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Appellations of origin and local customs: the need for innovation

"Le Rhum de la Martinique": an example of AOC recognition of a product in an industrialised context

Roncin François¹

¹ Institut National des Appellations d'Origine, Angers, France

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**Appellations of origin and local customs :
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**"Le Rhum de la Martinique" :
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in an industrialised context**

RONCIN François

Institut National des Appellations d'Origine, Angers, France

Abstract

The regulations concerning products of "Appellation d'Origine Contrôlée" (AOC) refer to accepted and established local customs. By "customs" is meant the collection of practices, which have been validated by past-experience and by the participants engaged in the establishment of AOC production. In France, the law confers on the Institut National des Appellations d'Origine (INAO) the responsibility of determining which of these customs deserve definition under AOC regulations of each product.

The accession of Martinique rum to the AOC system illustrates how the transition from a standardised industrial process to a one that takes full account of the intrinsic qualities and variability of raw materials requires continual innovation in :

- The organisation of relations among producers of the raw material, sugar cane, and between these producers and other participants in rum production ;*
- The quality and quantity control procedures used at each stage of the production process ;*
- The methods of farming, manufacture and commercialisation.*

For AOC products, tradition is based on the search for quality and character and incorporates yearly variation of the characteristics of raw materials. Within this framework, continual innovation transforms into an asset the same variation that is considered a handicap in standard industrial processes. To do so requires scientific research that runs against the technological trend that seeks liberation from the uncertainty associated with agricultural production. The innovations resulting from this research reflect a strategy that values the initial, variable qualities of raw materials at each stage of the manufacturing process, rather than one that corrects or compensates for the properties of standardised raw materials.

Keywords : AOC, appellation control and protection, innovation, local customs and traditions, product specificity, quality

INTRODUCTION

The designation of agri-food products by a geographical name goes back to ancient times. It was naturally convenient to use the geographical name to designate a well-known product that was not found elsewhere. This geographical name most often corresponded to the place of production but in certain cases it could indicate the principal place of commercialisation, the particular characteristics of the product remaining tied to its geographical origin.

Nowadays, within the framework of AOC¹ protection, this geographical designation is justified only in so far as certain properties of the products are directly related to not only to the natural environment (e.g. climatic or geological factors) but also to human factors (e.g. customs or practices). The word *terroir* designates the system of interactions between human and natural factors of a particular area or territory.

In France, AOC protection is recognised in a decree that the *Institut National des Appellations d'Origine* (INAO) has the exclusive right of proposing. This protection is extended to the European Union under the framework of EEC Council Regulation n° 2081/92. French law stipulates that recognition of AOC status is a prerequisite for registration of a product as Protected Designations of Origin (PDO) defined in the above-mentioned Council Regulation.

One might think from the relatively unchangeable characteristics of the natural environment that the techniques involved in the development of a product character would themselves be unchanging. This also appears to be indicated by French legislation under the law of 8th May 1919, concerning appellations of origin. The initial version of this law stipulates the necessity of accepted and established local customs in justifying the right of a product to an appellation of origin.

As a result, French law acknowledged the need to define those practices which bestow on products the particular qualities justifying protection of their appellation. If it is relatively easy to understand the meaning of accepted customs, the reference to established local customs deserves further comment.

The question is to know to what extent the reference to established local customs fixes the techniques used for

AOC products and to what extent innovation is possible. The question has already been debated (Capus J., 1947, p. 65), and French laws (of the 30th of July 1935 and 2nd of July 1990) confer on the national committees of INAO responsibility for evaluating the utility of any innovations, for specifying their field of application and for proposing their regulation to the Government.

One should not understand established local customs to mean "intangible" practices which would render production as fit only for a museum. "Local" customs are specific to the defined region of production and cannot be easily transferred elsewhere. They are "established" because they exert a constant influence and cannot be made use of in an opportunistic or occasional manner. These customs are by their nature subject to change, as the reputation of AOC products requires continual adaptation to the context of the times (e.g. technological and economical) as does the pursuit of product quality and character.

This adaptation and pursuit of quality is a collective activity of a region and locally established customs should not be confused with individual skills or knowledge. Jurisprudence and the decisions of INAO have recognised the collective nature of established local customs which should be observable throughout the defined region. They are not techniques left solely to the initiative of individual producers or manufacturers.

Recent analysis of these elements (Sylvander B. and Marty F., 1998) distinguished between territorial and sector-related factors in the regulation of AOC products. The field of innovation in local customs can therefore be explored not only in respect to innovative technologies but equally in respect to innovations in the social organisation of production. The producers engaged in such activity have to collectively decide on changes to their practices so as to justify the ties between the natural environment, production conditions, properties of the raw material and the specific character of the recognised AOC product.

It appears therefore that the determination of production conditions is based partly on selection from among production traditions of those practices which undeniably guarantee the specific character of AOC products, and partly on a framework allowing future change. As a result, this process is an opportunity for major innovation within an industry during its application for AOC status.

