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# The multiple ontologies of freshness in the UK and Portuguese agri-food sectors

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This paper adopts a material-semiotic approach to explore the multiple ontologies of “freshness” as a quality of food. The analysis is based on fieldwork in the UK and Portugal, with particular emphasis on fish, poultry, and fruit and vegetables. Using evidence from archival research, ethnographic observation and interviews with food businesses (including major retailers and their suppliers) plus qualitative household-level research with consumers, the paper unsettles the conventional view of freshness as a single, stable quality of food. Rather than approaching the multiplicity of freshness as a series of social constructions (different perspectives on essentially the same thing), we identify its multiple ontologies. The analysis explores their enactment as uniform and consistent, local and seasonal, natural and authentic, and sentient and lively. The paper traces the effects of these enactments across the food system, drawing out the significance of our approach for current and future geographical studies of food.

## KEYWORDS

agri-food studies, freshness, material semiotics, multiple ontologies, Portugal, UK

## 1 | INTRODUCTION

While the idea of “freshness” in food marketing and related commercial contexts is deployed in an almost uniformly positive way (as pure, wholesome and natural), its meaning is far from stable, referring to multiple qualities of food. “Fresh” can be contrasted with “frozen” (sometimes complicated through the idea of “fresh-frozen” food). It can refer to specific attributes of food, including its visual appearance, smell and taste. It can be a synonym for “local” food or refer to the time since it was harvested (as in “freshly picked”). When the UK Food Standards Agency sought to revise its guidance on food labelled as fresh in 2008, they concluded that some uses of the term were helpful to consumers but, when used for its emotive appeal in phrases such as “oven fresh” or “garden fresh”, they concluded that the term “had no real meaning” and should be avoided (FSA, 2008, paras 26–29).

This paper seeks to challenge the conventional view of freshness as a single, stable quality of food.<sup>1</sup> Following the material semiotics approach outlined by Annemarie Mol and others (De Laet & Mol, 2000; Law, 2009; Mol, 1999, 2002), the paper goes beyond the idea that the multiplicity of freshness can be understood as a series of social constructions or as different perspectives on essentially the same thing. Instead, we attend to the multiple ontologies of freshness and to the way their enactment produces various effects.<sup>2</sup> Our work builds on recent geographical and related work that adopts a

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similar approach, including studies of the multiple ontologies of local food (Forney, 2016), animal disease (Enticott, 2017) and water resources (Lavau, 2013; Yates et al., 2017). While most of these studies have had a material object as the focus of attention, a further contribution of our work is to explore the ontologies of freshness as a *quality* of food that is enacted in multiple ways and with variable effects.

The paper is based on the authors' comparative research in the UK and Portugal, including in-depth research with major retailers and their suppliers and with smaller producers and market traders, together with intensive household-level research with consumers.<sup>3</sup> In each country, we focused on three agri-food sectors (poultry, fish, and fruit and vegetables) with some additional research on other sectors, including bread and bakery products.<sup>4</sup> The paper begins by unsettling conventional ideas of "freshness" before introducing our material-semiotic approach. After a brief account of our research methods, the paper then outlines four ontologies of "freshness", tracing their effects across the food system. We conclude by drawing out the significance of our approach for current and future geographical research on food. These include the way different enactments of freshness may have implications for how "consumer choice" is understood or how responsibility for food governance is distributed across different actors in the food system. Our work therefore has potential significance for policy and practice as well as academic value in theoretical terms.

## 2 | UNSETTLING "FRESHNESS"

Food scientists, chemists and nutritionists have long researched freshness and the various biochemical and microbial mechanisms that contribute to food's deterioration (e.g., McGee, 2004; Singh & Cadwallader, 2002). Freshness has also attracted the attention of management scientists, focusing on the analysis of supply chains, technical infrastructure and logistics (e.g., Entrup, 2005; Gustafsson et al., 2009). By contrast, and with some notable exceptions such as Latour's (1993) work on the "pasteurization" of France and Shove and Southerton's (2000) research on the "creeping normalization" of the domestic freezer, the social and cultural significance of freshness in contemporary agri-food systems has been relatively neglected. Freidberg's (2009) "perishable history" of freshness is an important exception, examining the socio-technical arrangements through which freshness is produced and circulated. While Freidberg's work is a landmark study, taking freshness as its object of inquiry, our work differs in its geographical focus on the UK and Portugal (while Freidberg focuses mainly on the USA) and in our exploration of its contemporary enactment (compared to Freidberg's predominantly historical research).

Terms like "fresh" and "natural" are key words in the contemporary food industry (Jackson, 2013). Linking fresh and natural in the context of modern agri-food systems is, however, paradoxical because what is sold as "fresh" frequently depends on a series of socio-technical innovations (such as refrigeration, long-distance transportation, irradiation and modified atmosphere packaging) that are anything but "natural". This paradox has been referred to as the production of "industrial freshness" (Freidberg, 2009, p. 2), a process that has enabled the year-round availability of a wide variety of foods, sourced from all over the world. This process resulted from a range of socio-technical innovations that took place during the 20th century, from streamlining crop varieties, through technological advances in food storage, preservation and refrigeration, to marketing campaigns that position freshness as a quality associated with wholesomeness, purity, taste and naturalness. While previous research sheds light on the historical development of "freshness", its significance as an agricultural strategy and marketing concept, and some of its unintended consequences, the current paper goes beyond the argument that freshness is socially constructed and historically contingent to examine the contemporary enactment and multiple ontologies of this particular quality of food, taking a material-semiotic approach.

## 3 | A MATERIAL-SEMIOTIC APPROACH

Different variants of a material-semiotic approach have been deployed in recent geographical studies of food and consumption where it has been used to stress the interplay of material and discursive elements in the production of commodities, meanings and places (e.g., Coles & Crang, 2011; Goodman, 2004). Here, we deploy the term in the sense used in science and technology studies by John Law and Annemarie Mol. According to Law, material-semiotic approaches focus on the enactment of materially and discursively heterogeneous relations, providing "a toolkit for telling interesting stories about, and interfering in, those relations", including "a sensibility to the messy practices of the relationality and materiality of the world" (Law, 2009, p. 142). In this view, the material and the discursive are not approached as separate entities but as *relational effects* whereby "everything in the social and natural worlds is a continuously generated effect of the webs of relations within which they are located" (2009, p. 141).

