Textile Mythbusters

The top 5 myths about animal leather

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I have been a fashion lover my whole life and strolling through the designer department of fashion boutiques always lit up my day. However, for an animal-lover like me, there simply was no option on the market, as all designers incorporated leather into their collections. This started the journey of Melina Bucher as a brand. In the last three years, I had a lot of discussions with customers and brand owners regarding leather. And while for me personally, it was an ethical choice not to use leather, I wanted to give a profound answer to everybody who was afraid leather could be the more sustainable choice.

As a scientist, I was intrigued and wanted to dive deeper into the topic. Let me tell you, this was a wild ride: I read everything from the processes of burning the hair of animals to different ways of preventing skins from rotting. Not the easiest of matters for me actually – but necessary to get a clearer picture.

So here are the top 5 myths about leather cleared up. The questions I am addressing are mainly based on conversations I had with you guys, but also on the innumerable magazine articles I read about this topic. The answers I got there often were either, too shallow or misleading. This article is based on scientific journal articles and studies from industry professionals. A download version with all sources is also available for everyone interested.

Myth 1: Leather is a waste product of the meat industry

“Leather is a waste product of the meat industry and not the reason why animals are killed. Why shouldn’t I use it then?” I hear this argument all the time, especially from designers working with leather products. In reality, it is not that simple. Let me try to discuss this statement from an economic and ecological perspective.

Economically, the question is if leather – or raw hides to be more precise – are actually waste or a profitable by-product, meaning that money is earned from selling raw hides to leather production facilities. Depending on the market, studies

show that the by-products of the meat industry contribute to 12-19 % of the cow's total value with hides being the most valuable by-product.[1] For farmers the value added from by-products means realizing higher prices for the cows and thereby subsidizing meat,[2] meaning that without selling these by-products, meat prices should be higher.[3] In comparing the worldwide trade volume of different commodities, the importance of hides and leather are emphasized even more: Meat has a worldwide trade volume of around 29.2 billion USD, whereas leather and hides have a trade volume of 28.5 billion USD (including 6.2 billion USD for raw hides). Thus, trading hides and leather has nearly the same economic value as trading meat.[4]

What does this all mean? Animal hides and leather are trading around the same volume of money as meat itself. By looking at the value added to the meat industry, calling leather a waste product is a huge underestimation. If you are a vegetarian or against animal exploitation, it could therefore make sense to avoid buying leather products and putting money into this system subsidizing the meat production.

When looking at the ecological perspective, many believe that the animal hides used for making leather are directly taken from the slaughterhouses nearby. The reality looks a little different: around 70% of all hides and leather is produced in developing countries.[5] China, India and Brazil are the top three countries producing raw hides and leather.[6] The German Federal Ministry of Economic Affairs explains the high production volumes of developing countries by both the low labor costs and the non-existing or lower ecological standards in the leather production processes.[7] Leather from Germany, on the other hand, is mainly used in the automotive industry.[8] Moreover, three quarters of Italian and Spanish leather is imported from developing countries and then finished in Europe.[9] This means that

[1] Petry, 2014, Spotlight on Economics; Marti et al., 2011, p.2.
[2] Marti et al., 2011, p. 10, p. 14.
[3] Marti et al., 2011, p. 14.
[4] FAO, 2016, p. XVII.
[5] FAO, 2016, p. XVI.
[6] FAO, 2016, p. 13-17.
[7] BMWi, 2020, Lederindustrie; Navarro et al., 2020, p. 1.
[8] BMWi, 2020, Lederindustrie.
[9] European Commission, 2013, p. 7.

