French and European grading systems for bovine carcasses and beef: current situation and research in progress

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法国和欧洲肉牛胴体和牛肉
评分系统:现状与展望

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尽管欧洲肉牛行业做了很多努力和尝试,但是牛肉风味的不稳定性仍然是一个问题。1980年,在欧盟委员会的监管下,最初建立了一个肉牛胴体分级方案,即用以描述肉牛胴体结构和皮下脂肪含量的EUROP系统。随后,法国开发了质量标签体系,其目的是由官方对地域性特定牛肉产品进行认定,同时打击那些非法使用著名地理标识的案例,以促进农业的可持续发展。这些体系目前已经演变成欧洲现存的三个方案,即著名的原产地标识保护计划(PDO计划)、地理标志保护计划(PGI)和传统特产保障计划(TSG),均用来保护和宣传优质农产品和食品的品牌名称。此外,法国还开发了一个名为"红色标签"的质量标签系统,与其他标准类型的相关产品相比,具有该标签的产品则被认为是在某类特性上具备更高的质量水平。与产品形象密切相关的牛肉风味和质量是决定其标签的主要因素。然而,在法国牛肉市场原产地标签或质量标签的相对重要性非常低。因此,目前仍然没有面向大众市场的牛肉分级方案。由于缺乏这样一个方案,较优秀的法国零售商选择简化胴体切块名称,包括对它们潜在的食用品质进行描述(建立在胴体切块相关的信息上)和烹饪方式的建议。

另一方面,澳大利亚已经建立了澳大利亚肉类品质标准(MSA)体系,这是一个全面的质量管理系统,旨在为消费者精确描述牛肉的食用品质。MSA系统不仅考虑胴体切块和其烹饪方式,而且也考虑排酸时间、胴体重、脂肪含量、动物的成熟度和其他的相关参数,所有这些参考因素都包括在一个数学模型中,该模型针对不同的分割部位与不同的烹饪方法进行组合,达到准确预测牛肉食用品质的目的(Meat Research, 2015, 29, 43 – 49)。MSA模型可以用来巩固与牛肉产品原产地或传统牛肉产品相关的品牌或现有的标签。法国科学和工业部门已经认识到这种科学认证体系的优点,但它可能不能与法国肉牛产业实现无缝对接。这是由法国肉牛产业和市场的复杂性(动物种类多)及和现存的质量标签体系产生竞争所致(Hocquette et al., 2011, Anim. Prod. Sci., 51, 30 – 36)。MSA系统已经在不同的国家进行了测试,包括亚洲、美洲、非洲以及一些欧洲国家比如法国(Legrand et al., 2013 Animal, 7, 524 – 529)、爱尔兰共和国(Allen et al., 2014 Viandes & Prod. Carnés, VPC – 2015 – 31 – 1 – 5)、北爱尔兰(Farmer et al., 2009, ICoMST meeting)和波兰(Guzek et al., 2015 Pak. J. Agric. Sci., in press)。将欧洲的相关数据收集到一个统一的数据库之后,现有的MSA模型的适用性—"能否描述欧洲肉牛现状和消费者情况"的能力被测试。尽管在模型修正参数方面有些细微的差异,但是在使用MSA体系对牛肉品质进行评估时,所有国家的消费者的评估结果相差无几。此后,在爱尔兰和波兰进行的一系列相关的实验证实了该模型对于电刺激、悬挂方法、去骨时间和排酸时间(Allen et al., 2014)以及热处理(Guzek et al., 2015)效果的稳定性。然而,更广泛的数据分析已经确定了一些动物因素可能需要进行调整,以使MSA模型适用于欧洲牛肉行业。例如,青年公牛的食用品质得分比小公牛或母牛(后备母牛和奶牛)得分低,因此,MSA模型对青年公牛的预测得分精确度较低。同样,通过16个肌肉部位中6个肌肉部位的测定,MSA模型可以观察到不同品种类型之间的差异性(Bonny et al., 2015, EAAP meeting)。而澳大利亚常用骨化程度评分来评估成熟度,这对具有较高成熟度的胴体而言明显是不合适的,比如在法国,淘汰母牛通常被用作牛肉生产(Bonny et al., 2015, ICoMST meeting)。最后,虽然