The approach is richly illustrated in Mol's account of *The body multiple* (2002), which offers a rejoinder to the representational and social constructivist tendencies of much recent work in the social sciences and social theory. Taking atherosclerosis as her case, Mol shows that there are not simply different representations of the disease in the doctor's surgery and ultrasound lab, in the radiography department and operating theatre. Rather than seeing them as different perspectives on a single disease, Mol insists that different material and discursive practices generate their own reality. It follows that the body is not a singular subject, prone to a single disease, rather, the body has multiple ontologies, each arising from different enactments of atherosclerosis. It is this approach that we seek to emulate in our exposition of the enactment of "freshness" in contemporary agri-food systems, uncovering its multiple ontologies, paying attention to the different material and discursive practices through which "freshness" is done, and to the effects of these enactments across the food system.

## 4 | RESEARCH METHODS

Our comparative research in the UK and Portugal examines the multiple enactments of freshness as they have emerged in relation to changing technologies (such as refrigeration and preservation, transportation and display). The project explores how freshness is enacted at different points in the post-harvest supply chain and how it is practised and understood by different actors (including those involved in food manufacturing and processing, transportation and distribution, retailing and marketing) as well as among domestic consumers. In this respect, we pay particular attention to the measurement, monitoring and assessment of freshness by different supply-chain actors, whether via technical means (such as date labels or formal risk management procedures) or by more tacit and embodied forms of knowledge (such as the sensory competencies that are used in different settings).

The project is based on collaborative work with two leading Portuguese food retailers: the Pingo Doce supermarket chain (owned by Jerónimo Martins) and the Continente chain (owned by Sonae MC). In the UK, our retail partners include Marks & Spencer, Tesco and the Cooperative Group (known as the Co-op). Negotiating access and working closely with these companies required an acknowledgement of the complex "power geometries" involved in such collaborative research (cf. Jackson, 2015b). This involved convincing these firms that our research was sufficiently relevant to their commercial priorities to warrant their time commitment while maintaining critical distance and academic integrity.

Our aim was to access a range of staff (including buyers, technologists and category managers) at different stages of the production process, together with those involved in transport, distribution, marketing and display. While we did not secure the same level of access to each company, we managed to achieve a good level of cooperation in both the UK and Portugal, including interviews with key personnel in the two biggest Portuguese food retailers and on-site visits to some regional distribution centres and food preparation sites. In the UK, we undertook archival research with Marks & Spencer and interviews and site visits with staff at various points in the supply chain at both Tesco and the Co-op. These data were complemented by a number of "expert interviews" with technologists and engineers in each country, analysis of secondary sources (such as technical and marketing reports) and work with a range of smaller producers, market traders and independent retailers in both countries.

Access to consumers included in-depth interviews, accompanied shopping trips, kitchen tours and cooking observations, combining audio and visual recording. A wide range of participants were recruited in each country, varying in age from those in their 20s to those over 70, and from diverse social, economic and ethnic backgrounds. All of the interviews were transcribed, selectively translated (from Portuguese to English) and coded, following the protocols outlined in our application for ethical approval from our respective universities. Taking inspiration from Mol and colleagues (Mann et al., 2011), we also undertook a series of "tasting events", designed to capture our participants' embodied and sensory engagements with food, including things that could not easily be expressed in words but which might be recorded through photographic and video methods and/or be observed by the researcher.<sup>5</sup> Our work also builds on Hayes-Conroy's (2010) discussion of the visceral realm of food-based social movements and Longhurst et al.'s (2009) participatory-based exploration of the tastes, textures and aromas of cooking and eating with migrant women in New Zealand.

Our analysis initially sought to identify the *multiple meanings* of freshness, envisaged as social constructions, mobilised by different actors (producers, retailers, consumers) at various points along the supply chain. This representational and constructivist approach proved ineffective in making sense of our data, which led us to focus on the multiple ontologies of freshness. Accordingly, we turned to a different form of analysis, pursuing the *multiple enactments* of freshness and their effects across the food system.

## 5 | ENACTING FRESHNESS

The material-semiotic perspective adopted here does not conceive of “the social” as an “object” to be discovered but as a relational effect that makes things happen (cf. Law & Urry, 2004). We take a similar approach to the enactment of “freshness” in agri-food systems, exploring the socio-technical infrastructure that has enabled its development; the (re)configuration of “freshness” over time in different (commercial and domestic) settings; and the interplay between different (human and non-human) actants within these complex and dynamic assemblages (cf. Latour, 2005).

The following sections discuss our empirical data and provide a series of stories about the enactment of freshness in different contexts. Rather than organising this material in linear terms from producers to consumers (or from farm to fork), we have sought to integrate material from various sources along the supply chain to highlight different enactments of freshness and their relational effects. Through collective discussion within the research team, we abandoned a constructionist/representational approach and identified four distinct analytical registers to describe how freshness is enacted as: uniform and consistent; local and seasonal; natural and authentic; and sentient and lively. In each case, we trace how freshness is “done” and with what effects.

### 5.1 | Uniform and consistent

Our participants enact freshness in multiple ways that are at times incompatible but which sometimes support and depend on one another. For some participants, particularly those working in food production and retailing, freshness is a technical accomplishment, designed to produce uniform and consistent, safe and reliable goods, available year-round with minimum risk of disruption. The Commercial Director of one of the Portuguese supermarket chains went so far as to say that his ultimate aim was to have “no variation in quality” (uniform freshness), employing a variety of techniques (such as the use of ethylene to control the ripening of bananas or working with geneticists and agronomists to ensure that apples reach an acceptably uniform colour). This exercise in technocratic control was epitomised by one of our Portuguese participants sitting in front of a bank of computer screens, using sophisticated algorithms to improve the efficiency of the company's logistics and supply chain management. Similarly, the technical manager for bakery in one of the UK supermarkets stressed the importance of correctly forecasting demand and “getting the scheduling right” such that produce is not sitting on the shelf for too long before it is purchased by consumers. The imperatives of uniformity and consistency define business priorities as a “fight against time”, including both “residency time” (the time that it takes for fresh produce to reach the supermarket shelf) and “shelf life” (the amount of time that produce remains safe and edible on the supermarket shelf and after purchase). These businesses strive to ensure the longest possible shelf-life of their fresh produce both in-store and for customers at home.

