat replica".^[1] Motif then filed a petition with the U.S. Patent Trial and Appeal Board (PTAB) to invalidate the patent, alleging the claimed ingredients have been sold in food products for decades and are not Impossible's invention.

At the centre of the dispute is heme, an iron-binding molecule commonly found in animal and plant proteins and a central ingredient in certain Motif and Impossible products. The concept is that heme-based proteins make meat taste like meat and mimics the reddish-pink colour that is a hallmark of traditional beef burgers.^[2] According to Impossible, the two companies use distinct heme-protein sources. Motif uses a myoglobin protein produced naturally in cows. Myoglobin is a major source of heme in meat, occurring most often in muscle tissue. Impossible uses a leghemoglobin protein originating in the roots of certain plants like soy, but functionally identical to myoglobin. Leghemoglobin is not produced in the body of any animal species.^[3] Based on public sources, it appears both companies make the proteins in genetically engineered yeast using a fermentation process common in beer-making.^[4] Impossible alleged that Motif's use of this protein in burgers infringes the Impossible patent.

The sole independent claim of the applicable patent is to a "beef replica" product comprised of a "muscle replica" comprising 0.1%–5% of a heme-containing protein, and a "fat tissue replica" comprising at least one plant oil and a denatured plant protein, that are assembled in a manner that approximates the physical organization of meat.^[5] Motif alleges that this claim and the 16 others are anticipated by or made obvious in light of a 2006 patent application, which discloses methods for making soy-based proteins that may be incorporated into 100% meat-free or up to a 50% meat-product, and other prior art.^[6] Motif

claims that a person of ordinary skill in the art would already know that an alternative-beef product would require the 0.1%–5% claimed heme-protein range,^[7] and that a skilled person would be motivated to use heme-containing proteins to provide a more meat-like colour and nutritional profile.^[8]

Heme is not the only ingredient companies are hoping will convince customers of the “meatiness” of their products. Other products have relied on naturally derived ingredients like beet juice, pomegranate fruit powder, coconut oil and other ingredients to generate a sizzle and “bleed” when cut.^[9] Nevertheless, the plant-based meat market is highly competitive, and heme appears to be an advantage worth fighting over.

Mycelium trade secret dispute: *The Better Meat Co. v. Meati*

While patents are a common way to protect meat-substitute innovations, a dispute involving other rights arose recently between Meati and The Better Meat Co., two fungi-based meat alternative companies. Meati accuses Better of stealing Meati’s trade secret relating to the use of a thread-like fungus (mycelium) to simulate meat. Mycelium, also known as “mushroom root,” is branching fungi filaments that underlie mushrooms.^[10] While mushroom root is already used in the human diet — in tempeh, for example^[11] — many species and strains exist, and both companies have kept their strain as proprietary information. Meati’s secret was allegedly shared by a former Meati associate who went on to work at Better. Better was later granted a U.S. patent covering fermentation methods for producing mycelium-based meats.^[12]

In response to a December 2021 claim by Better against Meati for tortious interference, Meati alleged trade secret misappropriation and unfair competition against Better.^[13] The litigation is ongoing.^[14]

Canadian patent landscape

While it remains to be seen if Impossible will retain its exclusivity in the heme-based space, there are at least 27 companies that own upwards of 58 pending and issued meat-substitute and meat-alternative protein patents on record in Canada, and there are sure to be more filings as consumer demands incentivize innovations in the field.

Table 1: Canadian meat-substitute patents by company^[15]

| Company | Active Patents | |
|-----------------------------|----------------|---------|
| | Granted | Pending |
| Aleph Farms | | 2 |
| Avant Meats | | 3 |
| Beyond Meat | 1 | |
| Bunge Lodgers Croklaan B.V. | | 1 |
| Clara Foods Co. | | 1 |
| Corbion Biotech, Inc. | 2 | |
| Ecovative Design | | 3 |
| Emergy Inc (Meati) | | 1 |
| Fermentationexperts A/S | 1 | |
| Glanbia Nutritionals | | 2 |
| Impossible Foods | 1 | 9 |