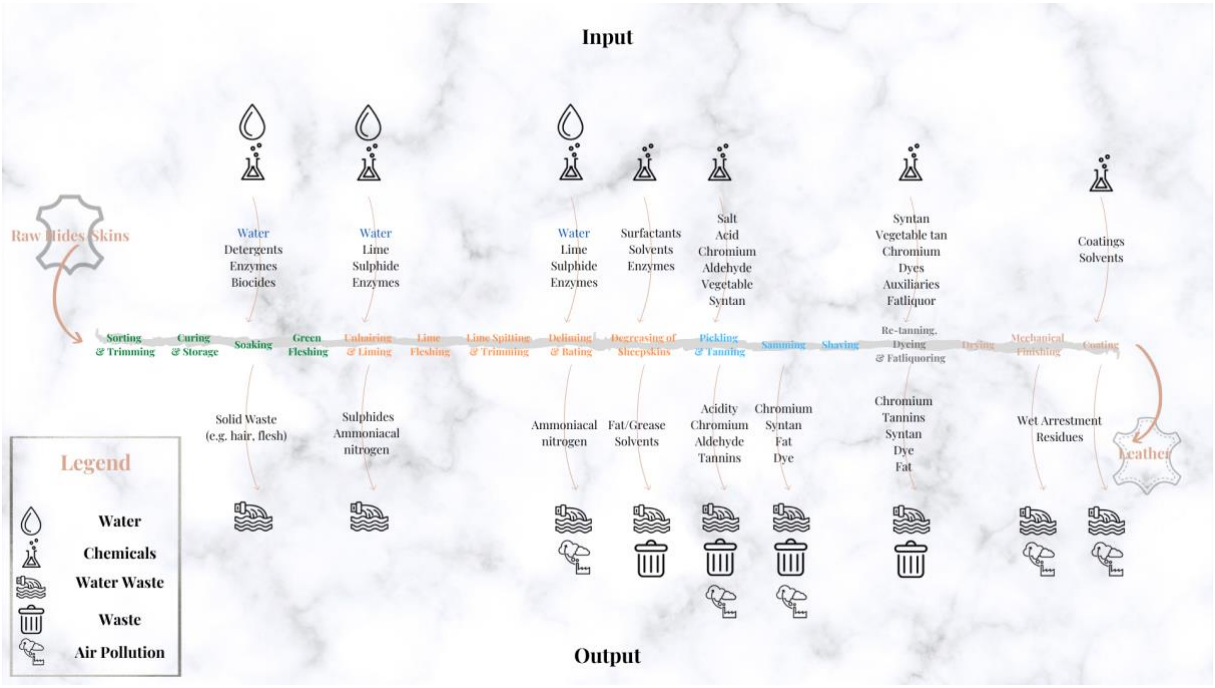
a huge amount of material is transported around the world one (or more) times in the production process of leather products .[10] The European Commission highlights that these imported intermediate materials might have been processed with chemicals prohibited within the EU without any restrictions leading to harmful effluents in the finishing countries.[11] When trying to answer the question whether it makes sense to use these animal hides from an ecological perspective, one should therefore take into account the additional ecological impact of the leather-making process.

Myth 2: Leather is a natural product

Another argument I hear often, especially when comparing animal leather to synthetic leather, is that leather is a natural product and is therefore more sustainable. First of all, leather is not a “natural” product, but animals and their hides are. To make use of animal hides as raw material for fashion or upholstery, the hides need to be preserved from rotting. This process is often referred to as “tanning”, but actually between 20 and 40 process steps are necessary to transform an animal hide to leather as we know it.[12] Without going into too much detail: the hides are salted (conserved when transported from facility to facility), any remaining hair as well es any residue meat is removed in chemical processes before they are tanned and re-tanned and finished with coatings and so forth.

[10] Notarnicola et al., 2011, p. 168.
[11] European Comission, 2013, p. 7.
[12] Laurenti, 2016, p. 2.