Enacting uniformity and consistency can be a risky and unpredictable process. As the customer manager at one of the UK supermarkets noted: “we have no idea how the product has been treated once it has left the [supermarket] front door” and our respondents pointed to a number of reasons – ranging from the inadequacy of domestic refrigerators to customers not following storage advice – why a product might not last as long as anticipated.

Accepting that they have limited influence on a product's post-purchase shelf life, the supermarkets' pursuit of consistency and uniformity is overwhelmingly focused on minimising residency time in order that shelf life for the consumer is maximised. The UK retailers reported that the best way to do this was to “cut down the number of stages” and “the number of times [a product] is touched” as it moves along the supply chain. To illustrate this, a technical manager offered the following “simple example” of how UK retailers purchase Spanish fruit and vegetables outside of the UK growing season:

Historically you would buy your products in Spain [having been harvested in Spain], bring them back to the UK, pack them in the UK, send them to DC [Distribution Centre] and then into store ... that's quite a long chain and so you end up with a product on shelf that may have three or four days' shelf life max.

She continued:

We [now] work directly with the source in Spain ... now what they have got is rigs ... a big piece of equipment that to harvest, pack, label and put in a finished case in the field within literally minutes, the product has been harvested, packed, labelled, and ready to go. They build the pallets in the field, they bring them straight back through a blast chiller to bring the temperature down as quickly as possible ... usually within 60 minutes.

Then it goes onto a lorry. It doesn't go through a pack house in the UK. It goes straight into our DC ... we cut easily 2 or 3 days out of the supply chain that we can then put onto the shelf life to give to customers.

Through these complex socio-technical interventions, involving rigs, pallets and blast chillers, food retailers aim to provide customers with year-round, uniform and consistently “fresh” produce.

The effects of these socio-technical enactments for consumers are paradoxical. On the one hand, they provide year-round availability of a wide range of products with a high degree of dependability. On the other hand, there may be consequences for the quality and taste of the produce. Consumers frequently complain about tomatoes that looked good on the shelves but deteriorate rapidly at home or which, when eaten, have little taste. As one UK consumer pointed out: “Fresh tomatoes are wonderful, but not the ones you get from Tesco in February”.

Parallels can be drawn with Heuts and Mol's (2013) work on valuing tomatoes which they describe as a performative act. The authors identify five evaluative “registers”: monetary (assessed in terms of financial cost), handling (assessed in terms of fragility and perishability), historical (where notions of nostalgia and heritage are in play), naturalness (compared to the use of artificial chemicals, for example) and sensual (including visual clues as an index of flavour, texture and taste). A “good tomato”, in one register, would have a firm texture, able to withstand transportation, while in another register tomatoes are valued primarily for their flavour and taste.<sup>6</sup> These different registers are relationally interconnected as when the refrigeration of tomatoes to prevent them rotting leads to a deterioration of taste.

Our data also confirm the extent to which the year-round availability of “fresh” produce is dependent on processes that are anything but “natural”. The Marks & Spencer archive includes historical evidence of the techniques used to extend the growing season of a particular variety of strawberries (prior to the introduction of poly-tunnels):

Elsanta need a cold period during winter to break dormancy before they will flower in the spring to produce the summer crop. Very simply the waiting bed technique involves lifting the young plants in the autumn and holding them for an extended period in cold storage. The plants are fooled into thinking that it is still winter. We then remove these cold stored plants from store, exactly 60 days before we want them to crop. This is the tricky bit and can only be done successfully with the best growers who have the correct soil type and the sophisticated irrigation necessary to keep these young plants cool as they emerge from cold storage ... With the support of our growers we were able to extend their season through August into September with superb fruit quality. (‘The Marks and Spencer approach to fresh produce’, 7 March 1995, Marks & Spencer company archive, University of Leeds, Q/Q11/1/6/24)

In our fieldwork with Tesco's main banana supplier, we observed a similar exercise in technical control, delaying the ripening of bananas as they are shipped to the UK, to be “woken up” by the application of ethylene, followed by carefully modulated temperature control and elaborate logistics to ensure that the right quantity of fruit, of uniform appearance and consistent quality, appears on the supermarket shelves each day. The environment manager at another UK supermarket commented on this process:

Bananas are really, really interesting because they're packed when they're green and they're kept in a chilled environment ... when they are ready to be sent on to us they're warmed up and they're given a dose of ethylene and that opens the pores up, its stomata, and starts the ripening process ... then they're shipped to us at about 12°C ... Because if you put the bananas, after that, in the fridge they go black quickly. So, we keep them in nice warm segregated containers in our ... chilled depots.

A final example which emphasises the role of quality assurance, food safety and conservation management as socio-technical means of enacting freshness is depicted in the advertising for Pingo Doce's “Frescura” range (see Figure 1).<sup>7</sup> The text strikes a complex balance between “art and science”: ideal temperatures and strict selection criteria combined with artfulness and hands-on artisan methods of production.<sup>8</sup>

## 5.2 | Local and seasonal

A second enactment of freshness is almost the opposite of the first, where smaller producers and market traders seek to capitalise on the associations of fresh and local, including produce that is freshly “in season” and not produced for year-

**SE NÃO FICAR SATISFEITO**  
**100%**  
**Frescura**  
**GARANTIDA**  
**DEVOLVEMOS O SEU VALOR**

*Peixe*  
O NOSSO PEIXE FRESCO É TRANSPORTADO À TEMPERATURA IDEAL, ENTRE OS 0 E OS 4°C. É POR ISSO QUE CHEGA TÃO FRESCO ÀS NOSSAS LOJAS, SEMPRE DE MADRUGADA

FEITO COM A ARTE E O SABER DE QUEM PÕE VERDADEIRAMENTE A MÃO NA MASSA E LEVA ATÉ SI, DIA APÓS DIA, O PÃO MAIS DELICIOSO

*Pão*

*Carne*  
A NOSSA CARNE É RIGOROSAMENTE SELECIONADA. É POR ISSO QUE O NOSSO TALHO É TÃO FRESCO E A NOSSA CARNE TÃO TENRA E SABOROSA

FRESCURA ACABADA DE COLHER. SOMOS EXIGENTES POR NATUREZA, ATÉ COM O QUE VEM DA NATUREZA.

