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European and German Food Legislation Facing Uncommon Foodstuffs

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In Europe, uncommon foodstuff (UFS, i.e., traditional foods from specific European regions and uncommon ethnic foods from non-EU countries) have been contributing to a diversification of the food supply. E-commerce and specialized retail shops are the main sources for UFS. This article discusses the legal bases for UFS introduction and evaluation. By means of 35 representative UFS, this article analyses the possibilities of trade and veterinary inspection of these products in Germany, comparing European Union and national food legislation with the many idiosyncrasies the UFS presents. Conservatory legislation bans the trade with endangered species (primates, cetaceans, songbirds), but for many other species, this is a complex matter that may ban only subpopulations from trade. Although introduction of legal UFS is regulated (yet complicated), the lack of appropriate definitions, intra-European trade harmonization, and of sufficient scientific knowledge hampers a satisfactory evaluation of many UFSs, for example, reptile meat or terrestrial insects. In these cases, official inspection would only be very basic.

Keywords Food trade, exotic foodstuff, ethnic foodstuff, protection of species, foodborne diseases, public health

INTRODUCTION

With the world population growing rapidly, food production and distribution are of vital importance, not only to provide nutrition but also to avoid conflicts related with malnutrition and starvation (de Haan et al., 1997). For most inhabitants of the European Union (EU), the scope has moved away from satisfying substantial demands toward the luxury of choosing the food under cultural and personal preferences. These preferences have undergone fundamental changes as a wider array of products has been offered (Hopkins and Freeman, 1999).

On one hand, the choice of different foodstuffs has increased in the traditional distribution channels like (super)markets and grocery stores; the last decades were characterized by the introduction of formerly exotic and, thus, expensive products, that is, kiwifruit (*Actinidia deliciosa*), mango (*Mangifera indica*),

ostrich (*Struthio camelus*), and helmeted guineafowl (*Numidia meleagris*) meat to a general public.

On the other hand, retail shops specialized in ethnic food (mostly Asian and African products) have also been emerging, initially as a response to the culinary needs of, for example, the immigrant workers who entered several European countries from the 1960s onward, and fugitives and asylum seekers from non-EU countries (NEUC), which is why the term “diaspora foodstuff” was also coined. These needs originate either out of reminiscence or from religious needs; in fact, food trade and catering are the most important economic niches that Turks (referring here to native Turks and German born of Turkish origin) residing in Germany occupy (Sinan, 2000). However, these specialized retail shops (SRSs) are now also frequented by Europeans who wish to add to their customary diet, a phenomenon also observed in North America (Connor, 1994).

Then, e-commerce has also reached the food market; among others, this business has become increasingly attractive to small-scale enterprises that either produce traditional European foods on a home-made basis or trade foreign products. This may be achieved via Internet stores, via virtual/Internet auction

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platforms, or a combination of both (Morath and Doluschitz, 2002).

Specifically, in Germany, some other factors also contributed to this development, for example, as follows:

- increasing wealth due to an increasing gross domestic product
- more awareness of uncommon foods due to increased traveling activities and globalization (e.g., tropical fruit, crustacean and fish species)
- increased information about (supposed) nutritional and/or curative properties of uncommon foodstuffs (e.g., noni [*Morinda citrifolia*] or kumyss)
- rediscovery of foodstuffs that played a role in human nutrition in Germany centuries ago (e.g., beechnut [*Fagus sylvatica*], spelt [*Triticum spelta*], or colostrum)
- diversification of gastronomy considering European, 3PC, ethnic, and religion-dominated cuisines.

The trade with uncommon foodstuff (UFS) can mean significant economical benefits. Prices for swiftlets' nests may surpass US \$ 300 per 30 g (Hopkins and Freeman, 1999). Between 1998 and 2002, the United States imported approximately 5000 tons of amphibian and 25 tons of reptile meat, and exported 5 tons of amphibian and 200 tons of reptile meat (Schlaepfer et al., 2005). The case of songbirds, traditionally consumed in, for example, Italy and Malta, however, shows that despite rigid legislation, a highly organized criminal activity persists, which is estimated to be worth approximately €10 million per year (Papp, 2008; TRAFFIC, 2009).

So, Europeans are experiencing a vast diversification of both foodstuffs and distribution channels. Although this may seem an advantage, this diversification may also pose a problem to official veterinary food control and consumers alike. In fact, e-commerce is harder to control than traditional distribution channels. UFSs, regardless of how they were purchased, may also pose some practical problems, for example, which parameters are important to guarantee the safety of crocodile meat or whether a Japanese persimmon fruit (*Diospyros kaki*) can be eaten with or without peeling it (Giandolfi and Guidi, 2008). To assure this, all persons involved in the food chain need to be informed adequately. Reliable data on uncommon foods, however, may be scarce, obtained only with difficulty, or be frankly inexistent.

With the European Food Safety Authority (EFSA) and the European food legislation acts, the EU has intended to craft an appropriate system to cope with modern demands of food security for the entire EU. National regulations have been adapted to harmonize with it and focus now on the food idiosyncrasies of every EU country not contemplated by the EU, which however play a role for the domestic market, for example, the consumption of attested (raw) milk in Germany. However, the question arises if and how this set of regulations is able to cope with these "food trade fringe groups."

The present article intends to answer this question by matching existing EU and national legislation with a selection of UFSs. In this process, the first obstacle is a clear definition of

UFS, which will be dealt with in the following section. This selection (Table 1) comprises UFS categories considering their zoological taxonomy. This material is analyzed regarding the following questions:

- Can a given UFS be traded legally?
- Are there any legal bases to evaluate it regarding food safety?

As will be seen, any official veterinary control measure is applicable only when the foodstuff it is aimed at fits into defined food categories. Thus, one major issue in the present article is that of definitions and how they may apply to this list of UFSs.

DEFINITIONS

Etymologically, the English word *food* derives from a Germanic root **fod*—which in turn derives from the Proto-Indo-European **PA-* (or **PI-*), meaning "to tend, keep, pasture, to protect, to guard, to feed." This feeding concept appears in many other Indo-European languages, for example, in Spanish, where *alimento* derives from a corresponding Latin root. However, the corresponding modern German term *Lebensmittel* translates into "appliance for living." In turn, Mandarin Chinese, the most common language on earth, refers to "food" as 食物 (*shíwù*), that is, "objects to eat," a definition used also by other (even non-Asiatic) people, for example, the Aztecs (*tlacualli*), meaning just the same.

Besides the mere word in a given language, there are many different definitions for food and specific foodstuffs; when evaluating words of law, it is vital to consider the scope a given regulation is intended for, because definitions tend to vary from one regulation to the other.

On one hand, the Codex Alimentarius defines "food" as "... any substance, whether processed, semi-processed, or raw, which is intended for human consumption, and includes drink, chewing gum, and any substance which has been used in the manufacture, preparation, or treatment of 'food' but does not include cosmetics or tobacco or substances used only as drugs," but has put this definition to discussion (Hasslberger, 2004). On the other hand, "food" is referred to as "(1) articles used for food or drink for man or other animals, (2) chewing gum, and (3) articles used for components of any such article" in section 201 (f) of the US Federal Food, Drug, and Cosmetic Act.