The example of *Rhum de la Martinique* has been chosen to illustrate different aspects of innovation in AOC production. The rum sector is highly industrialised in France and therefore this product appears, theoretically, to be open to major technological innovation. The strategy of the rum industry has been to free itself from the qualitative and quantitative constraints of a raw material supply that is restricted to the French West Indies and too dependent on climatic uncertainties.

This strategy is in complete opposition to that required by AOC production which must take full account of the variability of raw materials of defined origin so that the final product displays qualities due to the natural milieu of production.

This present article will analyse the innovations resulting from the process of defining AOC production conditions, using the example of the accession of Martinique rum to the AOC system during the years 1989 to 1996. These innovations are compared with more classic processes of transformation for an industry considered to follow a "standardised" or "Cartesian model" (Marty F., 1998). This model is most frequently encountered in agri-food industries, where innovation mostly operates internally, on marginal processes, rather than by changes to the overall organisation involving modification before and after production (Nicholas F. and Hy M., 1999). We will show that both these types of innovation are necessary for AOC production in order to respect established local customs.

1. GENERAL CONTEXT BEFORE AOC RECOGNITION

1.1. Rums and *Rhum agricole de la Martinique*

Rhum agricole de la Martinique, to give it, is full AOC name, benefits from an Appellation of Origin status in France since 1921, through application of the law of 6th of May 1919, as indeed do all rums from the French West Indies. This particular Appellation of Origin lies outside of INAO's responsibility. The expression *rum agricole* (which could be translated as "farm rum") should not be understood as meaning exclusively farm production. Rather it refers to the well-known custom, dating back to the 19th century, of producing rum from fresh sugar cane juice instead of from sugar refinery molasses.

A State Council decree of the 22nd of April 1988 updated regulations and distinguished between "traditional" rums, derived from sugar refinery molasses, and *rhums*

agricoles. "Agricultural rums" from the French Caribbean (*rum agricole*) benefit in Europe from protection under the framework of Council regulation (EEC) n° 1576/89 of the 29th of May 1989 which relates to the designation and appearance of alcoholic spirits. Rum does not fall into the PDO product category because, like all alcoholic spirits, it is not listed among the agricultural and food products in Appendix II of the Treaty of Rome. The annual production of *rum agricole* on Martinique is of the order of 55,000 hectolitres of pure alcohol. It therefore represents an important product on the national market (nearly 80% of the *rum agricole* market). But it is a marginal one compared to the industrial production of alcohol from sugar cane which ranks as the world's highest producer of ethanol (several million hectolitres of pure alcohol although it is difficult to establish precise figures). The land on Martinique used for the production of *rum agricole* is about 1800 hectares and it is the second most important agricultural product of the island after bananas. This production, however, is marginal compared to the land used for sugar cane in other French Overseas Departments (over 20 000 hectares).

1.2. Distinctive features of the rum sector on Martinique and other Overseas Departments. The state of the industry before the process of AOC recognition

Before 1996, the producers of the raw material, sugar cane, used for Martinique rum received remuneration according to gross tonnage without any consideration of qualitative parameters. Negotiation of prices and deals between producers and industrial buyers of sugar cane were open to scrutiny from public authorities by means of a framework of interprofessional organisations. Remuneration was calculated on a global basis, no matter what the end-use (sugar or *rum agricole*), according to a seasonal guide price. No account was taken of criteria influencing rum quality despite such criteria existing for sugar (the level and purity of sugar).

In each French Overseas Department (DOM), this interprofessional structure was based on a distillers' union, CODERUM (Committee for the defence and organisation of the rum market) and a technical body CTCS (Cane Sugar Technical Committee). Coordination at a national level was assured by the federation FENARUM.

The technical body CTCS was financed by an indirect tax and contributed to the technical supervision of production through quantitative studies.

In the middle of the 1980s, the production of *rhum agricole* on Martinique had long been greater than rum production from molasses, but it had difficulty in distinguishing itself from the production of other Overseas Departments (DOM).

Although the State Council decree of 22nd of April 1988 requires each island to use sugar cane from French Overseas Departments, no detail is given about sugar cane properties or production conditions. Sugar cane is therefore restricted to coming from the Caribbean Islands, but not from cane possessing particular characteristics.

The only qualitative regulation mentioned in the decree is that the level of non-alcohol found in rums must be at least 225 grams per hectolitre of pure alcohol. This regulation is nonetheless an important constraint because it imposes an expensive distillation method using the traditional distillation columns installed in the DOM mostly during the First World War. This suits D.O.M. industries because they do not need to invest in technology used for the distillation of light rums.

The decree also contains regulations concerning the ageing of rums and these undeniably impose strict rules in this regard (ageing in small casks for a minimum of three years on the site of production).