Figure 1: Production Process of Animal Leather



Source: own presentation.[13]

To investigate the environmental impact of these processes, scientists can use so called life-cycle assessments (LCA). LCA studies assess all energy and material flows in the value chain and calculate different potential environmental impacts like GHG emissions, water consumption or toxicity. Many LCA studies investigating leather production show that these processes have a huge environmental impact in terms of GHG emissions, water consumption / water scarcity, eutrophication, resource depletion and chemicals. The whole leather production process generates waste water containing chemicals, biological material as well as contaminated solid waste.[14] Strong acids, pesticides and chromium pose the greatest threat to the environment amongst all hazardous by-products of the process, as they are not only highly toxic to humans, threatening those who work unprotected in supply chain processes, but are also released into water systems due to a lack of proper waste management.[15] In developing countries, studies show

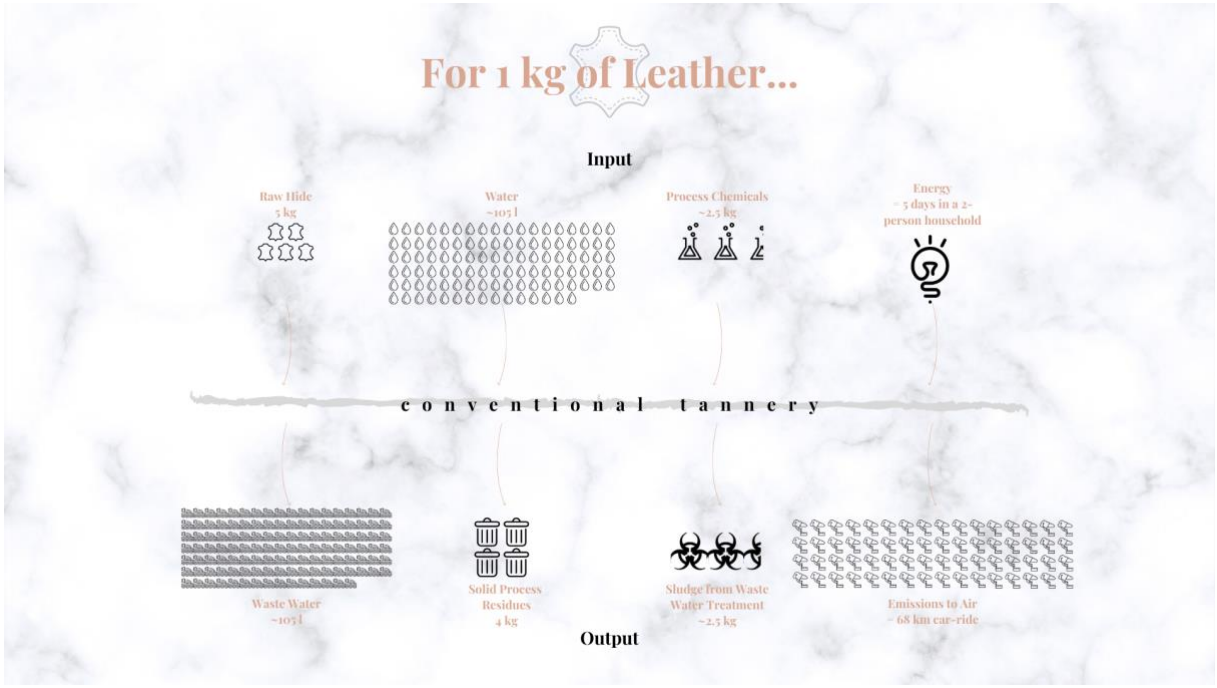
[13] Flow diagram following European Commission, 2013, p. 13.
[14] Notarnicola, 2011, p. 172-174.
[15] Navarro et al., 2020, p. 4.

that waste water is sometimes not even managed at all but discharged untreated and uncontrolled into the environment.[16]

To make things a bit more tangible: 5 kg of raw hides need to be tanned in order to get 1 kg of leather. The residual 4 kg of the material goes to waste, which needs to be managed. Around 105 liters of wastewater is generated, and 2.5 kg of chemicals are consumed. The energy needed to produce 1 kg of leather is comparable to the energy a 2-person household consumes in 5 days[17] and the CO2 emissions are equivalent to a 68 km ride by car.[18] Of course, these measures differ highly according to country, tannery etc. The numbers are based on a study investigating an Italian leather production[19], which likely has a lower environmental impact according to stricter EU regulation compared to developing countries and is based solely on the tannery process (no cattle raising, farming, slaughtering and production of the leather good is included). Therefore, the real numbers are likely to be much larger. The example emphasizes how many resources are needed to get this material, which we perceive as natural, ready to be used for fashion.