The Regulation (Reg [CE]) 178/2002 provides the broadest definition for "food", that is, "any substance, whether processed, partially processed, or unprocessed, intended to be, or reasonably expected to be ingested by humans" (chapter 1, article 2). The decisive term in this definition is "reasonably" and the way it is interpreted; most European Christians will find the consumption of pork reasonable, whereas European Muslims and Jews will not. Most Europeans will not consider insects as a food, as opposed to hundreds of entomophagous tribes and people outside the EU. Even within EU, the definitions of "reasonable" vary considerably, as only 4.4% of British consumers approve horse meat consumption, whereas 23.1% of German consumers do (Nagasaki, 1994). Something similar happens in

Table 1 A selection of uncommon foodstuffs (Fiedler 1990, 2007; Hopkins and Freeman, 1999; Pople and Grigg, 1999; Mickleburgh et al. 2009; Warkentin et al. 2010)

Foodstuff category	Taxa related to the foodstuff category*
Domestic dogs and cats	<i>Canis lupus familiaris</i> , <i>Felis silvestris catus</i>
Domestic rodents	Domesticated species and those being domesticated, e.g. paca (<i>Agouti paca</i>), agoutis (<i>Dasyprocta</i> spp.), giant African rat (<i>Cricetomys gambianus</i>), guinea pig (<i>Cavia porcellus</i>), rats (<i>Rattus</i> spp.), capybara (<i>Hydrochaeris hydrochaeris</i>), coypu (<i>Myocastor coypus</i>), and grasscutters (<i>Thryonomys</i> spp.)
Non-domestic rodents	Beaver (<i>Castor fiber</i>), porcupines (<i>Hystrix africaeaustralis</i>), marmots (<i>Marmota</i> spp.), springhares (<i>Pedetes capensis</i>), and gray squirrel (<i>Sciurus carolinensis</i>)
Chiropterans	Flying foxes (<i>Eidolon</i> spp. and <i>Pteropus</i> spp.) and free-tailed bats (<i>Tadarida</i> spp.)
Primates	Red colobus species (<i>Piliocolobus</i> spp.)
Bovines	Impala (<i>Aepyceros melampus</i>), springbok (<i>Antidorcas marsupialis</i>), bison (<i>Bison bison</i>), yak (<i>Bos grunniens</i>), water buffalo (<i>Bubalus bubalis</i>), wildebeests (<i>Connochaetes</i> spp.), blesbuck (<i>Damaliscus dorcas phillipsi</i>), oryx (<i>Oryx gazella</i>), eland (<i>Taurotragus oryx</i>), and kudu (<i>Tragelaphus imberbis</i> , <i>T. strepsiceros</i>)
Cervids	Red deer (<i>Cervus elaphus</i> spp.), fallow deer (<i>Dama dama</i>), and reindeer (<i>Rangifer tarandus</i>)
Dromedary	<i>Camelus dromedarius</i>
Dairy products from non-EU countries	Products from domestic and non-domestic species alike
Colostrum	Products from domestic and non-domestic species alike
Plains zebra	<i>Equus quagga</i>
Kangaroos	Grey kangaroos (<i>Macropus giganteus</i> , <i>M. fuliginosus</i>), whiptail wallaby (<i>M. parryi</i>), common wallaroo (<i>M. robustus</i>), Bennett's wallaby (<i>M. rufogriseus</i>), red kangaroo (<i>M. rufus</i>), and Tasmanian pademelon (<i>Thylogale billardieri</i>)
Cetaceans	Rorquals (<i>Balaenoptera</i> spp.), sperm whale (<i>Physeter catodon</i>)
Meat products of non-EU countries	Products from domestic and non-domestic species alike
Organs of domestic mammals	Products from domestic and non-domestic species alike
Ratites	Ostrich (<i>Struthio camelus</i>)
Songbirds	European and South-East Asian <i>Passeriformes</i>
Pigeons	Rock pigeon (<i>Columbia livia</i>) and wood pigeon (<i>C. palumbus</i>)
Swiftlets' nests	Edible-nest swiftlet (<i>Aerodramus fuciphagus</i>) and black-nest swiftlet (<i>A. maximus</i>)
Non-chicken eggs	Domestic ducks and geese, quail (<i>Coturnix coturnix</i>), gulls (<i>Larus</i> spp.), and lapwing (<i>Vanellus vanellus</i>)
Balut	Nearly-developed duck or chicken embryos in their egg shells
Crocodilians	Freshwater crocodile (<i>Crocodylus johnstoni</i>), Nile crocodile (<i>C. niloticus</i>), and saltwater crocodile (<i>C. porosus</i>)
Snakes	Rattlesnakes (<i>Crotalus</i> spp.) and Burmese python (<i>Python molurus bivittatus</i>)
Lizards	Black iguanas (<i>Ctenosaura</i> spp.), green iguana (<i>Iguana iguana</i>), and ocellated lizard (<i>Timon lepidus</i>)
Terrapins	European pond terrapin (<i>Emys orbicularis</i>), diamondback terrapin (<i>Malaclemys terrapin</i>), and Chinese soft-shelled turtle (<i>Pelodiscus sinensis</i>)
Marine turtles	Green turtle (<i>Chelonia mydas</i>)
Amphibians	Axolotls (<i>Ambystoma</i> spp.), crab-eating frog (<i>Fejervarya cancrivora</i>), giant Javan frog (<i>Limnonectes macrodon</i>), and American bullfrog (<i>Rana catesbeiana</i>)
Sharks	e.g. dogfishes (<i>Squaliformes</i> spp.), smoothhounds (<i>Mustelus</i> spp.), catsharks (<i>Scyliorhinidae</i> spp.), makos (<i>Isurus</i> spp.), porbeagle (<i>Lamna nasus</i>), basking shark (<i>Cetorhinus maximus</i>)
Fugu puffer fish	Tetraodontid fish of the genera <i>Takifugu</i> , <i>Lagocephalus</i> , and <i>Spheroides</i>
Arachnids	Tarantula (<i>Theraphosidae</i> spp.) and scorpion (<i>Heterometrus</i> spp.)
Crustaceans	Chinese mitten crab (<i>Eriocheir sinensis</i>), blue crab (<i>Callinectes sapidus</i>), flower crab (<i>Portunus pelagicus</i>), mud crab (<i>Scylla serrata</i>), and rice field crabs (<i>Somanniathelphusa</i> spp.)
Insects	Termites (<i>Isoptera</i>), grasshoppers (<i>Acrididae</i>), crickets (<i>Gryllidae</i>), shield bugs (<i>Pentatomidae</i>), giant water bugs (<i>Belostomatidae</i>), grubs (<i>Scarabeidae</i>), moth caterpillars (<i>Saturniidae</i>), ant (<i>Formicidae</i>), bee (<i>Apidae</i>) and wasp (<i>Vespidae</i>) eggs, larvae and pupae
Earthworms	<i>Eisenia foetida</i> and <i>Lumbricus terrestris</i>
Snails	Giant African snails (<i>Achatina</i> spp.), common whelk (<i>Buccinum undatum</i>), abalones (<i>Haliotis</i> spp.), escargots (<i>Helix</i> spp., <i>Iberus gualtieranus alonensis</i> , <i>Otala punctata</i>), periwinkles (<i>Littorina</i> spp.), rock snails (<i>Muricidae</i> spp.), conchs (<i>Strombus</i> spp.)
Jellyfish	<i>Rhopilema esculentum</i> and <i>Stomolophus meleagris</i>

* = In fact, the foodstuff categories would, in some cases, include many more species, but selection was done to the typical representatives of a given category, and analysis data in the subsequent tables refers exclusively to the array of taxa presented in this table.

Reg (CE) 1774/2002 that deals with “products of animal origin not suitable for human consumption.” Among others, it also refers to “pet animals” that are “normally” nourished but not consumed by humans. Once again, “normally” depends on the point of view, as rats are consumed by certain Indian castes and West African people, Guinea pigs by the Quechua and Ay-

mara, budgerigars by Australian aboriginals, and dogs and cats by many non-Western people, some of them on a regular basis (Fiedler, 1990; Hopkins and Freeman, 1999).