| | | |
|----------------------------------|---|---|
| JUST, INC (EAT JUST) | | 2 |
| Kalamazoo Holdings | | 1 |
| Luya Foods | | 1 |
| Marlow Foods | | 2 |
| Memphis Meats (Upside Foods) | | 2 |
| Mycotechnology | | 3 |
| Novameat Tech | | 1 |
| Ocean Spray Cranberries | | 1 |
| Redefine Meat | | 2 |
| Roquette Freres | | 1 |
| Societe Des Produits Nestle S.A. | | 9 |
| Solae, LLC | 1 | |
| Terramino | | 2 |
| The Fynder Group | | 2 |
| Unilever Ip Holdings B.V. | | 4 |
| Valio Oy | 1 | |

Looking forward

With increasing public interest in climate-friendly and economic food options, as well as increasing competition, the plant-based meat industry will continue to evolve and grow. Globally, the meat-substitutes market is projected to grow from \$5.37 billion in 2021 to \$10.8 billion by 2028.^[16] According to the National Research Council of Canada, the market for alternative proteins is expected to grow at 14% annually by 2024, making up to a third of the protein market.^[17] A key market for customers is the omnivore or “flexitarian” (semi-vegetarian) market, which is expected to grow to 10 million Canadians in the next five years.^[18] This growing market is a lucrative one in which consumers are now shaping their views about available products. As the U.S. experience shows, intellectual property disputes arise at just such times.

The Impossible and Meati proceedings underscore the importance of companies having a robust protection strategy and reevaluating their approach to intellectual property protection and due diligence, especially in a fast-growing market. Experienced intellectual property counsel can assist in navigating this complex space, including advising on risks associated with others’ patent rights, pursuing a cost-effective patent procurement and enforcement strategy, and strategies to protect confidentiality of sensitive business practices.

For more information on options to protect your products and methods in the plant-based and meat-substitute market, please do not hesitate to contact a member of our Intellectual Property Group.

[1] Brown, P., *et al.*, “Methods and Compositions for Consumables”, (15 December 2020), Patent No. US 10, 863, 761.

[2] Pat Brown “Heme, Health and the Plant-Based Diet”, (2 March 2018), online: *Impossible Foods* <impossiblefoods.com/ca/blog/heme-health-the-essentials>; “Unlocking Flavor In Meat Alternatives: The Science Behind HEMAMI”, (8 December 2021) online: *made with Motif* <madewithmotif.com/2021/12/08/unlocking-taste-and-flavor-hemami-2/>; See also *Motif FoodWorks Inc v. Impossible Foods Inc*, (PTAB Apr. 20, 2022), Inter Partes Review (IPR)

2022-00887 at page 4-5.

[3] Michael Eison, "How GMOs Can Save Civilization (and probably already have)", (16 March 2018), online: *Impossible Foods* <impossiblefoods.com/ca/blog/how-gmos-can-save-civilization-and-probably-already-have>.

[4] "Unlocking Flavor In Meat Alternatives: The Science Behind HEMAMI", (8 December 2021), online: *made with Motif* <madewithmotif.com/2021/12/08/unlocking-taste-and-flavor-hemami-2/>; Michael Eison, "How GMOs Can Save Civilization (and probably already have)" (16 March 2018), online: *Impossible Foods* <impossiblefoods.com/ca/blog/how-gmos-can-save-civilization-and-probably-already-have>.

[5] Brown, P., *et al.*, "Methods and Compositions for Consumables", (15 December 2020), Patent No. US 10,863,761 at page 48, claim 1.

[6] See also *Motif Foodworks Inc v. Impossible Foods Inc.*, (PTAB Apr. 20, 2022), IPR 2022-00887 at pages 22-70.

[7] Petition, *Motif FoodWorks Inc. v. Impossible Foods Inc.*, (PTAB Apr. 20, 2022), IPR 2022-00887 at page 25.