[16] Chowdhury et al. 2018, p. 18.
[17] Assumption: a 2-person household consumes 2,400 kwH per year.
[18] Based on EU average emissions of new cars registered in 2019 (0.1224 kg CO2 / km (European Environment Agency, 2020, Average CO2 emissions, https://www.eea.europa.eu/highlights/average-co2-emissions-from-new-cars-vans-2019)
[19] Notarnicola, 2011, p. 172-174.

Figure 2: Leather Production In- and Output per 1 kg of Leather



Source: own presentation.[20]

But what about vegetable tanned leather? The ecological impact of chromed vs. vegetable tanned leather is not yet well investigated. Even though vegetable leather eliminates the toxicity of chromium, a first study indicated no significant differences between chromed and vegetable tanned leather regarding GHG emissions, water and energy consumption.[21]

Myth 3: Leather is more sustainable than synthetic alternatives

After taking a closer look at the production process, the question remains how the ecological impact compares to other raw materials. Synthetic or vegan leather is often said to be more ethical, but less sustainable than leather.

To my knowledge, there is no academic paper directly comparing the environmental impact of synthetic leather to animal leather. One peer-reviewed study compares the production of synthetic shoes with leather shoes. The study estimates that the production of animal leather consumes about double the amount of energy compared to polyurethane (which is often used as an animal friendly

[20] Flow diagram following European Commission, 2013, p. 47. Numbers calculated based on Notarnicola, 2011, p. 172-174.
[21] Laurenti, 2016, p. 6.

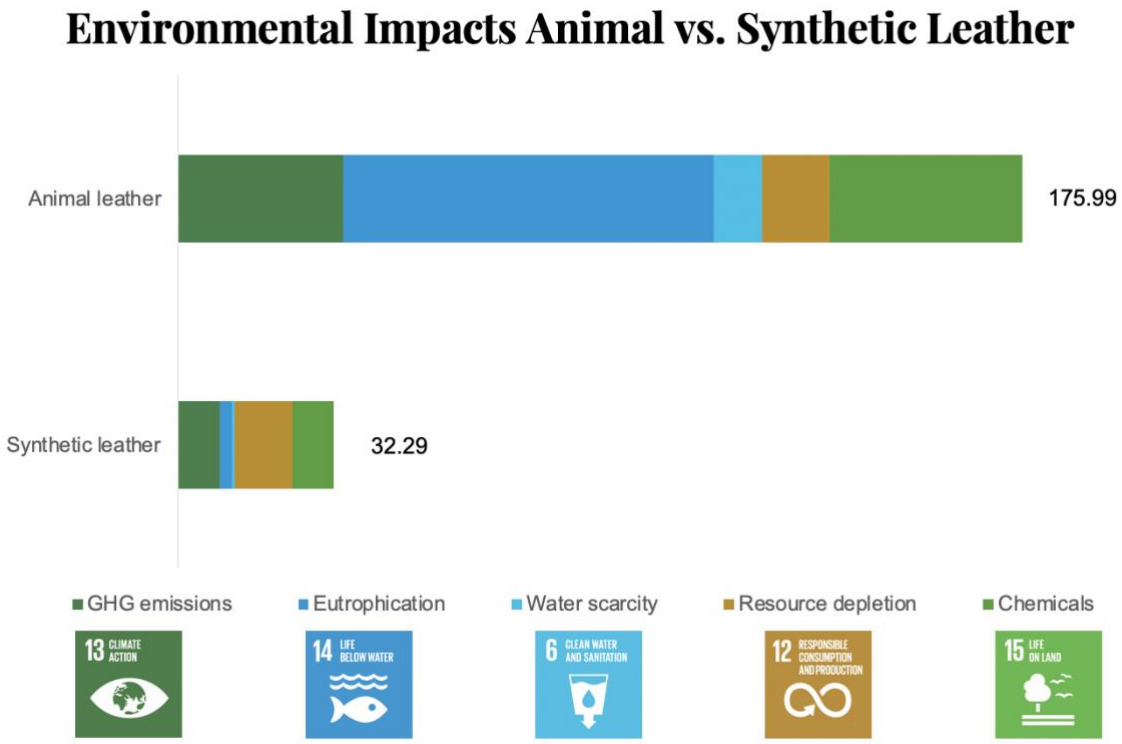
leather).[22] Another study estimates the CO2 emissions of leather to be 6.5 times higher than that of synthetic leather.[23]