In response to high labour costs, the planters and industrialists mechanised harvesting. As a result, sugar cane became increasingly soiled and problems of bacterial contamination during the storing of cane increased and altered fermentation. These problems were only resolved by purifying the fermentation medium by chemical acidification of the cane juice and by resorting to the addition of massive amounts of fermentation yeasts (DE MINAC 1988). These crude methods eliminate any distinctive properties of the sugar cane, rendering it uniform. It is therefore especially by means of different distillation columns assembled that each company could claim distinctive qualities which distinguished it from competitors. These technologies correct for failings introduced by the innovations reducing production costs (*i.e.* mass production methods), but do not take into consideration the quality of the raw material used. While this allowed Martinique *rhum agricole* to attain an undeniable level of quality, as well as certain notoriety in the domestic market, it nonetheless depended on a static and protected market.

Since 1921, the DOM rum industry benefited from special provisions drawn-up to meet the shortfall in demand that it had known ever since the high level of production that developed during the First World War. A special fiscal regulation accorded to each company a market quota with a significant reduction of the duty paid on alcohol. This allowed each company to survive on its allotted quota. The only area of competition which existed between companies was the buying of production quotas whenever an enterprise was sold. From 1921 to 1990, the number of distilleries on Martinique fell by over a hundred. Nine remain in production of which five belong to major national spirit companies.

During this period, distilleries which better controlled their sugar cane supply by reducing production costs and maintaining technical quality (*i.e.* a reduction in mechanical and fermentation losses) best survived over the years and managed to develop the reputation of their production. These distilleries were relatively isolated and avoided competition with sugar refineries for their sugar cane supply. The nine surviving distilleries are widely distributed across the whole island, each having its own particular area of supply. Only three of them share their cane supply with the sugar industry established in the central part of the island. As a general rule, supply is assured by large plantations and five distilleries receive over 80% of their supply from their own plantations.

In such a context, the monitoring of companies by the CTCS was limited to comparing their levels of transforming a given tonnage of sugar cane into rum and to evaluating the causes of mechanical or fermentation loss. Concerns about quality or product character have not been priorities in the work of the centre (CTCS annual activity reports, 1987 onwards).

2. THE ESTABLISHMENT OF AN AOC SYSTEM ON MARTINIQUE

2.1. Requirements for AOC entry : the procedures used

In 1976, the INAO National Committee gave its approval in principal to AOC recognition in the light of the reputation of the product and its ties to a particular *terroir*². This preliminary approval, however, was conditional on the realisation of a number of objectives which were only achieved some twenty years later with

publication of the decree recognising AOC *rhum agricole de Martinique* on the 5th of November 1996.

First of all, it was necessary to resolve the legislative and regulatory problems so that INAO could assume responsibility for AOC recognition of rum, and this was only resolved in 1989. An initial condition of INAO was that all the island's rum producers (both of *rhum agricole* and molasses rum) had to agree on restricting use of the appellation "Martinique" to *rhum agricole*.

In regards to the production conditions, it was necessary to convince the National Committee that the particular quality of Martinique rum did indeed derive from characteristics of the natural environment and that the full potential of the raw material (the cane used for *rhum agricole* and no longer sugar cane in general) was realised by the use of all necessary production techniques (needing a suitable technical and regulatory framework). This essential AOC requirement entails the traceability of materials, from the cane field to the end of distillation. The particular qualities due to the natural milieu can thereby be revealed in each rum.

So as to achieve publication of the decree recognising this AOC, the National Committee designated, from among its members, a commission of inquiry with the task of studying the demand.

The commission of inquiry was composed of grape growing professionals who knew little about rum production. Lacking technical preconceptions, they led the applicants to reconsider their ways of production so as to respond better to the questions posed and to select "good practices". As in the case of all AOC, the applicants were required to assign more value to the inherent variability of their raw materials rather than attempting to reduce this variability to a minimum. Producers were asked to present a "charter of quality" for each step of the production process, requiring debate amongst cane producers, distillers, technical experts and traders.

It was therefore the Martinique producers themselves who proposed their own regulation, the commission of inquiry ensuring that their reasoning was well-founded by arranging public inquiries, expert consultations and open debate. Such an approach is defined by INAO procedures and validated by constant jurisprudence of the State Council.

2.2. Innovation in the organisation of producers : from a union in defence of producers to a union in defence of the product

The AOC application was initially formulated by a small group of people who realised that their production techniques and quality needed to evolve if the agricultural production essential to their regions was to be maintained. This would require developing genuine, high-quality production. They quickly understood the necessity of reaching out beyond the domestic market and that to do this they would have to be willing to abandon the advantages tied to protection of this market and confront competition by means of qualitative advantages in an open market.

The application for AOC recognition was firstly presented by the distiller's union, CODERUM. In 1989, the initial legislation being in order, the union was asked to reflect on their regulation and define quality objectives. CTCS was also asked to carry out initial work, in particular on developing sensorial analyses and on certain technical issues (CTCS 1990 and 1991).