[8] Petition, *Motif FoodWorks Inc. v. Impossible Foods Inc.*, (PTAB Apr. 20, 2022), IPR 2022-00887 at pages 58-60.

[9] See, e.g., Beyond Meat, "Yes, It's Meat made from Plants", online: *Beyond Meat* <www.beyondmeat.com/en-CA/about/our-ingredients/>.

[10] Morgan Agho, "What is Meati's star ingredient, mushroom root?", online: *Eat Meati* <<https://meati.com/blog/what-is-meatis-star-ingredient-mushroom-root>>.

[11] Morgan Agho, "What is Meati's star ingredient, mushroom root?", online: *Eat Meati* <<https://meati.com/blog/what-is-meatis-star-ingredient-mushroom-root>>; Elaine Watson, "Alt meat legal dispute heats up as fungi-fueled start-ups Meati Foods and The Better Meat Co square up over IP", (4 March 2022) online: *Food Navigator USA* <www.foodnavigator-usa.com/Article/2022/03/04/Alt-meat-legal-dispute-heats-up-as-fungi-fueled-startups-Meati-Foods-and-The-Better-Meat-Co-square-up-over-IP>.

[12] Pattillo, "Enhanced aerobic fermentation methods for producing edible fungal mycelium blended meats and meat analogue compositions", (13 July 2021), Patent No US 11,058,137.

[13] Elaine Watson, "Alt meat legal dispute heats up as fungi-fueled start-ups Meati Foods and The Better Meat Co square up over IP", (4 March 2022), online: *Food Navigator USA* <www.foodnavigator-usa.com/Article/2022/03/04/Alt-meat-legal-dispute-heats-up-as-fungi-fueled-startups-Meati-Foods-and-The-Better-Meat-Co-square-up-over-IP>; The legal disputes are: *The Better Meat Co v Emery Inc* (d.b.a. Meati Foods), Paul Vronsky, and Bond Capital Management LP. Case #2:21-cv-02338 filed December, 12 2021 and *Emery Inc* (d.b.a. Meati Foods) v *The Better Meat Co* and Augustus Pattillo. Case # 2:21-cv-02417 filed on December 27, 2021.

[14] Elaine Watson, "Alt meat legal dispute heats up as fungi-fueled start-ups Meati Foods and The Better Meat Co square up over IP", (4 March 2022), online: *Food Navigator USA* <www.foodnavigator-usa.com/Article/2022/03/04/Alt-meat-legal-dispute-heats-up-as-fungi-fueled-startups-Meati-Foods-and-The-Better-Meat-Co-square-up-over-IP>.

[15] List of possible companies involved was acquired from Leonard R. Svensson, "Substitute/Cultivated Meat Technology: A Deep- Dive Patent Landscape Analysis" (26 May 2021), online: *IPWatchdog* <www.ipwatchdog.com/2021/05/26/substitute-cultivated-meat-technology-a-deep-dive-patent-landscape-analysis/id=133894/>; additional searches conducted were for active patents with the following terms in the claims or description: "plant-based meat", "meat replica", "meat alternative", "meat substitute" and "meat-like". Table is representative and patents listed contain reference to products or methods related to alternative-meat products. It is not meant to be exhaustive of all search results.

[16] Fortune Business Insights, "Meat Substitutes Market Size, Share & Covid 19 Impact Analysis, By Source, Distribution Channel and Regional Forecasts, 2021- 2029" in Market Research Report (August 2021), online: *Fortune Business Insights* <www.fortunebusinessinsights.com/industry-reports/meat-substitutes-market-100239>.

[17] National Research Council Canada, "Plant-based protein market: global and Canadian market analysis", (28 October 2019), online: *Government of Canada* <nrc.canada.ca/en/research-development/research-collaboration/programs/plant-based-protein-market-global-canadian-market-analysis>.

[18] Jason McBride, "What the skyrocketing popularity of Beyond Meat means for our planet" (12 July 2019), online *Maclean's* <www.macleans.ca/news/canada/what-the-skyrocketing-popularity-of-beyond-meat-means-for-our-planet/>.