Annex 1 of Reg (CE) 853/2004 contains definitions that are referred to in other, but not in all, related European acts. The same is true for the categories mentioned in other regulations, for

example, 2073/2005. Two problems arise: (1) these definitions may not apply to all UFS, and (2) one and the same product may be considered in different ways according to the definition in specific regulations.

Finally, Reg (CE) 258/97 was designed for modern food technology issues dealing with the so-called “novel food,” a category sometimes used to denominate some of the items discussed in the present paper (Table 1). However, in the current version of the regulation, it applies solely to molecularly modified foods, to microorganisms (including fungi and algae), food ingredients isolated from animals, and to foodstuff treated in new manners that significantly change structure or composition (article 1, 2. c to f), that is, to none of the products listed here. Although index 3 of that article empowers the EU to include more foodstuffs in this regulation, only phytosterins in dairy products (among foodstuffs of animal origin) have been accredited so far. Among the foods mentioned in this article, the closest item was a request to accredit antler velvet powder as a food additive, which was rejected (Bundesinstitut für Risikobewertung, 2009a, 2009b). However, the approach provided by this regulation would be suitable to cope with potential hazards associated with the consumption of the goods presented in Table 1. Another way to assess risks is provided by section 409 of the US Federal Food, Drug, and Cosmetic Act which leads to the implementation of the “generally regarded as safe” concept (G.R.A.S.). Yet, section 409 only refers to food additives, that is, the items presented in this work are not considered.

UFSs in the EU lack an official definition. For the present article, the definition of UFS used comprises both “ethnic” (foods originating from 3PC and cultural areas that are little known in the EU, including neozoa) and “traditional” foodstuffs (consumed only regionally within someone’s specific EU country, sometimes using foodstuffs not consumed in other parts of this specific nation), solely of animal origin. Unlike “ethnic,” “traditional” is defined within EU legislation in terms of “food with traditional characteristics” (Reg [CE] 2074/2005, Article 7.1), that is, “. . . foods that, in the Member State in which they are traditionally manufactured, are: (a) recognised historically as traditional products, or (b) manufactured according to codified or registered technical references to the traditional process, or according to traditional production methods, or (c) protected as traditional food products by a Community, national, regional, or local law.”

By definition, game meat would also be UFS. However, game trade, veterinary control, and consumption have been specified extensively in EU and national hunting legislation so that these species are excluded from the present analysis.

SOURCES OF UFS IN EUROPE

Import From Non-EU Countries

Besides economical reasons, food trade is controlled to ensure consumer safety and epidemic control. As UFSs are not

defined officially, the same basic trade regulations apply to them as for regular products.

European Commodities Chart Versus Species Protection

On one hand, the European commodities chart for the foreign trade statistic (European Commission, s.a.¹) provides code numbers applicable to all UFSs listed in Table 1, being the most general code 0410 (“edible products of animal origin, neither specified nor included elsewhere”). This suggests that any foodstuff was tradable.

On the other hand, global Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES), EU (Reg [CE] 338/97 and related) and German conservation legislation (“Law for Protection of Nature and Landscape Conservation” [LProtNatLSC], also known as the “Federal Law for Protection of Nature” [*Bundesnaturschutzgesetz*, *BNatSchG*] and related), clearly protect certain animal taxa, either generically or on a restricted basis, of which some are used as a food resource in 3PC, banning them thus from regular trading.

The legislation for the protection of species is relatively complex as it has been issued on different administrative levels and intends to consider a maximum of idiosyncrasies. Some taxa, for example, cetaceans are generally endangered throughout their range and are therefore protected strongly. Some species may be in danger of extinction in some countries (therefore requiring protection) and have become almost a nuisance in others (being of “least concern” there), for example, the Cattle Egret (*Bubulcus ibis*) that originally was native to the *Old World*, is strictly protected when inhabiting Ghana (Reg [CE] 338/97) but crossed the Atlantic by the 1930s, having invaded North and South America by now and amounting to an estimated world population of 4 to 7 million individuals (ISSG, 2008).

CITES and Reg (CE) 338/97 recognize three levels of protection, that is, one that forbids trade entirely, 1 that subjects trade to strict regulations, and 1 that forbids the trade if a species originates from a certain country. In general, Reg (CE) 338/97 is stricter because it contains more species and puts some taxa under more severe protection, for example, cetaceans. Dir [CE] 92/43 contains, in 2 appendices, those EU species that are protected, that is, whose trade is not permitted. Germany put into practice this directive by considering species listed in appendix IV as “worthy of protection” in its national legislation (see later). Finally, Dir [CE] 79/409 focuses on wild bird species, dividing them into several protection categories into which many songbirds and *Charadriiformes* (whose eggs are traditionally gathered in some areas) fit. In these cases, the degree of protection varies with the species and its country of origin. Both Dir [CE] 79/409 and 92/43 disregard neozoa.

In Germany, national wildlife legislation pertaining UFS is contained in 3 main acts besides LProtNatLSC:

¹<http://exporthelp.europa.eu/thdapp/taxes/MSServlet?languageId=EN&CFID=2351544&CFTOKEN=18741087&jsessionid=6430d450c2c16c441226>; Table 3 lists the product codes of those UFSs that may be imported into the EU without trade restriction.

- “Federal Hunting Law” (FedHuntL; *Bundesjagdgesetz, BJagdG*²),
- “Federal Regulation for the Protection of Game Species” (FedRegProtGSp; *Bundeswildschutzverordnung, BWildSchV*)
- “Regulation for the Protection of Wild Animal and Plant Species” (RegProtWAnPlSp), also known as “Federal Regulation for the Protection of Species” (*Bundesartenschutzverordnung, BArtSchV*)

FedHuntL contains a list of 25 mammal and 16 bird species that are native to Germany. Although hunting and eventually consuming these species is allowed under strict compliance of the FedHuntL, most other native species fall into two LProtNatLSC protection categories that virtually ban or restrict from trade all wild specimens of these species.

UFS Versus Conservatory Legislation

As a general rule, the species concept as handled in these texts comprise all living forms of an animal species, dead specimens, and products crafted from them (LProtNatLSC § 7 [2] 1.), and this would include foodstuff. Yet, the sources of UFS may be many, that is, caught in wild in Germany (e.g., game), other EU member states (e.g., *Timon lepidus* in Spain), or 3PC (e.g., kangaroos in Australia), bred in captivity in Germany (e.g., farmed ostriches), other EU member states (e.g., escargots in France), or 3PC (e.g., crocodiles in Thailand). There is also the possibility to use bred European members of taxa known to be edible, although these given species have not been consumed due to cultural reasons so far (e.g., grasshoppers). Most of the acts center on wild specimens, excluding, thus, bred ones. Article 39 (1) 1. of LProtNatLSC prohibits to kill any wild animal without a rational reason, being “rational” definitely a debatable term.

Table 2 shows that conservation issues do pertain some UFS-providing species. However, the degree varies between strict trade bans (e.g., for cetaceans or primates) and trade limitations (banning some [sub]species, specimens of certain regions, or wild specimens [as opposed to those bred in captivity]). Ostrich meat may be banned from trade if it originates from, for example, wild animals in Senegal but ostriches farmed in EU do no pose a problem. Red deer (*Cervus elaphus*) may be hunted and consumed unless the specimens belong to subspecies *C. elaphus hanglu*, *C. elaphus bactrianus*, and *C. elaphus barbarus*, the latter only if the animal originates from Tunisia. Consumption of the soft-shelled turtle *Pelodiscus sinensis* is also legal, as long as no wild specimens in China were used (Table 2).