*Legumes*

**pingo doce**

**FIGURE 1** Advertisement for Pingo Doce's "Frescura" range (reproduced with permission).

round consumption through large-scale industrialised agriculture. In Portugal, for example, small retailers such as *Fruta Feia* (Ugly Fruit) and *Cabaz do Peixe* (a fish box scheme) aim to compete with larger food retailers by associating their organisations and products with locality, seasonality, small-scale production, a shortened time period between harvest and sale, a disregard for cosmetic appearance and increased customer care.

For António, the fisherman who administers *Cabaz do Peixe*, “freshness” is a consequence of immediacy.<sup>9</sup> With slogans such as “do pescador para si” (“from the fisherman to you”) or “direto do mar ao prato” (“straight from the sea to the plate”), *Cabaz do Peixe* promotes the freshness of its fish by highlighting the lack of intermediaries in its activity. In this way, freshness is enacted through the care and attention that experienced fisher folk employ when fishing, from the time right after it is caught at sea until it reaches the consumer. These findings corroborate claims in the alternative food network (AFN) literature (for example Kneafsey et al., 2008; Maye, 2013) that stress their social and moral embeddedness, their potential to reconnect producers and consumers, and their critique of more globalised and anonymous systems of food provisioning.

The effects of these enactments of freshness as local and seasonal are to enhance the competitive advantage of AFNs and others who trade directly with the public. “Doing” freshness in this way enacts a closer relationship between producers, sellers and consumers than supermarkets are usually able to achieve, emphasising directness, immediacy and connection. Such enactments work on a local scale and through specific temporal rhythms, including the fact that not all products are available year-round, increasing their desirability when they are in peak condition according to the season.

This comes through strongly in one of the UK consumer interviews where Ted (a retired professional) comments on the importance of locality and seasonality in terms of taste and sustainability:

You should eat fresh food as close as possible to where it's grown, for freshness ... So in general, I like to eat food that's grown up the road, but in the context of a British winter that's difficult ... I would take the view that you should, if everyone ate what they had locally, there wouldn't be a lot of the problems that we have with managing the world's resources ... [It's about] air miles I suppose, but not ... in an ecological sense, it's just a waste of resources ... and food [that has travelled for long distances] never tastes good.

Ted goes on to associate freshness with provenance (“where this stuff comes from”), referring specifically to imported tomatoes: “Things that cost £2 a kilo in Italy in July, cost £5 a kilo in Waitrose [an upmarket UK supermarket chain] in February”.

In Portugal, the head of the *Fruta Feia* cooperative emphasised that her clients have a “sentimental relation with the product”. As she put it, “you have more affection [with the food] when you eat things that you know came from the hands of the producer on that day, and that were harvested or caught that day; [then] you have a much higher relation of proximity with the fresh product, rather than knowing that it is something that was stored for a long time and that it took chemicals to preserve”.

In the UK, officials at the National Market Traders’ Federation (NMTF) singled out variety and localness as key points of difference from supermarket produce. Their Chief Executive suggested that supermarkets only stock three or four of the 40 varieties of potatoes that are available in the UK, selected on the basis that they are amenable to cold storage. Describing how traditional markets compete with supermarkets, he insisted that “local knowledge is always best” and stall-holders have the advantage of a direct relationship with their suppliers, with a personal knowledge of the farmer, their produce and their customers. Whereas supermarkets have to stock a full range of fruit and vegetables, market traders can be more selective, spotting an opportunity where “something is going down”, such as bags of cheap spinach. Having their “finger on the pulse” and exploiting their local knowledge enables market traders an opportunity “to turn a shilling”.

Customers who bought direct from farm outlets shared the view that market-bought produce was superior in quality and taste to supermarket goods.<sup>10</sup> One UK participant (Steve) insisted that the Maris Piper potatoes he had bought from a farm shop shortly before Christmas were “ten times better than supermarket potatoes” and, if stored correctly (in a cool, dark place such as his garden shed), would “last forever” (until March or April). This, he suggested, was because supermarkets “force grow” produce to bring it on “very early and very quick”, compared to the seasonality and locality that he associated with market-bought goods. Steve was also observed testing parsnips for freshness by holding them in one hand and bending the thinner end with his other hand. Searching to the bottom of the box, he commented that parsnips go off really quickly and that, despite his training in food science, he was unsure how best to store them.

### 5.3 | Natural and authentic

An extension of the second enactment of freshness as local and seasonal, freshness can also be enacted in ways that emphasise a close and direct relationship with the natural qualities of food, described here in terms of “authenticity”.<sup>11</sup> While participants talked about freshness in terms of the desire to avoid spoilage and delay the natural process of decay (as one supermarket manager remarked: “I think it relates to a lack of ... rottenness; it is not starting to go mouldy if it is a fresh fruit”), they also acknowledged the complexity and multiplicity within this apparently singular process. For example, several participants talked about tomatoes, suggesting that if they stored them in the fridge, they stay “fresher for longer” (in the sense of retaining nutrients and remaining safe) but that they may “inevitably and irreversibly lose the fresh green tomato flavour”.

On this point, Callon et al.'s (2002) distinction between intrinsic and extrinsic qualities is instructive (see also Murdoch & Miele, 2004). Intrinsic qualities relate to properties such as material composition, size and texture, whereas extrinsic qualities relate to more subjective judgements and evaluations (such as taste). We note that our respondents use freshness as a proxy for intrinsic qualities of food, for example by stating that when perishable produce is no longer fresh, it is no longer safe to eat. However, we also note that they use freshness as a proxy for extrinsic qualities such as taste.