The arrival of the INAO inquiry commission in 1992 was the occasion for the producers on Martinique to create a union in defence of *rhum agricole*, independent from CODERUM and bringing together on equal terms the sugar cane producers and distillers. This new union had the aim of defending a product and not a profession. It carried out important work not only on the quality of rums but also on developing research into sugar cane farming and into the effect on product quality and character of each step in the production chain (CTCS 1994 - 1, 2, 3). New perspectives were also opened up by rum research carried out by the *Institut National de la Recherche Agronomique* (Fahrasmane L. et al. 1996).

2.3. The selection of local customs for codification

The surveying and progressive selection of local customs by the Martinique *rhum agricole* union allowed regulation of production conditions.

2.3.1. Use of the sensorial analysis of rums to organise debate on local customs : the notions of "specificity" and "typicité"

With production registered to a defined region, professionals considered how to reorganise their production.

Throughout this reflection, practices were selected in order to optimise the quality and unique character of the final product. Optimisation was verified through discussion initiated by tasting juries which brought together producers and experts over a period of several years.

The aim of sensorial analysis was not to define a standardised aromatic profile, but rather to confirm the agreement reached among producers on the range of qualities that they considered as part of their "gustatory heritage", and which reflected the customs of their *terroir*. This firstly required the formation and training of tasting juries from volunteers among Martinique producers, once oenologists had been recruited by the union (CTCS 1991).

Initially it appeared that it would be difficult to achieve an agreement between juries of local producers and those from mainland France, due to the different sensorial references of each jury member.

More extensive analyses were carried out of volatile compounds as well as of results on the same rum samples evaluated by tasting juries on both the mainland and on Martinique. These analyses demonstrated that the sensory evaluation criteria were different due to the different cultural backgrounds of the juries. Nevertheless, it was also found that the overall product classifications reached by the tasting juries were identical and were also coherent with chemical analyses (Roncin F., 1996).

This indicates that a product can be appreciated in a given cultural context, according to the appropriate criteria, without this preventing its appreciation from following the same order of value using alternative criteria in an entirely different context. Respect of local production criteria is in this case an opportunity for cultural exchange rather than a barrier.

This study also shows that it is not possible to establish any simple correlation between the chemical characteristics (or "specificity") of spirits and the coherent organoleptic classification (or "*typicité*"³) obtained from different tasting juries. Rather, these findings confirm that the *typicité* of a product must be distinguished from the specificity (Salette J., 1997).

Specificity concerns those characteristics that are measurable or can be quantified and thereby made the

object of norms. The *typicité* designates those characteristics that can be discerned and identified but which cannot be measured or quantified. Etymologically, the word "*typicité*" derives from a Greek word signifying "imprint" or "impression". It is therefore local producers who are capable of collectively identifying those products that have their origin (and not simply their provenance) in their respective *terroirs* by comparing their sensorial observations with the "impression" formed by their collective memory. It has been shown that the tasting juries formed on Martinique were capable of correctly identifying Martinique rum from among other products. Their sensorial background predisposed them to discern differences that consumers would not notice (Fabian T. et al, 1998).

From this careful diagnosis, the producers were able to agree on the value of different techniques and customs, for their respective locality, which best expressed the *typicité* of their products.

The codification of local customs was therefore a constant interplay between observation and decision-making, with sensorial analysis adopted as the means of confirmation.

The notion of *typicité* runs contrary to any notion of uniformity and resists normalisation. The different nuances and variation resulting from differences in the natural environment and skills of individual producers can hence be expressed even among products of the same type. Given the number of different parameters involved, the natural environment can never be considered uniform. If certain criteria can be used to establish the limits of an AOC production zone, other criteria allow products to be differentiated according to individual producers. Five different mesoclimatic zones, influencing the maturation of cane sugar and thereby the type of rum produced in each zone, were defined for the Martinique. Notwithstanding this distinction, the rums from these five sectors could be distinguished by tasting juries from other rums of neighbouring islands and could therefore be recognised as having the same particular character *i.e.* *typicité*.

Innovations resulting from the methodical and collective use of sensorial assessments did not stop with accession to the AOC system in 1996. The production agreement allows INAO to organise control juries which continue to provoke further innovation.

2.3.2. Consideration of the qualities of the raw material in rum manufacture, distillation and ageing

In the opinion of the inquiry commission and according to AOC principal, the sugar cane used for rum production potentially possesses particular qualities relating to its *terroir*. The fermentation processes used should allow the expression of these qualities in the final product. The codification of pressing, fermentation and final production techniques is therefore justified only in so far as it permits the expression of the specific qualities relating to the *terroir* and hence the unique character of the product.

The producers, however, did not immediately seek to adopt such an approach. Initially they sought to "correct" faults and "normalise" processes in order to meet qualitative objectives. Only gradually did they realise that it was not a question of normalising the processes of manufacture so as to produce a product of superior quality according to pre-defined criteria. One must not misunderstand the significance of regulating such practices, the purpose of which is to ensure that the variability of the raw material is reflected by the range in quality of the final product.