Regarding environmental impact in a broader sense, the HIGG material index is known as one of the only tools for comparing different raw materials used in the fashion industry. In this index, which is based on both industry and academic data, leather has 5.5 times the environmental impact than polyurethane-based leather. This result is mainly driven by the tannery processes, as cattle raising is only taken into consideration with 3.6% and land use is not taken into consideration at all. Comparing all available fabrics, leather is the third most polluting raw material after silk and wool.[24] Kering, known for brands like Gucci and Saint Laurent, states that leather is the most environmental pressuring raw materials in their supply chain, with 5 times the impact per kg compared to polyurethane.[25]

In my research, I found no study indicating a higher environmental impact of synthetic leather compared to leather. Whereas both materials have profound impact on the environment, synthetic leather seems to be the better choice according to academic studies – without the huge impact of farming and agriculture on the environment even taken into account. The most sustainable thing to do (regarding all products) is: buy less, buy better quality and prolong the life of your products as much as possible.

[22] Herva, 2011, p. 1879.
[23] Gottfridsson & Zhang, 2015, p. 35.
[24] HIGG Co, 2021, Material Sustainability Index, Material Sustainability Index, https://portal.higg.org/
[25] Kering, 2020a, p. 7; Kering, 2020b, Material Intensitites Database. https://kering-group.opendatasoft.com/pages/material-intensities-2019/

Figure 3: Environmental Impact of Animal leather vs. Synthetic Leather



Source: own presentation.[26]

Myth 4: Leather is biodegradable

Biodegradability is another buzzword used in marketing lately, causing a lot of confusion around the term. But what does biodegradability actually mean? To gain a better understanding of the term, I spoke to chemical scientists. The concept is simple: a material is biodegradable if there is any bacteria or fungi in the natural world that can “eat” the material. Eating in this case means that it can break the chemical bonds holding the material together, so that the material breaks down into its components. This process is impacted by temperature and moisture. Also, time plays a significant role: some materials are biodegradable per se, but it would take tens or hundreds of years for the material to biodegrade.

When we speak of biodegradability, it is not a binary yes / no characteristic of materials, but rather a question of how long it takes for the material to decompose under certain environmental conditions. This is the reason why there are specific

[26] Numbers based on HIGG Co, 2021, Material Sustainability Index, Material Sustainability Index, https://portal.higg.org/

standards, for example those of the ISO, which say that a material needs to break down in a specific time frame and under specific conditions to be defined as biodegradable. On the other hand, biodegradability does not mean that a material must break down in your compost at home; some materials need an industrial environment to biodegrade.