Another example from our archival research with Marks & Spencer helps clarify the historical emergence of these multiple enactments of freshness, taken here from a promotional leaflet for a selection of “fresh, healthy, convenient” vegetables in 1995 (see Figure 2). Inviting their customers to “join us on a voyage of discovery ... to exotic places such as Zimbabwe and Thailand”, the company proudly asserted that:

Fresh vegetables from faraway places are no longer a luxury. Fresh, healthy and convenient, the best selection in produce and prepared recipe dishes is now available all year round at Marks and Spencer.

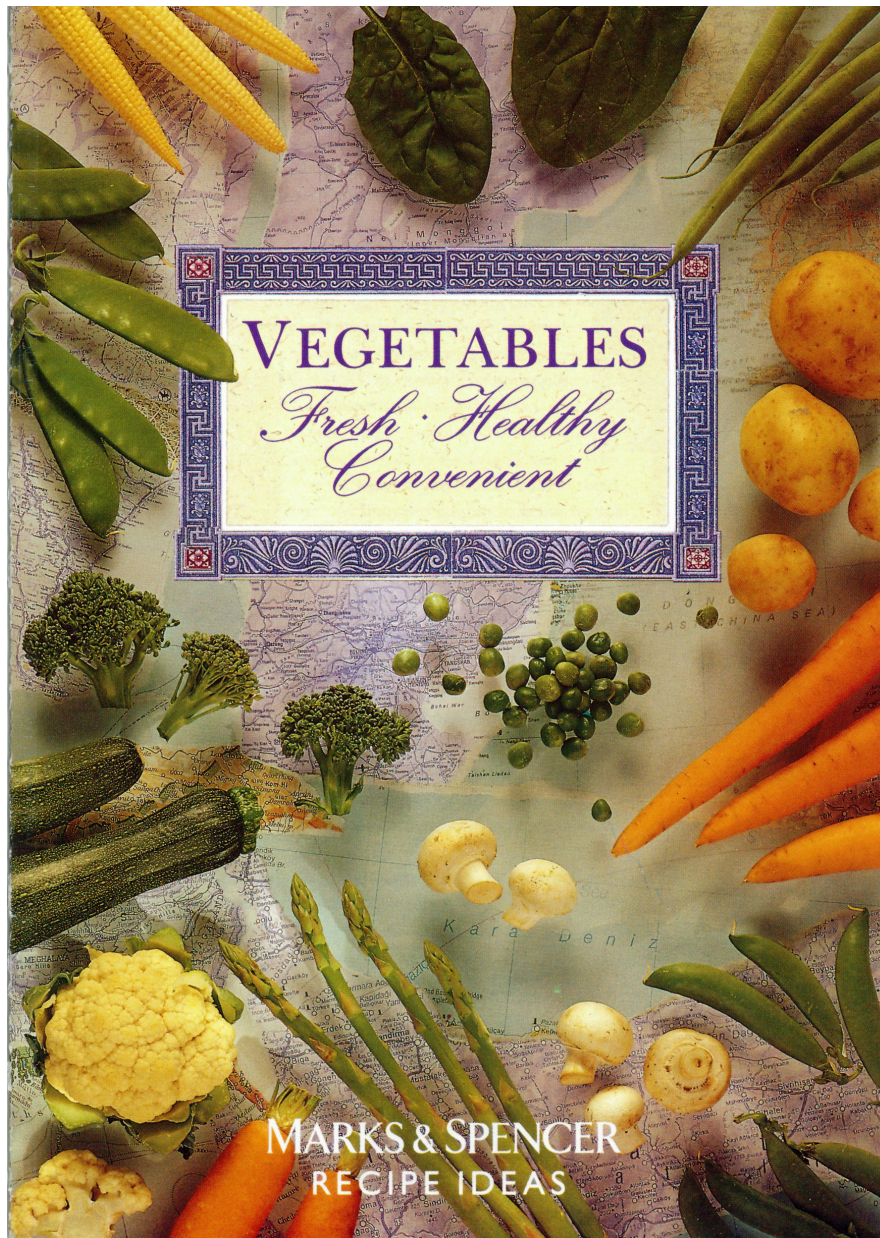
The text continued:

With our suppliers, we travel the world to bring you the very best. St Michael produce [M&S brand name] is full of goodness and flavour, and comes ready to use with minimum fuss and waste ... Marks & Spencer is revolutionizing production and harvesting techniques to offer vegetables that are consistent in size, texture and flavour ... To guarantee supplies of consistently fresh, quality produce Marks & Spencer experts work closely with a worldwide network of approved growers and suppliers, who offer an exclusive service. (Marks & Spencer company archive, University of Leeds, HO/11/1/2/47)

As this example shows, natural and authentic produce “full of goodness and flavour” is often the result of “revolutionary” production and harvesting techniques, long-distance transportation and a global network of suppliers.

While freshness can be enacted as an authentic relation to the natural, our interviews, site visits and observations also reveal that the “freshness” of produce is continually measured, monitored and qualified as it moves along the supply chain. Numerous technologies are used in both the UK and Portugal to assess the intrinsic properties of food. These include Brix refractometers (to measure sugar content); penetrometers (to measure firmness); temperature probes and thermal imaging cameras (to monitor the temperature of food and the environments where it is stored and transported). Additionally, a good deal of assessment relies on human judgement and sensory evaluation according to sight and touch. While this necessarily refers to food's extrinsic qualities, the process is assisted by various socio-technical devices such as colour charts, “spec” sheets and measuring hoops to check conformity with standardised product requirements (see Figure 3). These devices might be seen as a guarantor of freshness or as confirmation that industrialised production involves an alienation from food's natural and authentic qualities.