To complicate things even further, confronting the list in Table 1 to the Global Invasive Species Database (GISD; ISSG, 2010), several species also are considered invasive and endangering to other species and the environment. Similar as with the conservation legislation, this information might apply only to certain species in certain areas. However, catching for consumption would be one way to manage these invasive species.

This is done with the Chinese mitten crab (*Eriocheir sinensis*), which is caught and consumed mainly by Asian SRS clients in Germany (Grabowski and Klein, 2008). Several UFS-providing species are listed by GISD. Curiously, although there is no trade restriction for some of them (e.g., some rat species, Chinese mitten crabs, and some rock snail species), others are subjected to restriction despite being invasive. This may be due to the taxon level, as in the case of red deer, reindeer, and some termite, ant, bee, and wasp species, there is a match on the taxon level chosen for this investigation but not on inferior levels (genus, species, subspecies) meaning that, for example, some termite species are invasive and some are endangered. However, there are cases where the taxon coincides (*Sciurus carolinensis*, *Columba livia*, *Python molurus bivittatus*, *Iguana iguana*, and *Rana catesbeiana*). Usually the area of invasion differs from that of endangerment, but in Germany, *Sciurus carolinensis* is protected, although it is an invasive species and is competing actively with the native red squirrel (*S. vulgaris*). *S. carolinensis* is consumed by Native Americans (Fiedler, 1990). To combat *Rana catesbeiana*, ponds are dried temporarily in Germany, a task that costs approximately €270,000 per annum.

In terms of conservation, each UFS lot has to be evaluated therefore by carefully observing:

- What species exactly was used for a UFS?
- From which country’s respective area does it originate?
- Was it caught in the wild or bred in captivity?

Other Trade Impediments

The most drastic trade impediment is the embargo. Presently, Germany participates in the embargo imposed on several countries. Regarding UFS, they may, on one hand, be considered as “delicatessen,” which are included in the embargo against North Korea. Furthermore, UFS may be part of the normal goods a given company or person trades. Partial embargos (prohibiting, among others, any trade with goods) are directed toward certain organizations or persons held suspicious for major criminal acts. These partial embargos may be imposed on certain countries, that is, Côte d’Ivoire, Democratic Republic of Congo, Iran, Myanmar, Serbia, Somalia, and Zimbabwe, or on an international organization (in this case, Al-Qaida; BMF, 2010).

Another way to restrict the trade with a certain 3PC is a common EU directive that foodstuff may be imported only from certified trade partners and establishments. These are contained in Commission Decisions (Dec [CE]), e.g., 2006/766/EC and 2006/696/EC. Recently, Reg (CE) 605/2010 was issued that regulates the introduction of milk and dairy products from 3PC. In Germany, the bases to issue a corresponding list are summarized in Annexure 2 of the “Regulation for Food Introduction” (RegFIn; *Lebensmitteleinfuhr-Verordnung*), which is in fact Article 5 of RegImpPreComFHygLeg³. It also points out that for several products (in case of UFS: eggs, egg products, snails, and

²Original names of German legal texts are given in *italic*, whereas English abbreviations are introduced to allow a quick reference. When German abbreviations are commonly used, they are also set in *italic*.

³After the implementation of EU food legislation in 2004, German authorities performed an extensive alignment of German and EU regulations, eliminating all duplicate acts in favor of the European version. Fragments unconsidered by the EU but still relevant

Table 2 Details of conservatory issues regarding the species providing UFS as listed in Table 1

UFS	Species	International (CITES)	European	German			Trade restriction for
				FedHuntL	RegProtGSp	AnimPLSp	
Domestic rodents	<i>Agouti paca</i>	III*	1 C*				a, c
	<i>Dasyprocta</i> spp.	III*	1 C*				b, c
Non-domestic rodents	<i>Castor fiber</i>		3 IV*-V*			s	a, c
	<i>Marmota</i> spp.	III*	1 C*, 3 IV*	+	1*	s*	a, c
	<i>Sciurus carolinensis</i>					b	d
Chiropterans	<i>Pteropus</i> spp.	I*-II	1 A*-B			b	e
	<i>Tadarida</i> spp.					s	e
Primates	<i>Ptilocolobus</i> spp.	I*, II	1 A*-B				e
Bovines	<i>Bison bison</i>	II*	1 B*			b*	a, b
Cervids	<i>Cervus elaphus</i> sspp.	I-III*	1 A*-C*, 3 IV*	+		b*, s*	a, b
	<i>Dama dama</i>	I*	1 A*	+			a, b
	<i>Rangifer tarandus</i>		3 II*				a, b
Cetaceans	<i>Balaenoptera</i> spp.	I*, II	1 A, 3 IV			s	e
	<i>Physeter catodon</i>	I	1 A			s	e
Ratites	<i>Struthio camelus</i>	I*	1 A*			s	a, c
Songbirds	<i>Passeriformes</i> spp.		2 I*, 2 II-B*	+	1*	s*	a-e
Pigeons	<i>Columbia livia</i>		2 II-A	+		s	a, c, d
	<i>C. palumbus</i>		2 II-A, 2 III-A	+	1, 2	b	a, c, d
Non-chicken eggs	<i>Coturnix coturnix</i>		2 II-B	+	1	b	a, c
	<i>Larus</i> spp.	I*	1 A*, 2 I*, 2 II-B*	+	1*	b*	a-e
	<i>Vanellus vanellus</i>		2 II-B			s	a-e
Crocodylians	<i>Crocodylus johnstoni</i>	II	1 B			b	a, c
	<i>C. niloticus</i>	I-II*	1 A*-B			s	a, c
	<i>C. porosus</i>	I-II*	1 A*-B			s	a, c
Snakes	<i>Crotalus</i> spp.	III*	1 B*-C*			b*	a-c
	<i>Python molurus bivittatus</i>	II	1 B				a
Lizards	<i>Iguana iguana</i>	II	1 B			b	a
	<i>Timon lepidus</i>					b	a
Terrapins	<i>Emys orbicularis</i>		3 IV			b	e
Marine turtles	<i>Chelonia mydas</i>	I	1 A, 3 IV			s	e
Amphibians	<i>Ambystoma</i> spp.	II*	1 B*			b*	a-c
	<i>Limnonectes macrodon</i>		1 D				none
	<i>Rana catesbeiana</i>		1 B			b	a
Sharks	<i>Cetorhinus maximus</i>	II	1 B			b	e
Arachnids	<i>Theraphosidae</i> spp.	II*	1 B*			b*	a, b
Insects	<i>Isoptera</i> spp.		3 IV*				a-d
	<i>Acridae</i> spp.		3 IV*			b*, s*	a-d
	<i>Gryllidae</i> spp.		3 IV*			b*, s*	a-d
	<i>Saturniidae</i> spp.		3 V*				a-d
	<i>Formicidae</i> spp.					b*	a, b, d
	<i>Apidae</i> spp.					b	a, b, d
	<i>Vespidae</i> spp.					b*	a, b, d
Snails	<i>Haliothis</i> spp.	III*	1 C*				a-c
	<i>Helix</i> spp.		3 V*			b*	a-d
	<i>Strombus</i> spp.	II*	1 B			b	b

An asterisk (*) means that only certain taxa (genera, species, subspecies) or local populations are considered. Data in column "European" refer to the act (1 = Reg [CE] 338/97, 2 = Dir [CE] 2009/147, 3 = Dir [CE] 92/43) and the appendix the taxon is listed in. Within the RegProtWAnimPLSp column, b refers to species listed in appendixes A and B of Reg (CE) 338/97, and s to those in appendix A only. Both types are also listed in appendix IV of Dir (CE) 92/43. Trade restriction data refers to a = wild specimens, b = some taxa, c = some countries, d = German population, e = complete trade ban (i.e. no trade is allowed).

frogs), there are no EU bases to edit a list of providing establishments. Besides, not all UFS can be matched with the categories of this annexure (Table 3). Certification usually implies that comparable food safety standards have been implemented

in that country and that transport to the EU is safe. Although this is effective for well-known foodstuffs, many of the UFS precisely lack an equivalent product of European origin.