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EUROP 体系可能足以描述胴体品质，但是它不能在消费者层面预测烹饪牛肉的食用品质（Bonny et al., 2013, EAAP meeting）。总之，MSA 模型至少可以用于部分欧洲国家的肉牛产业，以将不同的分割部位分类为不同的食用品质等级，并减少评价食用品质的变量的数量。

（翻译：胡玉梅）

French and European Grading Systems for Bovine Carcasses and Beef: Current Situation and Future Perspective

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Despite efforts by the European beef industry, variability in beef palatability is still an issue. Initially, a regulated beef carcass classification scheme was established in the 1980s under the authority of the European Commission: the EUROP system which describes conformation and external fat level of carcasses. Subsequently, quality labels have been developed in France to officially recognize local and typical products with the aim to fight against the usurpations of famous geographical names and to enhance the sustainable development of agriculture. This has evolved such that three EU schemes now exist, known as PDO (protected designation of origin), PGI (protected geographical indication) and TSG (traditional speciality guaranteed), all promoting and protecting the names of quality agricultural products and foodstuffs. France has also developed a quality label called "Label rouge", certifying that the product possesses a specific set of characteristics establishing a level of quality higher than that of a similar product of the standard type. Palatability and quality associated with the image of the products are important for this label. However, the relative importance of labels of origin or quality is very low in the French beef market. Therefore, there is still no beef grading scheme for the mass market. In the absence of such a scheme, select French retailers have chosen to simplify cut names, included a description of their potential eating quality(based on knowledge on the cut) and a recommendation of their culinary destination.

On the other hand, Australia has developed the Meat Standards Australia (MSA) system, which is a Total Quality Management System aimed at delivering an accurate description of beef eating quality to the consumer. The MSA system takes into account not only the cut, its culinary destination but also ageing time, carcass weight and fatness, animal maturity and other parameters, all included in a mathematical model to accurately predict beef eating quality for each cut x cooking method combination (Meat Research, 2015, 29, 43 – 49). The MSA model can be used to underpin brands or existing labels associated to origin or tradition. The French scientific and industry sectors have recognized the strengths of this scientifically proven system, however it may not be seamlessly adaptable to the French beef industry. This is due to the complexity of the French beef industry and market (with a great number of animal types) and due to competition from pre – existing quality labels (Hocquette et al., 2011, Anim. Prod. Sci., 51, 30 – 36). The MSA system has been tested in various countries from Asia, America, and Africa, as well as a number of European countries includingFrance (Legrand et al., 2013 Animal, 7, 524 – 529), the Irish Republic (Allen, et al., 2014 Viandes & Prod. Carnés, VPC – 2015 – 31 – 1 – 5), Northern Ireland (Farmer et al., 2009, ICoMST meeting) andPoland (Guzek et al., 2015 Pak. J. Agric. Sci., in press). After compiling the European data into one combined database, the suitability of the existing MSA

model has been tested for its ability to represent European cattle and consumers. Despite some minor differences in the model adjustment, consumers provide similar responses in all countries for the assessment of beef quality with the MSA system. A series of additional experiments conducted in Ireland and Poland demonstrated the robustness of the model in accounting for the effects of electrical stimulation, hanging method, time of boning and ageing time (Allen, *et al.*, 2014), as well as thermal treatment (Guzek, *et al.*, 2015). However, analysis of the broader dataset has identified some animal factors that may need to be adjusted to suit the European beef industry. For example, young bulls had lower eating quality scores than steers or females (heifers and cows), thus the MSA model predicted the scores for bulls with less accuracy. Similarly, for 6 out of the 16 muscles tested, some differences were observed between breed types have been observed (Bonny, *et al.*, 2015, EAAP meeting). Whereas in Australia the usual maturity estimate is ossification score, it appears inadequate for carcasses with more advanced maturity such as cull cows commonly used for beef production in France (Bonny, *et al.*, 2015, ICoMST meeting). Finally, while the EUROP system may adequately describe carcass characteristics, it does not predict eating quality of cooked beef at the consumer level (Bonny, *et al.*, 2013, EAAP meeting). In conclusion, the MSA model could be used by the beef industry at least in some European counties to sort cuts into eating quality classes and reduce the amount of variation in eating quality.