It is useful to draw attention to two issues that were the subject of major debate within different sectors of the profession.

■ Duration of fermentation

So as to avoid bacterial contamination, which is always liable to develop in the tropics, the profession initially sought to impose a very short fermentation time and the immediate use of "wines" after fermentation, with a maximum interval of 72 hours proposed. Rapid fermentation requires suitable levels of available oxygen and nitrogen for the yeast biomass, which can be met only by the addition of exogenous sources of these elements.

However, the large biomass necessary for the rapid fermentation of all of the sugar leads to a very poor yield. Over 23 grams of sugar is needed to produce 10 centilitres of pure alcohol at 20°C compared to 17 grams needed in slow fermentation.

Moreover, fermentation yields improved as soon as high quality sugar cane was used and the fermentation time could be prolonged without risk of bacterial attack by adopting good standards of hygiene. The alcohol

obtained was also more aromatic and, for the first time, appreciable differences were found according to the batch of sugar cane used. A new conception of fermentation management began to develop, which integrated more and more factors depending on the exact origin of the sugar cane, an origin defined at the level of the crop parcel (Roncin F. et al, 1998).

■ Distillation column

It was decided that INAO should define the type of distillation columns and approve their assembly after an opinion from an expert-committee. This process led to major debate among distillers about their respective skills and know-how. Many column assemblies and adaptations were found to be useless or even deleterious for the expression of rum character. It was also confirmed that distillation, even without a purifying or rectifying column, could produce high-quality rums if the fermentation potential of sugar-cane had been respected and the potential quality of fermentation wines preserved. The simplification rather than standardisation of distillery columns became an essential condition for preserving the particular character of rums. In doing so, the producers also imposed on themselves greater rigour in the operation of distillations and a major training scheme was therefore set up for the operators.

2.3.3. Quality criteria of the raw material

To ensure the quality of pressing and fermentation processes requires the harvesting of well-ripened canes, possessing few leaves and neither soiled nor modified by bacterial attack. The sugar content (measured in Brix) and acidity (measured by pH) were found to be the most pertinent criteria accounting for the value of canes and minimum values were specified in the regulations. These criteria, which are evaluated for each batch delivered to the distillery, quickly drove harvesters to reorganise their practices and to select appropriate sugar cane parcels so as to meet the requirements. This effort to improve quality was further encouraged by a graded system of payment according to the quality of cane delivered to the distillery.

2.3.4. Suitability of sugar cane varieties and soil quality

As has been previously mentioned, the selection of sugar cane varieties for the production of rum, rather

than sugar, posed an entirely new dilemma. A new research program was undertaken so as to re-evaluate old varieties, reputed for their aroma but which had been abandoned in favour of more productive varieties. While waiting for the results of this work, due to be completed ten years from now, a restrictive list of varieties was drawn up, maximum yields imposed and chemical treatments prohibited, so as to optimise quality and eliminate any risk of chemical residues in the rum.

2.3.5. The importance of soil quality and climate

The unusual climate and volcanic soils of Martinique are unique among the islands of the French West Indies. One might recall that Martinique, discovered by Christopher Columbus, was named the "island of flowers" (or Madininia) by the people of the Caribbean as it appeared so distinct from the other Caribbean islands. It is the site of exceptional volcanic activity (of type *Peléen*), which contributes to the unusual geology and soil structure. The definition of production zones effectively eliminated those areas of Martinique where the climate was not favourable to sugar cane production or where the soils were no different from those found on other Caribbean islands.

3. INNOVATIONS REQUIRED BY A STRATEGY RESPECTING PRODUCT ORIGIN

3.1. Research and technological innovation

Throughout the process of defining local customs and practices, scientific and technical questions as well as organisational problems were encountered at each stage of processing.

Table 1 presents a synthesis of the type of innovations and research instigated on the different steps of sugar cane processing used to produce Martinique rum. One can see the importance of scientific and technical work on the characterisation of *terroirs* suitable for growing sugar cane, the genetic selection of varieties and the optimisation of farming techniques. The new orientation of research through collaboration with professionals and other organisations outside Martinique is itself a major innovation.

The optimisation of farming techniques has a dual objective. It not only seeks to optimise practices to meet a set quality of production, but also to ensure the sustainability of farming and to protect environments

suitable for sugar cane production from any type of degradation. The principal threat comes from overly intensive farming practices or those that upset the natural balance of the environment.

It was for these reasons that limits were placed on yields and irrigation methods. In contrast, less easily controlled techniques such as the use of fertilisers could not be regulated, but yield limits nonetheless reduce any benefit in excessive use. Agricultural research was therefore entirely re-oriented towards controlling both quantity and quality, and ensuring sustainability.