Germany banned the consumption of domestic dogs and cats (§ 13a of RegFIn), whereas, for example, obtention and consumption for personal use is legal in Switzerland if animal welfare issues are considered.

Reg (CE) 206/2009 deals with the introduction of foodstuffs of animal origin from 3PC by individuals and for personal use

for the domestic market were rearranged in the "Regulation for the Implementation of the Prescription of the Community's Food Hygiene Legislation" (RegImplPreComFHg-Leg; Verordnung zur Durchführung von Vorschriften des gemeinschaftlichen Lebensmittelrechts).

Table 3 European and German acts pertaining uncommon foodstuffs which are legally tradable

Foodstuff category	Reg (CE) 853/2004	Reg (CE) 854/2004	Annex 2 RegFIn	Annex 4 RegFIn	Reg (CE) 2073/2005	small amounts	NPCR
Domestic rodents	1.4.	I	11	III		+	
Non-domestic rodents	1.4.	I	11	III		+	
Bovines	1.2.	I	9	III	2.1.1 2.1.3	+	
Cervids	1.5.	I	12	III		+	+
	1.6.	I	11	III		+	+
	1.8.	I	9, 12	III		+	+
Dromedary	1.6.	I	11	III		+	+
Dairy products from non-EU countries	7.2.	IV	1	IV	2.2.1–2.2.8		+
Colostrum	*	IV	1	IV	2.2.1		+
Plains zebra	1.6.	I	9, 11	III	2.1.1 2.1.3	+	+
Kangaroos	1.8.	I	12	III		+	+
Meat products of non-EU countries	1.9.	I		III	2.1.1–2.1.5	+	
	1.10.	I		III		+	
	1.13.		13	III	2.1.6		
	1.15.		13	III	2.1.8		
	7.1.		14, 15	III			
Organs of domestic mammals	1.12.	I		III		+	
	8.1.		16				
Ratites	1.6.	I	9	III		+	+
Pigeons	1.3.	I		III		+	+
	1.5.	I	12	III		+	+
	1.7.	I	12	III		+	+
Swiftlets' nests	8.1.						
Non-chicken eggs	5.1.		2	VI		+	
Balut	1.3.	I	2	III	2.1.5	+	+
	7.3.			VI	2.3.1	+	
Crocodilians	8.1.	I					
Snakes	8.1.						
Lizards	8.1.						
Amphibians*	3.1.	III	3	V		+	+
	6.1.						
	7.4.			V			
	8.1.						
Sharks	3.1.	III	3	V		+	+
	3.5.	III				+	
	7.4.			V			
Arachnids	8.1.						
Crustaceans	3.1.	III	3	V	2.4.1	+	+
	7.4.			V	2.4.1		
Insects*	3.1.	III	3	V		+	+
	7.4.						
	8.1.						
Earthworms	8.1.						
Snails*	6.2.		3	V			
	8.1.	II	3, 8	V			
Jellyfish	3.1.	III	3	V		+	+

“Reg (CE) 853/2004” refers to the food categories defined in its Annex I. “Reg (CE) 854/2004” relates to the Annexes I to IV that contain special veterinary inspection procedures. The code in “Annex 2 RegFIn” refers to the foodstuff number; see the original for details on the documentation required. “Reg (CE) 2073/2005” contains the foodstuff classes applicable to the process hygiene criteria. “Small amounts” refers to the annexes of Articles 1 and 2 of RegImplPreComFHygLeg insofar as a ‘+’ claims that requirements for the delivery of a specific foodstuff exist. A cross in the column “NPCR” refers to a UFS that can be sampled within German residue control.

* = see text.

by means of personal transportation inside the luggage or by mail (being either sent as a gift or a delivery from a previous order). It basically bans the introduction of any kind of meat and dairy product into the EU for personal use, with the exception of fish and other foodstuffs of animal origin, for example, honey.

Some products may be introduced from other European non-EU countries. The debate on definitions, which is common in many laws, is mostly futile in this regulation as it refers to the trade codes which encompass all foodstuffs (including UFS), so that only swiftlets' nests, nonchicken eggs, and crustaceans are

exempted from Reg (CE) 206/2009. Balut, however, is debatable as it contains an embryo (i.e., poultry meat, code 0207), which may be still alive (code 010511) inside an egg (code 0407). If the meat is the primary feature, introduction according to Reg (CE) 206/2009 would be forbidden.

So, when visitors arrive in Europe through German borders, customs check includes, regarding foodstuffs of animal origin, 2 basic questions:

- Does the foodstuff originate from a protected species? If so, the product is confiscated.
- If not, does Reg (CE) 206/2009 apply? If so, the product is also confiscated.

Recently, Reg (CE) 206/2010 was issued dealing with a list of 3PC from which it is possible to introduce fresh meat (Reg [CE] 853/2004 category 1.10.) of all *Equidae* and some “ungulate” taxa, which in this case includes the orders *Artiodactyla*, *Perissodactyla*, and *Proboscidea*, according to the definition that is reused from Dir [CE] 2004/68. However, Reg (CE) 206/2010 only applies to domesticated species and specimens and excludes meat preparations. The definition provided in Commission Directive (Dir [CE]) 2004/68 would include all UFS mentioned under “bovines” and “cervids,” but the limitations expressed by Reg (CE) 206/2010 reduce the bovines considered to yaks, water buffaloes, and possibly elands.

Finally, substances with pharmacological effects also lead to trade bans; moreover, if the 3PC does not have any system to avoid contamination of foodstuffs with them (RegFIn).

Basic Veterinary Inspection

Commercial introduction of foodstuff and its veterinary inspection is mainly regulated by the Reg (CE) 882/2004 and 854/2004 and by Dir [CE] 97/78, whereas the introduction of foreign foodstuffs for noncommercial purposes is specified in the Reg (CE) 206/2009.⁴ In terms of food, they all refer to the definition from Reg (CE) 178/2002. In Germany, RegFIn completes the EU specifications.

As a general rule, only (a) safe foodstuffs from (b) known and certified sources (countries, plants, fishery ships, etc.; see earlier) meeting (c) at least the same requirements as comparable European products may be introduced and traded. If this is not the case, the foodstuffs are withdrawn from the trade (Reg [CE] 882/2004, articles 19–21).

Reg (CE) 178/2002 refers to “unsafe” when a foodstuff is “injurious to health” or “unfit for human consumption,” regarding the “normal conditions of use of the food,” “information provided to the consumer,” probable short- and long-term effects and particular food sensitivities, and whether a food is “unacceptable to human consumption according to its intended

use” (article 14). As to “injurious,” the toxicity of fugu puffer fishes leads to a general ban on the trade with these tetraodontids in the EU (Reg [CE] 853/2004, annex III, section VIII), whereas consumption in Japan and the United States is legal under certain regulations.

However, as all items listed in Table 2 at least meet the most basic definition of “product of animal origin,” they are subjected to the basic veterinary control procedures at the moment they enter EU territory (Dir [CE] 97/78, article 4), that is, as follows:

- documentary check (probably the most practical check);
- identity check (may be difficult, as, e.g., frog legs are usually skinned, and species identification is difficult, even in their countries of origin; Warkentin et al., 2009)
- physical check (also includes sensory tests [i.e., smell, color, consistency, and taste; a rather difficult task in the case of UFS when the true characteristics of quality are unknown], simple physical or chemical tests [cutting, thawing, and cooking], and tests to detect “residues, pathogens, contaminants, evidence of alteration” [no further specification]).