In our shopping trips and site visits, participants often used their embodied knowledge and sensory judgement when assessing food's freshness. For example, Sean, who owns and runs a greengrocer's shop in South-West England, reports on his customers' sensory skills in assessing the freshness of his produce: “you see them in here, rifling through all of the peppers until they find the ones that they like the look of ... and then they have a feel, maybe a sniff”. Sean contrasts this sensory and engaged shopping experience with the “clinical” experience of supermarkets, where “excessive packaging” and “all this home delivery” precludes the possibility of evaluating food in this way. Related to this, Sean narrates his own ability to tell that an apple is fresh “just by looking at it” and that the produce that he sells is “far fresher” than “the perfect, shiny, red ones in packs of four” on supermarket shelves which have been unduly “messed with”. A similar argument is



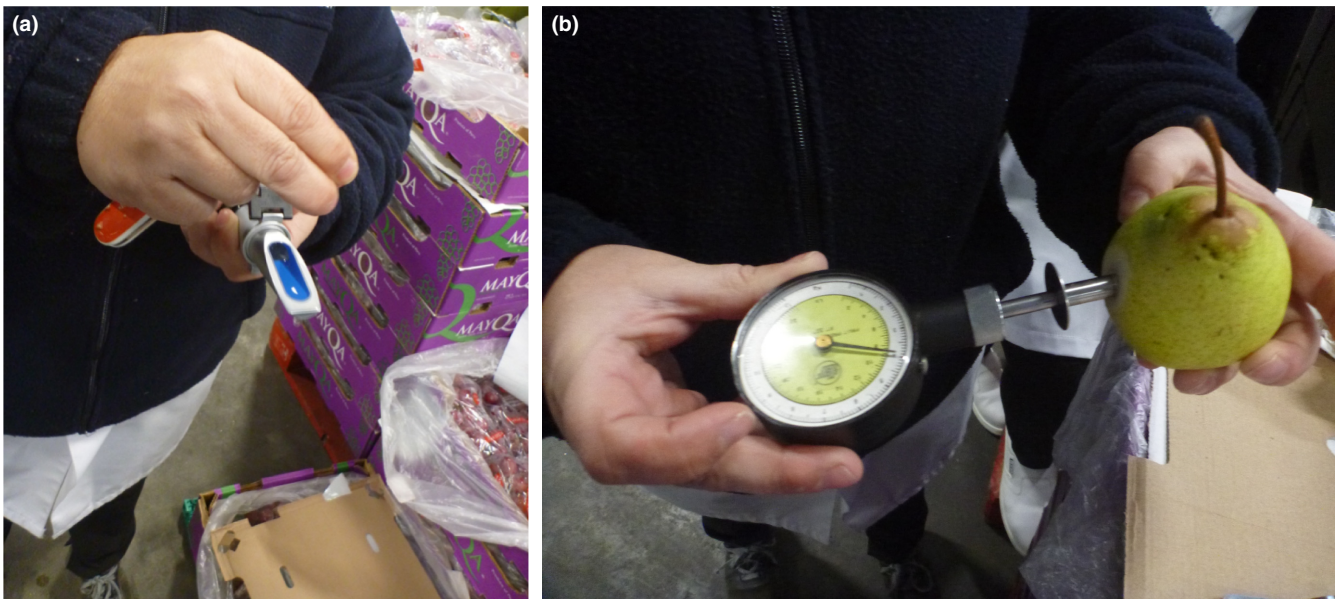
**FIGURE 2** Marks & Spencer promotional leaflet (1995).

Source: Marks & Spencer company archive, reproduced with permission

made about the application of strict aesthetic criteria “a specific level of redness, a window of size, a degree of blemish” in industrialised packing lines by Legun (2017, p. 110).

Assessments of food's naturalness and authenticity often evoked a sense of empowerment and knowledgeability in our participants. For example, Steve, a former deep-sea fisherman, reported that, for fish to be fresh: “The gills have to be really red, because that's absolutely fresh, because the blood has still not drained from it. As soon as they start going pinky, the blood's come away and that fish is old”. While fresh fruit and vegetables should “look good on the outside”, without “bruising” (in the case of potatoes, tomatoes, onions and strawberries) or “black speckles” (in the case of bananas), it was simultaneously acknowledged that attractive visual appearance might be achieved via artificial means (“wonderful bright green salads”, as one UK consumer remarked, were suspected of being “pumped full of gas”).

In Portugal, some consumers drew a distinction between “authentic” and “artificial” freshness. As Magda explained: “For me, freshness has a lot to do with food being authentic, not having too many additives and having its own [natural] shelf life”. Others, such as Vanda, preferred “small, ugly fruit”. However, she also explained how she was attracted to bright and shiny fruit, forcing herself to buy ugly fruit because it is more authentic. Tânia expressed a similar point of view:



**FIGURE 3** Use of refractometer and penetrometer to assess qualities of food (photographs taken by the authors).

The fruits are so washed, they are so waxed, they have such a fabulous appearance when you look. You see a shiny apple, without a hint of anything, and that seems to be fresh. The apple inside is fresh, but it already had so many washings, a wax cover to appear shinier. And there are people who have that stigma, they see an apple that is dirty, or a potato that has soil on it, or a carrot with soil and they immediately think that is not fresh. No! These are the fresh ones! Not the ones that have been through half a dozen machines.<sup>12</sup>

These ontological claims about food's naturalness and authenticity often rested on and helped enact specific biographies through which participants narrated themselves and their experiential knowledge. While many participants insisted that fresh food has a superior taste and that home-grown or home-made food tasted better still, respondents who were born or who grew up elsewhere (in sub-Saharan Africa, Cyprus, Jamaica, Pakistan and Portugal) spoke of fruit cut from the tree when ripe; “healthy and tasty” vegetables that have benefited from “every day sunshine”; and fish and meat being eaten the day it was caught or slaughtered, thereby giving it a particular texture and flavour.