Table 2 shows that the relatively strict regulatory framework controlling sugar processing prevents resorting to the addition of preservatives during fermentation or to product purification during distillation. This framework severely restricts the field for technological innovations to compensate for deficiencies in the raw material or to correct for product defaults, at least in so far as one understands innovation as the discovery of new products. Such a strategy abandons corrective technology and reinforces an approach which prevents the risk of defaults and conserves the original qualities of the raw materials used.

In order to minimise stopgap measures during fermentation and distillation, it is necessary to undertake considerable research on controlling fermentations by a better understanding of microbial ecology. The automation of fermentation monitoring and control opens up new possibilities for the future. Similar possibilities apply to the distillation process where errors are no longer permissible. An entirely new approach to personnel training and qualifications will develop, as the automation of processes rapidly becomes indispensable.

We turn at last to the final major issue that needs mention. From the moment companies realise that differences in the quality of certain batches of rum are due to the origin of the sugar cane, they can begin to differentiate rum production through the composition of ageing batches according to the sugar cane used. Companies can establish lasting practices that differentiate among their product range through a knowledge and control of land that has interesting properties. Accesses to new methods of characterising the land are therefore needed to better define the relationships between the area of production and product differentiation.

A new blending strategy will also arise from the establishment of a range of products, differentiated

according to their production origin and ties to their *terroir*, and this will allow the development of new marketing strategies.

At this level of our analysis, each company has to develop innovations incorporating differences in the raw material and viewing them as an asset rather than a handicap. This presumes further innovation upstream and downstream of individual companies. This type of innovation, which differentiates raw materials before processing, is not unique to Martinique rum. Similar developments can currently be seen within the AOC cheese industry in France. For the cheese AOC *Comté*, a correlation has been established between the *typicité* of cheeses and the specificity of pastures tied to the processing site (Monnet J.Cl. and Gaiffe M., 1998). Numerous cases, from the Northern Alps as well as the Massif Central, have demonstrated similar relationships between milk characteristics, methods of manufacture and the unique characteristics of cheeses (Coulon J.B. et al, 1996). Once again, respect for local customs, that account for differences in the raw materials (pasture and milk), stimulates new research subjects with the potential for further innovation.

3.2. Organisational changes resulting from the respect of local AOC practices

The work that has been described had major consequences on the organisation of participants in the Martinique rum sector. To begin with, the producers of sugar cane have no longer to maximise the gross tonnage that they supply for processing. They are directly responsible for upholding local practices that they themselves defined and to meet quality obligations with respect to distillers. Payment is no longer related simply to gross tonnage, but adjusted according to quality criteria. Sugar cane is no longer stored and transported in an indiscriminate manner, but conveyed rapidly in batches of the same quality and separated according to variety. The process of making all the participants in production responsible for quality is clearly visible in such changes.

These new relations are respectful of tradition but also adapted to the modern world. Sugar cane which had formerly been harvested under laborious conditions and loaded onto the backs of mules, but which was

nonetheless unsoiled and with clean leaves, must now be harvested using sophisticated techniques. These techniques allow the harvesters to be in permanent contact with cane processors to ensure that the needs of the factory and the rate of harvesting are in perfect harmony. Any delay results in degradation in the quality of microbiological processes. Telecommunications and the use of powerful computer systems allow not only the coordination of operations but also differentiation between batches of sugar cane according to their maturity and growth site. The number of management and quality parameters has increased and the relationships between processors and sugar cane producers have changed.

Further downstream, at the level of processing, much investment has also been seen. This is not only to ensure that the chosen production conditions are met but also equally to demonstrate to visitors (and potential consumers) the quality of work within the company. In a space of five years, the quality of work in the sugar cane fields, the cleanliness of processing and the pride taken in such work has been reflected by the quality of the welcome for visitors to companies on Martinique.

Lastly, each participant contributes, according to his role, to the creation of a product of defined quality yet subject to the uncertainties of nature. To a certain degree, they are led to continually adapt their practices to the whims of nature. Their creativity is thereby stimulated and, with further assistance from sensorial analyses, their work becomes to a certain extent an art. This innovative approach is very similar to that adopted by oenology in respect to the ties to the *terroir* required in AOC viticulture (Ribereau-Gayon J., 1989).

All companies have recruited more staff with higher technical qualifications and major professional training programs have been launched. Visits to distilleries have become a feature of tourism on Martinique. Rum has lost its status as an industrialised alcoholic drink and is instead valued as an integral part of the cultural identity of a small island surrounded by ocean.

Innovations are therefore largely organisational in nature and allow companies to adapt to uncertainties, both upstream and downstream of production, by ensuring that differences due to environmental variation are properly accounted for.