These checks were further detailed in Reg (CE) 854/2004 but only for a subset of selected foodstuffs as defined in Reg (CE) 853/2004⁵ (Table 2). So, foodstuffs not contained in this subset are controlled via Dir [CE] 97/78, being very ambiguous.

On the national level, RegFIn states in its Article 5 that the introduction is only possible when the batch was inspected accordingly at an official customs office. Fishery products and some living marine invertebrate taxa (bivalves, gastropods, echinoderms, and tunicates) from Iceland and Faroese islands are exempted if inspected according to local laws (§ 5[2]1-2) as are certain foods that are altogether (a) no meat products, (b) contain less than 50% of animal foodstuff, (c) are storable at ambient temperature or thermally treated in a way to visibly having denatured the animal foodstuff, (d) are clearly marked for human consumption, (e) contained in sealed packages, and (f) accompanied by corresponding documents (Annexure 1). This may eventually apply to some UFS preparations.

UFS Production Inside Europe

Both ethnic and traditional food may also be produced within the EU. Previous chapters stressed the importance of observing conservatory issues.

For living animals, farming conditions are usually contemplated in Commission Directives, that is, acts that require national regulation to enact. It depends on the member state if this was done for specific animal species. Besides that, member states might also have independent national regulations dealing with farming, harvesting, and processing.

⁴These acts also cover other items, for example, feeds and animal products not destined for human consumption. Dir [CE] 97/78 refers to the acts Dir [CE] 89/662, 90/425, 92/118, and 2002/99, and Reg (CE) 1774/2002 and 854/2004.

⁵As will be seen later, foodstuffs are characterized beyond the Reg (CE) 178/2002 definition in Reg (CE) 853/2004, which in turn is the basis for subsequent legal acts.

Because there is no official definition, UFSs produced within EU borders have to attain to the same requirements as common foodstuffs do (see later).

UFS Made in Germany

German law does not recognize UFS as such and sticks to the EU definitions considered in Reg (CE) 178/2002 and 853/2004. The “Code for Foods, Commodities and Feeds” (CoFComFed; *Lebensmittel-, Bedarfsgegenstände- und Futtermittelgesetzbuch*) is the central act for food safety and refers, in terms of food definition, to Reg (CE) 178/2002. Section 2 deals with foodstuffs; it postulates that foods that injure the consumer (cf. Reg [CE] 178/2002), and/or contain illegal food additives, substances with pharmacological effects, herbicides, and pesticides, (or illegal doses of legal composites and irradiation) cannot be placed on the market. The same is true for products labeled in false pretence and with health claims on them (§ 5 to 12). This also applies to all UFS. Lists of allowed substances are detailed in subsequent regulations. The legislative tools to ensure this goal are specified in Article 13 and contain, among others, veterinary inspections, requirements for manufacture, composition and labelling of foodstuffs, and prohibition of certain products, additives, or procedures. Many different acts derive from the CoFComFed, of which some were abolished with the enactment of the EU hygiene package and the RegImplPreComFHygLeg.

Although UFSs are not defined in any way, a new category of so-called “traditional food” was introduced in the “Food Hygiene Regulation” (FHygReg; *Lebensmittelhygiene-Verordnung*), which is Article 1 of RegImplPreComFHyg; it contains some dairy products, naturally ripened raw sausages, and raw salted meat products. Annex 3 specifies EU (Reg [CE] 853/2004) and German requirements for their manufacture. A connection to UFS is arguable but seems feasible if traditional German products are either manufactured with UFS (e.g., a cheese with yak milk) or 3PC meat and dairy products are made in Germany (e.g., nem chua, a traditional Vietnamese fermented raw sausage).

An interesting concept that is attended in both European and German acts is that of “small amounts of foodstuffs,” for which regulations usually are not as severe as for larger quantities. As most of the UFSs are not sold in large amounts, these regulations could apply to the SRSs that trade them. Annexure 2 of Article 1 and Annexures 1 to 4 of Article 2 RegImplPreComFHygLeg specify the requirements to deliver small amounts of food category that apply to some UFS (Table 3).

Interestingly, both articles are based on the generic Reg (CE) 853/2004 class 8.1., a category that is so all-encompassing that it may be used even for many reptile and invertebrate UFSs. With this, at least the basic hygiene principles must be applied to these little-known products. Still, all specifications refer exclusively to more popular foodstuffs, and so they may be applied only to the more similar UFS, for example, Annexure 5 of Article 2, which contains further specifications made there for the manufacturing and treatment of mammal and poultry meat, minced meat and

meat preparations, meat products, eggs and egg products, and dairy products (including those made with raw milk).

Several other German regulations exist, remnants of the times before the EU hygiene package and adapted to the modern needs. The “Dairy Product Regulation” (*Milcherzeugnis-Verordnung*) defines a series of standard products but also regulates, in its Article 6, “foreign” products (defined as non-German, i.e., EU and 3PC), stating that they may be placed on the market if they were produced in accordance with the legislation of the country of origin, and if the marked differences that may eventually exist to the standard products are clearly specified on the label. However, not all 3PC have a corresponding food legislation that may be consulted whether a UFS was or was not produced accordingly.

Summing up, trade bans exist for the following UFSs:

- chiropterans, primates, cetaceans, songbirds, nonchicken eggs (when taken from the wild), terrapins, and marine turtles
- certain taxa, when caught from wild, and eventually only from certain areas
- UFSs from embargoed countries, persons, or organizations and 3PC/areas not included in corresponding Commission Directives
- fugu puffer fish
- domestic dog and cat meat
- meat and dairy products from 3PC introduced for personal use
- foodstuffs that do not comply with the regulation considered so far (moreover Reg [CE] 882/2004 and connected acts on EU and national level), for example, those contaminated with pharmacological substances (Reg [CE] 37/2010) or originating from countries with no notified HACCP programme to reduce contaminants

So, the following considerations refer to those UFSs that are legally tradable, be it because they enter accompanied by corresponding documents, be it because they were bred in captivity.

VERIFICACION OF UFS FOOD SAFETY

EU Regulation

Those UFSs from Table 1 that may reach the European food market legally are detailed in Table 2. One central issue in official veterinary control procedures is to make sure that the legal regulations they are mentioned in do relate to the product in question, that is, it is a matter of definition.

Reg (CE) 178/2002 defined foodstuffs in a very general way. Some UFSs are hard to define (Table 2):

- Reptile meat does not fit in any of the established categories
- Balut (see earlier)

- Conception of “offal” varies, for example, external pig ears (offal in EU) are a basic component in some sausages in Asia (e.g., nem chua)
- Colostrum is defined as being from third to fifth day after parturition (Reg [CE] 1662/2006), which reflects physiological reality but opens legal discussions

If foods are supposed to be “safe” (Reg [CE] 178/2002), this food safety must be verified via the European food legislation. It was seen that there is a basic set of tests (Dir [CE] 97/78) supplemented by detailed inspections for certain products (Reg [CE] 854/2004). Table 2 shows that these inspections do not apply to all UFSs because they do not fit into the definitions for which a regulation is valid; in fact, annexure I refers to “fresh meat” (category 1.10. in Reg [CE] 853/2004) of traditional domestic mammals and poultry, lagomorphs, farmed game, and wild game, but omits the kangaroo, which would be classified as “large wild game” (1.8.).

In Article 7, Reg (CE) 2074/2005 refers to traditional foodstuffs. Basically, this article enables producers of these foodstuffs to continue with their traditional practice, although this might be contrary to common EU hygiene requirements (some chapters in Annexure II of Reg [CE] 852/2004). However, it does not mention whether quality criteria have also to be adapted.