In this way, the assessment of freshness as natural and authentic can be seen to enact particular biographies and identities. For example, Xinavane was born in São Tomé and Príncipe and had spent his life in Angola, Japan and, for the last 25 years, Portugal. He had mixed feelings regarding fresh products: “I’m very relaxed but also very demanding with food”. He exemplified this with apples, meticulously selecting “only the yellow ones ... looking at their perfection ... their shape, colour and the number of black flecks they have”. Xinavane also said that he was open to different “possibilities of freshness”, highlighting the different geographical and historical contexts in which he has encountered multiple versions of freshness (*frescuras*): “In Luanda, I lived close to the beach ... I used to help the fishermen pull in the fish with their nets ... I only ate that type of fish, the fish coming directly from the sea ... this was fresh fish ... but when I came to Portugal, I started to eat frozen fish ... things evolved and today, although they are different, I think these [frozen fish] are also fresh”.<sup>13</sup> This latter point is echoed by ex-deep-sea-fisherman Steve, who claimed that fish carrying the label “frozen on board” is the “freshest kind you can get”. While these stories all relate to the natural and authentic enactment of freshness, our final section involves the attribution of liveliness to different kinds of produce, bordering on anthropomorphic qualities of sentience.

## 5.4 | Sentient and lively

Freshness is enacted in ways that stress the lively qualities of fresh food, recalling recent geographical and related work on the vitality of matter (Bennett, 2009; Evans, 2018; Gregson et al., 2010). These qualities, mostly enacted at the point of sale, sometimes border on sentience. During accompanied shopping trips, participants pointed out how aubergines “puff

out” when they are getting “seedy”; fresh peas go “mealy” when stale; “bendy” carrots can be resuscitated by putting them in water; and fresh fish, meat and chicken should be firm, not “lazy” to the touch. Sirloin steaks were described as “delightful” and mushrooms needed to “breathe”; vegetables were said to “sweat” if left in their plastic wrapping; radishes “fester”; and tubs of sour cream get “bloated” if left on the shelf too long.

While most of our participants assessed freshness through sight or touch (a process we came to describe as “seeing with fingers”), in some cases sound was also invoked. In the case of savoy cabbage, for example, one participant suggested: “if you squeeze it, it gives off these little noises [imitates sound], these little squeaky noises”. The same participant (Ted) also evoked the liveliness of yeast when baking bread, demonstrating how it “thrutches” when becoming active in the process of fermentation. The vitality of foodstuffs extends to imputing feelings and sensations to fruit and vegetables. For example, one British woman (Carol) living in Portugal reported that shopping for “fresh veggies” in supermarkets depressed her because “they all seem so sad”, while her husband described some mushrooms as looking “tired”. Carol argued that the freshness of different foodstuffs is not just about how they taste, but “what they communicate to us”. A Portuguese participant (Letícia) identified a cut pumpkin as fresh on the basis of “the way it looks and smiles at me”, while another (Francisco) avoided particular produce which seemed “to be crying”. By attributing sentience to perishable goods, participants became emotionally attached to them as they assessed and enacted their “freshness”.

Even when produce itself is not attributed with sentience, many of our participants (producers and consumers) enacted freshness in terms of the emotional qualities that “fresh” produce evokes. One effect of the sensory and sentient qualities of freshness was for those involved in food manufacturing and retail to refer to intangible qualities such as the “zing” of a lime or the “crunch” of an apple, going well beyond mundane technical assessments of freshness. There were references to passion and delight, as well as appealing to the consumer's heart and soul. Even the largest supermarket chains referred to the emotional investment in their produce as a point of differentiation within a crowded marketplace.

A technical manager for one of the UK supermarkets noted that the “fundamental mechanics are the same for all retailers” and that “what makes a difference is how much you've invested in your supply chain”. She continued: “Yes, you still have to hit the specification, but actually are you putting as much heart and soul into it as you could, or are you just doing it because that's what the specification says?” Other technical managers insisted that freshness “is at the heart of what we do” and “how we create differences”. In another instance, a UK supermarket manager suggested that freshness was about “delighting the customer”, evoking a positive emotional response to the qualities of food.

Freshness is also enacted via the performance of different kinds of sociality where people are relationally involved with the produce they select and with each other. These relations sometimes involve an assessment of food's lively materiality, as in the following examples from Portuguese markets. One participant (José) goes regularly to the market in Lagos to purchase fish, fruit and vegetables. The process of selecting produce and assessing its freshness is a highly social act involving sellers, other consumers and the people he knows and meets spontaneously. One morning at the market, José approached a shelf with two different varieties of tomato. He looked at the price of each one and touched them gently “to check their texture”. A saleswoman asked him: “Do you prefer them green or ripe?” before engaging him in a lengthy conversation about their personal preferences, the origin of the tomatoes, their seasonality, taste, texture, cosmetic appearance and perceived freshness.

Another participant (Raquel) said that she always went to the Vila do Bispo market to buy fresh fruits “because I know them and they are sweet”. When Raquel was comparing two different melons, a salesman asked his wife, who was serving another customer, for her opinion. She stopped what she was doing and smelt both melons. Silently, she pointed with her nose to one of the melons, which Raquel then chose, commenting: “Yes, that one seems fresher”, evoking an intimate and embodied relationship with the goods she chose. These are specific effects of the multiple ontologies of freshness, based on food's lively materiality and the social relations it enacts.

## 6 | CONCLUSION

The preceding analysis demonstrates that “freshness” cannot be understood as an intrinsic quality of food that can be assessed by universally recognised criteria (cf. Callon et al., 2002). “Freshness” is enacted in multiple ways that cannot be reduced to a series of social constructions or contrasting perspectives on what is essentially the same thing. It is not a stable object whose meanings are produced and contested in purely representational or semiotic registers. Instead, our evidence suggests, “freshness” is enacted in multiple ways. Its enactment is performative in the sense that it produces effects, making things happen both in relation to food (qualifying it in particular ways – as tasty or healthy, for example) and more widely (ranging from the field of commercial competition, through processes of place-making to the narration of personal biography).

Our research also demonstrates that enacting freshness involves the coordination of a range of human and non-human actants (retailers, consumers, technologies etc.), including the material qualities of specific foods and the plants and animals from which they are derived. Measuring the sugar content of fruit via a Brix refractometer or judging its ripeness by smelling and squeezing it do not simply refer to different representations of “freshness” but call into being different ontologies of food and freshness. We therefore prefer to speak of “enacting” freshness as an active and ongoing process – something that is done, done differently and re-done – rather than of freshness as a performance of something stable, invariable or universal.