Table 1 : Raw materials used "AOC Martinique" : customs and innovations

	Definition of a geographical area (GA)		Production conditions of raw materials	Monitoring of raw materials used	Production of musts Method of fermentation	Characteristics of product used
	Total GA	Selection of parcels				
Codified local customs	Using the following criteria : Climatic geological and soil (elimination of non-specific land)	Classified varieties and soils	- Farming regulations - Yield limit - Harvest quality criteria (brix and pH)	Traceability from the crop parcel to the fermentation vat	- Pure fresh cane juice, no additives except for a few authorised substances - Conditions and duration of fermentation controlled	Analytical norms of the "wine" used
Type of innovations and research required of the sector	- Characterisation of suitable "terroirs" - Survey of customs and practices	- Optimisation of production according to the respective soils and vegetation - Selection and protection of traditional varieties and characterisation of their flavour potential	- Prediction of ripeness, juice nitrogen levels and flavour potential - Optimisation of techniques to achieve chosen aims	- Logistics of transportation and storage - Management of inputs according to different quality criteria	- Hygiene and microbiological ecology - Must clarification technique and control of fermentations	- Normalisation of analyses - Predictive tools for blending

Table 2 - Product Manufacture "AOC Martinique" : customs and innovations

	Geographical area of processing	Definition of the method and processes of manufacture	Period of manufacture	Product Characterisation	Definition of ageing conditions
Codified local customs	Identical to the area of production	- A single type of column allowed, construction and use of stills subject to approval by an commission of experts - No possible purification or rectification	Distillation during the harvest period Storage and subsequent recuperation of "wines" prohibited	- Defined analytical norms - Sensorial analysis by a tasting jury	Definition of old rums and on-site ageing conditions
Resulting innovations and research	Blending technique of distilled product depends on the origin of the cane sugar used	- Simplification of distillation columns - Codification by scientific experts of distillation practices - Prediction of potential defaults (microdistillation)	- Microbial ecology : control of the flavour quality of the fresh fermented juice (wines) used	- Normalisation of analytical control methods - Training of tasters and organising automatic-controls	- Logistics of ageing and a blending strategy for ageing batches that takes account of the origin of distilled batches - Influence of the cellar environment

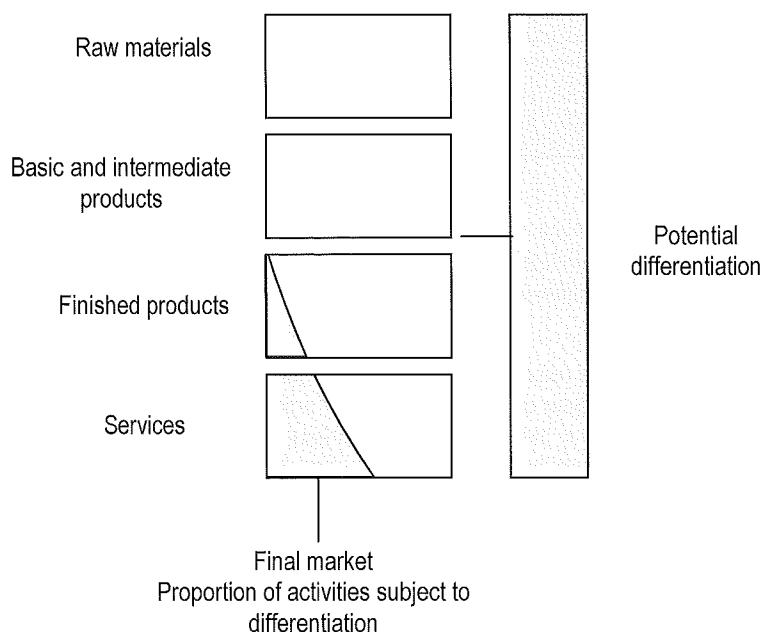
3.3. Changes to industrial strategies of production

Each of the interdependent steps of AOC production, from the raw materials to labelling, is essential to the final product. This can be summarised with the help of figures 1 and 2 taken from C. Chautard and M. Zarka (1986). Before accession to the AOC system, each company sought to differentiate its production from that of its competitors and to interest consumers only in the final stage of production, corresponding to the finished product and related services such as brand marketing, packaging etc. The raw material of production and intermediate products were considered commonplace and brought at the lowest price. It was only by means of particular technology and "production secrets" that a company could display any degree of innovation. Such

a state of affairs is frequently found in standardised industries.

Innovations in such a case allow either a reduction in the costs of manufacture, by using less and less expensive raw materials of an increasingly uniform quality or differentiation of products by the use of additives or other compounds specific to each company. Such differentiation can be a source of added value or a means of resisting competition. This type of company organisation is typical for the agri-food industry in which science is often seen as a means of imitating authentic products that have become too expensive. Such an approach corresponds with the establishment of a regulatory system that allows consumers to remain ignorant of the processes used and that protects the markets of the very products it regulates.