Reg (CE) 2073/2005 (Reg [CE] 1441/2007) prescribes the microbiological tests foodstuffs must be subjected to; it handles some of the definitions of Reg (CE) 853/2004 but also creates some new ones (ready-to-eat, intended to be eaten cooked, etc.). Still, Table 2 shows that the system does not cover all listed UFSs, specifically many UFS from cold-blooded animals. Besides, the fact that there are prescribed microbiological tests does not mean that the tests cover the relevant pathogens a given UFS might carry.

However, Reg (CE) 2075/2005 explicitly mentions reptiles, observing thus the role of these vertebrates in the life cycle of *Trichinella* spp. In this way, Annexure I, Section IV, Chapter IX of Reg (CE) 854/2004 must also be applied to crocodiles. Methods for the quality assessment of milk and dairy products and for fish and fishery products are specified in Reg (CE) 273/2008 and Reg (CE) 2406/96, respectively, as further elements to ensure the quality control of UFS. Gaps in definitions and monitoring procedures are intended to be filled via national legislations. At least for Germany, swiftlets’ nests, snakes, lizards, amphibians, arachnids, and terrestrial terrapins, insects, and snails are not considered in the current food legislation at all, and there are no national specifications for imported crocodile meat.

German Standards, Guidelines, and Criteria

The previous chapter showed that veterinary inspection of UFS can be a very complex matter in which many different acts on EU and national level have to be considered. Besides act-related inspections, there are a series of parameters that were established by both governmental and nongovernmental instances

that intend to evaluate food safety and composition, regardless of the origin of the product. Having generally originated in Germany before the introduction of the hygiene package, they focus on German foodstuffs, but this part of the discussion will analyze if these standards may also apply to UFS.

The “Official Collection of Methods of Analysis” (MiColAnaMeth; *Amtliche Sammlung von Untersuchungsmethoden*) is the official German standard and derives from Article 64 of CoFComFed. Being so, definitions originate from Reg (CE) 178/2002 including therefore all UFSs. Methods are classified and codified using a similar technique as for trade codes. Next to those methods applicable for all foodstuffs (general methods commencing with “L 00.00” and “L 00.90” for sensory tests), there are specific tests for certain food categories:

- milk and dairy products (L 01.00 to L 04.00), milk-based infant formulae (48.01)
- eggs and egg products (L 05.00)
- meat and meat products of homoeothermic animals (L 06.00 to 08.00)
- fish (L 10.00)
- fishery products (L 11.00)
- crustaceans, molluscs, and other animals including products made of them (12.00)

Definitions mostly coincide with the ones stated in Reg (CE) 853/2004; however, the meat definition of OfColMethAna encompasses all species without making the EU distinctions. In fact, every UFS could be analyzed using official methods. Yet, certain problems arise, as follows:

- Feasibility to perform standard analysis methods on UFS: To give an example, it was seen that chhurpi, a typical Bhutanese yak whey cheese, was so hard that the standard procedure to obtain bacterial counts (i.e., to homogenize with liquid) was impossible to carry out. Instead, chhurpi cubes were drilled-open sterilely and the dust was used for analysis (Grabowski and Klein, 2010).
- Reasonability of standard methods with regard to UFS idiosyncrasies: Methods described in L 12.00 (animals not considered in other methods) focus on injurious substances of marine origin. These would not play any major role in freshwater or terrestrial organisms.
- Inexistence of UFS reference values: The best example is the somatic cell count in milk, which, at bulk tank level, should be less than 400,000/mL in the case of cow milk, but for other species, physiological cell counts remain unknown, let alone commercial benchmarks (Reg [CE] 853/2004).

Another guideline that derived from the CoFComFed is the “German Food Code” (Deutsches Lebensmittelbuch), which contains guidelines for certain foodstuff classes. The guidelines define foodstuffs and refer to their physical properties. Intended as recommendations, they may be considered as legal norms in case of disputes.

Guidelines exist for meat of homeothermic species, fish, crustaceans and molluscs, and for ice creams and slaughtered animals' fat. Eggs, other dairy products, and poikilothermic species are unattended. The guidelines for fish, crustaceans, and molluscs in its present form (June 2010) enlists a series of taxa, among them also expressedly UFSs like the genera *Haliotis*, *Littorina*, *Buccinum*, *Helix*, *Achatina*, and the family *Muricidae*. Currently, this list is debated and a new version is expected in the near future (BMELV, 2010). Regarding meat, all homeothermic species are included so that labelling of UFS meat is possible. By adding the name of species, even meat preparations and products would pose no problem. Regarding ice creams, however, it is prescribed that the milk used for its manufacture must be cow milk as the guidelines refer to a corresponding definition in Reg (CE) 2597/97.

The German Society for Hygiene and Microbiology issues a series of benchmark and critical values regarding certain pathogens in foodstuffs. As with the guidelines, these values have a recommending character. Possible intersections between UFS and these values are as follows:

- deep-frozen products that have to be heated completely before consumption (*Escherichia coli*, coagulase-positive staphylococci [CPS], presumptive *Bacillus cereus*)
- whipped cream (aerobic mesophilic bacterial counts [AMBC], *Enterobacteriaceae*, *E. coli*, salmonellae, CPS, *Pseudomonas* spp., *Listeria monocytogenes*)
- milk-based infant formulae (AMBC, *Enterobacteriaceae* including *E. coli*, *B. cereus*, sulphite-reducing clostridia spores, moulds, CPS, salmonellae, *Listeria monocytogenes*)
- marine fish (AMBC, *Pseudomonas* spp., anaerobic *Enterobacteriaceae*, *E. coli*, salmonellae, *Listeria monocytogenes*, eventually *Vibrio* spp.)
- meat products and minced meat (AMBC, *Enterobacteriaceae*, *E. coli*, CPS, lactococci, yeasts, salmonellae, sulphite-reducing clostridium spores, *Listeria monocytogenes*, *Pseudomonas* spp.)
- ice creams (AMBC, *Enterobacteriaceae*, *E. coli*, CPS, salmonellae, *Listeria monocytogenes*)

So, some UFS apply to these categories, whereas others do not.

Finally, chemical contaminants are surveyed in a risk-orientated manner on a national basis ("National Plan for Residue Control"). Table 3 shows the matches between the monitored categories and the UFSs.

SAFETY HAZARDS OF UFS AND RECOMMENDATIONS FOR OFFICIAL CONTROL AND CONSUMERS

UFSs are as prone to foodborne diseases as well-known foodstuffs are. In addition to the classical food-borne infections (salmonellosis, listeriosis, shigellosis, etc.), however, they may lead to UFS-specific illnesses, for example, anaphylaxis induced by swiftlet's nests (Goh et al., 2000), avitaminosis due to massive ingestion of raw saturniid caterpillars (Adamolekun et al.,

1997), and certain parasitoses that are either not diagnosed on a routine basis or even elude these routine procedures, for example, toxoplasmosis, echinostomiasis (by freshwater or brackish water molluscs, crustaceans, fish, and amphibians; Graczyk and Fried, 1998), paragonimiasis (by freshwater snails and crustaceans; Liu et al., 2008), and several verminoses and pentastomiasis by consuming raw or undercooked fish, amphibian, or reptile meat (Dorny et al., 2009) or cysticercosis by *Taenia serialis* (host: rodent *Cricetomys gambianus*, accidentally also man; Lacasse et al., 2005). Chemicals (pesticides, rodenticides, molluskicides, etc., and even toxic substances used for warfare) may also pose a problem, depending on the area a food is produced and the position of the animal within the food web (Fiedler, 1990; Kim Oanh et al., 1995; Biradar et al., 2007). Although some foods, for example, crustaceans are contemplated within national residue monitoring plans, others (e.g., rodents) are not. Most publications are isolated case reports and there is a need for more comprehensive reviews as done, for example, for reptile products (Magnino et al., 2009).