As in Mol's research on atherosclerosis, different enactments of freshness call forth specific “reality effects”. So, for example, Mol (2002) contrasts the healthcare implications of different enactments of atherosclerosis, some of which configure patients as customers (expressing their preferences through the economic logic of the market), while other enactments configure patients as citizens (framed through models of governance and organisation). In our case, attention to the multiple ontologies of freshness and the effects they produce invites questions about how “the consumer” is constructed and mobilised (Evans et al., 2017). So, for example, the ontology of uniformity and standardisation enacts a model of “consumer choice” where supermarket shoppers are faced with a range of options, depending on what is on the shelves and what they can afford. The ontology of local and seasonal enacts a model of the caring, knowledgeable consumer, exercising responsibility for their health and for the sustainability of the environment. An ontology of naturalness and authenticity also implies a relatively knowledgeable and empowered consumer, whose food purchases help articulate their sense of self and subjectivity. Finally, the ontology of liveliness and sentience enacts an embodied consumer and active subject, where power is distributed relationally between human and non-human actants.<sup>14</sup> These are mere sketches of the effects of different enactments of freshness that sometimes cohere and sometimes conflict in what Mol (1999) describes as a process of ontological politics, which we are keen to explore in future research.

Pursuing the geographical implications of our work, we might also reflect on the similarities and differences between the way freshness is enacted in the UK and Portugal. Given the differences between the agri-food sectors in the two countries (with much higher consumption of fish in Portugal, for example, and much greater per capita consumption of chicken in the UK), we uncovered surprisingly few differences in how freshness was enacted between Portugal and the UK. There were more differences by sector than by place, with greater significance attached to the freshness of fish in both countries than to meat (where quality and taste figure more prominently). Combining sectoral and geographical differences, it is possible to identify minor variations in the way different ontologies are enacted, such as the prominence of locality in fish consumption in Portugal, where fish can be bought as soon as it arrives on shore, acquired directly from those who fished it from the sea a few hours ago. We also observed some differences in the conviviality of shopping in Portugal and the UK (as noted in the discussion of José and Raquel, above). But these are relatively minor variations between the two countries and the cross-country comparison revealed more evidence of convergence than divergence, as might be expected from the increasingly globalised character of contemporary agri-food systems and increasing conformity in quality standards and conventions (Goodman & Watts, 1997; Ponte & Gibbon, 2005).

Our research contributes to the growing body of work on the critical geographies of food laying the theoretical and empirical foundations for new work that focuses on the qualities and multiple ontologies of food. In doing so, we demonstrate the value of a material-semiotic approach that is willing to depart from what is effectively representational and semi-otic analysis (cf. Goodman, 2004).

Future research might focus on the way different enactments of freshness – or other qualities (such as convenience, provenance or ethical standards, as indicated through Fair Trade and other certification schemes) – configure consumers and producers in specific ways in relation to the market and with regard to wider debates about the health and sustainability of contemporary agri-food systems. Our work therefore has potential significance for policy and practice as well as academic value in theoretical terms.

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## DATA ACCESSIBILITY

Subject to participant consent and commercial confidentiality, the data underpinning our paper will be offered to the UK Data Service on completion of the project (November 2018). Standard access restrictions apply.

## ENDNOTES

- <sup>1</sup> For an introduction to the “qualities of food” literature, see Callon et al. (2002), Murdoch et al. (2000) and Harvey et al. (2004).
- <sup>2</sup> Useful comparisons can be drawn with De Laet and Mol's (2000) work on the Zimbabwean bush-pump in which they argue that this fluid technology is enrolled in creating a community of users, building the nation and shaping the world around it.
- <sup>3</sup> The project was funded by the ESRC (award number ES/N009649/1).
- <sup>4</sup> For further information on the economic significance of these sectors and recent market trends, see MINTEL (2014, 2015, 2016), INE (2013, 2016) and EUMOFA (2016). On the poultry sector and the role of “cold-chain” technology, see Godley and Williams (2009) and Jackson (2015a). For survey data on consumer attitudes to food in Portugal and the UK, see Eurobarometer (2010) and Schmidt et al. (2016), and for a critical account of Portugal's adherence to the “Mediterranean diet”, see Truninger and Freire (2014).
- <sup>5</sup> On the performative nature of food-tasting, see Miele (2017); on non-verbal assessments of food including “gustatory mms”, see Wiggins (2002); and on the importance of context in assessing everyday tasting practices, see Mann (2015).
- <sup>6</sup> Our Portuguese research also found evidence of “heritage” varieties of tomatoes being reintroduced, based on conversations with old producers and the search for varieties that matched consumers' sense of nostalgia.
- <sup>7</sup> Note that “*frescura*” and the related word “*fresco*” translate as both “fresh(ness)” and “cold(ness)”.
- <sup>8</sup> Roughly translated, the text reads: “100% freshness guaranteed. If you are not satisfied, your money will be refunded. Fish: Our fresh fish is transported at the ideal temperature, between 0 and 4°C. That's why it arrives in our stores so fresh, at dawn. Bread: Made with the art and knowledge of those who actually put their hands in the dough and then brought to you, day after day, the most delicious bread. Meat: Our meat is strictly selected, and that's why our butchery is so fresh, and our meat tastes so good. Vegetables: Freshness just picked, we are demanding by nature, even with what comes from nature”.
- <sup>9</sup> All participants are referred to by pseudonyms.
- <sup>10</sup> In our interviews with consumers, “quality” encapsulated many things, including freshness, and “freshness” was understood as a quality of food.
- <sup>11</sup> We are aware that authenticity has a vexed history in relation to food, particularly in the context of “ethnic” food and “exotic” cuisine. See, for example, the discussion of “food adventurers” by Heldke (2003) or Zukin's (2008) account of “consuming authenticity” which traces the politically contentious move from difference to exclusion.
- <sup>12</sup> On the perceived qualities of “mucky carrots”, see Eden et al. (2008).
- <sup>13</sup> We also had long discussions about the “freshness” of Portugal's national dish, *bacalhau* (salted cod), on which see Sobral and Rodrigues (2013).
- <sup>14</sup> Producers and other (human and non-human) agents are also mobilised, shaped and influenced by the enactment of freshness.

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