Animal hides would usually decompose when an animal dies. The tanning process is specifically designed to stabilize the collagen fibre and thereby preventing the skin from rotting. After the tanning process, the skins are no longer subject to putrefaction and are more resistant to heat and mechanical influence.[27] So the whole process is basically designed to prevent the biodegradability of the ultimate leather product. Furthermore, to make the leather look more smooth (i.e. hide any uneven parts or wounds in the skin) or to optimize its properties (protection against water, oil, soiling), the tanned leather is often times coated with synthetic materials like PU / PVC.[28] Coatings are not necessarily declared properly. In Germany, a coated leather with a coating under 0.15 mm thickness does not need any extra declaration and is simply sold as leather.[29]

To go back to the question: yes, animal hides are biodegradable. For leather, the answer is not that obvious. It highly depends on the tannins and other chemicals used in the production processes.[30] Moreover, the huge amount of waste water and solid waste produced cannot be broken down easily and some substances do not biodegrade at all.[31] Waste containing chromium, for example, is considered hazardous and does not biodegrade enough to break down the chromium to get non-hazardous – even under ideal conditions.[32] Due to the nature of elements as well as technical feasibility and economic reasons, the process waste gets either landfilled or incarnated.[33] Landfilling of solid waste becomes increasingly problematic, as availability of land decreases. Moreover, many countries put restrictions on the amount of waste which is allowed to be landfilled, because of

[27] European Commission, 2013, p. 20.
[28] European Commission, 2013, p. 22-24; p. 54; p. 57.
[29] Beuth 2021, RAL 060 A2.
[30] Silveria et al., 2019, p. 661.
[31] European Commission, 2013, p. 54; He at al., 2007, p. 465.
[32] Ferreira et al., 2010, p. 1091; Priebe et al., 2016, p. 411.
[33] European Commission, 2013, p. 65; p. 73; Mila et al., 1998, p. 205.

possible contamination with chromium, pesticides and other pollutants.[34] The majority of finished leather products are landfilled or incinerated as well, while recycling options are limited.[35] A lot of research is undertaken to increase the level of waste recovery instead of its disposal.[36] The system though is far away from being circular and the process doesn't ensure biodegradability.[37]

Myth 5: Leather standards ensure animal welfare

A lot of people still think that buying from luxury brands ensures a certain level of animal care, or that buying under specific standards, most commonly the leather working group LWG standard, ensures a minimum standard for the animals killed in the process. This myth probably makes me the most speechless, as it is highly encouraged by brands' Greenwashing methods. Let me be clear – the leather working group LWG standard, which is proclaimed by fashion houses to be the strictest standard - does not include any form of evaluation of the animals or the slaughterhouses. On the leather working groups website you can easily read that farming, animal husbandry, transport and slaughterhouses are not assessed in any way.

When fashion houses talk about "satisfying the most demanding standards in terms of animal welfare for all its raw materials"38, "traceability in their whole supply chain"39 or even proclaim "animal wellness"40, but measure their efforts with the LWG standard, there is no assurance on any animal care minimums whatsoever. Any "commitments" to achieve a certain percentage of certified suppliers in the next years41 to ensure animal welfare standards42 is therefore no commitment at all. Kering, on the other hand, has started to develop animal care standards for the first time in 2016 because it is of "such high priority"43, with no auditing in place

[34] European Commission, 2013, p. 79.
[35] Pringle et al., 2016, p. 1; Staikos, 2006, p. 497-498.
[36] European Commission, 2013, p. 75
[37] Navarro et al., 2020, p. 2; Pringle et al., 2016, p. 549.
[38] LVMH, Environmental Responsibility Report, 2019, p. 26.
[39] LVMH, Environmental Responsibility Report, 2019, p. 26; LVMH, Animal-based Raw Materials, 2019, p. 2.
[40] LVMH, Animal-based Raw Materials, 2019, p. 2.
[41] LVMH, Environmental Responsibility Report, 2019, p. 17.
[42] LVMH, Animal-based Raw Materials, 2019, p. 5.
[43] Kering, 2020a, p. 20.

yet. They are also providing information on the percentage of leather they can trace back to the slaughterhouse, not to the farm itself. The key message: big fashion companies, even the prestigious luxury houses, have problems tracing back their material to the suppliers; tracing back to animal husbandry / farm level is a problem not yet tackled sufficiently. Please be cautious when reading any environmental reports not published in the official financial statements, as there are no auditing processes involved in publishing them.

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