To reduce these risks, although no official regulation may apply, common sense (by both official control and consumers) should prevail. Thermal treatment (freezing, cooking) is prone to eliminate most microbiological safety risks. Toxins may be eluded by observing the traditional way of handling, preparing, and consuming UFS: Saturniid caterpillars are consumed on a worldwide basis because of their high nutritious value. Most species however are toxic in a raw state. By processing them traditionally (i.e., boiling and then sun-drying them), the toxins are inactivated (Akinlawo et al., 2002). This in turn implies that the European consumer who is usually unaware of these traditions must be informed accordingly and in a verifiable way. Therefore, correct labeling is essential for UFS.

Environmental substances remain the only serious peril to UFS, since not all products are subjected to official residue testing.

Regarding different distribution channels, a recent study (Grabowski and Klein, 2010) showed that UFS sold via Internet (Internet stores or virtual/Internet auction platforms) may or may not meet EU standards. This depended on the product, as commercially produced items were as safe as local products bought in retail shops. However, traditional dairy and meat products and fresh, sliced meat of exotic mammals contained elevated bacterial counts suggesting both spoilage and even the presence of pathogens (salmonellae in kangaroo meat). At SRS level, the only noteworthy problem observed was omitted labeling in shops for African products. However, the relevance of correct labeling and the provision with information that ensures a safe usage of a UFS, even by those not acquainted with traditional preparation methods, was stressed already.

FUTURE

Reg (CE) 258/97 is the first approach to deal with UFSs consumed within EU borders. However, the items listed in Table 1 do not apply to this regulation unless they would, in future,

be included following Article 1 (3). Still, the Commission of the European Communities (2008) presented a proposal for a new “novel food regulation.” In it, “novel food” is defined, next to terms known from Reg (CE) 258/97, as not having “been used for human consumption to a significant degree within the Community before 15 May 1997” (Article 2 [2ai]), but further criteria will be elaborated to decide whether a given foodstuff would fall into this definition (and be treated as stated in the regulation) or not.

In this proposal, “novel food” also applies to “traditional food from a non-EU country” (TF3C), that is, “. . . novel food with a history of food use in a non-EU country, meaning that the food in question has been, and continues to be part of the normal diet for at least one generation in a large part of the population of the country” (Article 3 [2b]).

Basically, the proposal focuses on the implementation of Community lists for novel and traditional foodstuffs. Without being mentioned in these lists, no legal trade would be possible. To feature on this list, foodstuffs may not pose any risk to the consumer, may not mislead the consumer, and—in case it is intended to replace another, well-known foodstuff—may not lessen the nutritional value of the product they would be added to. This reflects the basic principles for food as described in Reg (CE) 178/2002. Trading traditional food from a non-EU country would be authorized once a “history of safe food use” had been provided by the operator and approved by all EU member countries. This “history of safe food use” refers to “safety of food in question is confirmed with compositional data and from experience of use and continued use in the normal diet of a large part of the population of a country” (Article 2 [2c]).

For these novel foods, scientific evidence is just as important as traditional experience. This is prone to create a stable and reliable base for the evaluation of these products. However, definitions remain the important issue; what is “significant degree” or “large part of the population of the country”? On one hand, kangaroo meat is introduced in relatively large quantities from Australia where only 14.5% of the population claim to consume this meat (Ratcliff, 2008), whereas according to FAOSTAT⁶, the EU has not introduced any camel meat, despite more than 16 million Muslims living in the EU, the ritual significance of this meat for them and its regular consumption by nomads and economically weak people that in many Muslim countries pose the majority of the population.

The EFSA reacted accordingly and discussed this topic of definitions seeing it “challenging” to put them into practice (EFSA, 2009). However, the proposal has not yet become a regulation, and further adaptations can be made, especially elaborating on practical implications of history of safe food use in a NEUC. On the other side, new regulations are issued to improve existing acts, for example, Reg (CE) 558/2010 that specifies on nonfiltrating marine molluscs.

CONCLUSION

Two main problems were identified regarding UFS in the EU: the first is the lack of proper definitions for some UFSs, leading to flaws in food legislation making therefore a correct evaluation of the products (or the hazards potentially associated with them) impossible. If no official regulation exists, evaluation should be based on scientific data. However, and this is the second problem associated with UFS, there is little corresponding knowledge, and this implies, on one hand, that it is uncertain whether the classical methods to ensure food safety are sufficient in the case of UFS. On the other hand, the lack of knowledge also means that it is not known whether a given foodstuff poses other specific food-safety risks. Besides that, quality also refers to compositional properties. Without information, the composition of a given product (or charge) is impossible to evaluate. Therefore, considerably more research in this area is recommended.

With UFS, the need for food safety should be attended by many different groups of people. Information is crucial and may be provided by traditional knowledge and scientific evidence likewise. On the basis of this information, a solid legal background on EU level should be established by the EFSA to warrant EU officials to perform useful UFS checks and official testing, adapting to their idiosyncrasies. Finally, the consumer needs to be informed accordingly, keeping (in case of doubt) to traditional preparation techniques, but should not leave common sense and general food-hygiene standards unattended.

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⁶<http://faostat.fao.org/>

- novel foods and amending Regulation (EC) No XXX/XXXX [common procedure]. http://ec.europa.eu/food/biotechnology/novelfood/COM872_novel_food_proposal_en.pdf.
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APPENDIX: Legal Texts

- CITES
- Codex Alimentarius
- European Community Commission Decisions (“Dec [CE]”): 2006/696, 2006/766
- European Community Commission Directives (“Dir [CE]”): 79/409, 89/662, 90/425, 92/43, 92/118, 97/78, 2002/99, 2004/68
- European Community Regulations (“Reg [CE]”): 2406/96, 258/97, 2597/97, 338/97, 178/2002, 1774/2002, 852/2004, 853/2004, 854/2004, 882/2004, 2073/2005, 2074/2005, 2075/2005, 1662/2006, 1441/2007, 273/2008, 206/2009, 37/2010, 206/2010, 558/2010, 605/2010
- US Federal Food, Drug, and Cosmetic Act
- German Acts:

English abbreviation	Translation	German original	German abbreviation
CoFComFed	Code for Foods, Commodities and Feeds	<i>Lebensmittel-, Bedarfsgegenstände- und Futtermittelgesetzbuch</i>	<i>LFGB</i>
DPreG	Dairy Product Regulation	<i>Milcherzeugnis-Verordnung</i>	—/—
FedHuntL	Federal Hunting Law	<i>Bundesjagdgesetz</i>	<i>BJagdG</i>
FHygReg	Food Hygiene Regulation	<i>Lebensmittelhygiene-Verordnung</i>	<i>LMHV</i>
GerFC	German Food Code	<i>Deutsches Lebensmittelbuch</i>	
LProtNatLSC	Law for Protection of Nature and Landscape Conservation (Federal Law for Protection of Nature)	<i>Bundesnaturschutz gesetz</i>	<i>BNatSchG</i>
OfColMethAna	Official Collection of Methods of Analysis	<i>Amtliche Sammlung von Untersuchungsmethoden</i>	
RegFIIn	Regulation for Food Introduction	<i>Lebensmitteleinfuhr-Verordnung</i>	<i>LMEV</i>
RegImplPreComF HygLeg	Regulation for the Implementation of the Prescription of the Community’s Food Hygiene Legislation	<i>Verordnung zur Durchführung von Vorschriften des gemeinschaftlichen Lebensmittelrechts</i>	—/—