Figure 1 : Company strategy before accession to the AOC system
Special demand and stakes of companies involved at different stages in the production chain
 (after Chautard and Zarka, 1986)



The production strategy that is dictated by AOC rules (figure 2) is different for each step of the manufacturing process. Product differentiation is established at each processing step and transmitted to the following stage. The potential range of differentiated products is therefore greater than that resulting from a standardised

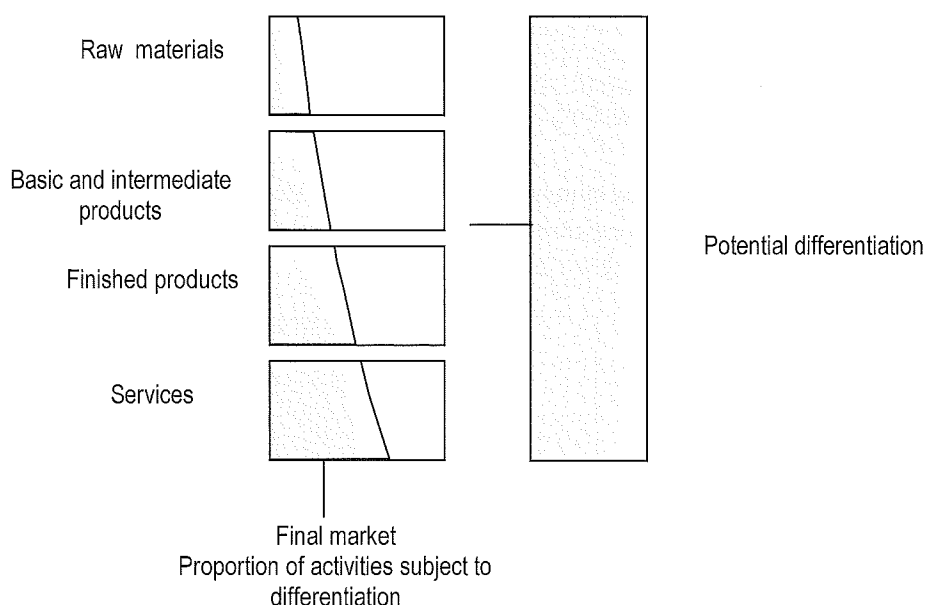
industry strategy. If the market responds favourably, greater differentiation will stimulate demand. But such an organisation of production also requires an entirely different growth strategy for both the marketing and processing industries. A real revolution is needed among manufacturers and distributors as well as in the

regulatory framework of agricultural food products, so as to eliminate market protection.

From such a perspective, companies have no longer to envisage growth as needing the standardisation of their raw material supply. Rather, it is above all the production of sugar cane in environments appropriate to each

distillery that is needed to realise the full value of their products. New relations develop between farmers and rum manufacturers, each ensuring the value of the final product by reorganising their practices to adapt to differences in the raw materials. This new, more flexible, strategy allows better satisfaction of consumer demands.

Figure 2 : Strategy of companies adjusting all stages of production
Specialised demand and stakes of companies involved at different stages in the production chain
 (After Chautard and Zarka, 1986)



Experience has confirmed that such a reorganisation of manufacturing strategy and the revealing of production processes is often of great interest to the consumer. The importance of imaginary and cultural factors should not be neglected in favour of purely nutritional considerations. This has been demonstrated by many psychologists and sociologists and has been brilliantly developed by C. Fischler (1990).

It is clear that the essential quality (in French *qualité substantielle*) which determines whether a consumer buys a product does not uniquely concern the nutritional value or standard criteria determined by "scientific" measurements. Industries following a standardised model do not easily take account of non-material aspects of quality, which lie beyond their field of competency. Products are only differentiated at the final

production stage, as shown by figure 1, and the role of prior processing remains unclear. In contrast, industries following an "open" model can more fully account for human demands which relate food to other cultural and social aspects of life. These demands require that a respect for the environment be reflected in the entire manufacturing process. This new attitude is outlined in figure 2 and implies the constant adaptation of the whole production chain to the variability of raw materials and to changes in the general context. One thereby sees more clearly the interest in the earlier distinction made between these two industrial models (Marty F., 1998).

Disagreements among commercial partners may arise concerning the interpretation of what we have referred to as "essential" quality and which in French is known

as *qualité substantielle*. Etymologically, the word *substantielle* derives from the Latin meaning "that which remains underneath". In philosophy, the word refers to the essence of things which is beyond appearances. Hence in French law, the *qualité subs-tantielle* of a food product covers all the material and non-material factors which influence consumer purchase of the product. For industries of a standardised model, it is tempting to reduce this quality to those characteristics that can be chemically measured. It is in their interest to conserve food regulations which neither requiring the mention of product origin nor the production processes.

A respect for etymology has considerable importance in respect to consumers and the opening up of markets. The essential identity (as in *identité substantielle*) of agricultural and food products should designate identical products not only in terms of their material properties but equally in respect to factors such as manufacturing processes and the emotional and cultural image of the product held by consumers. The field for innovation is therefore vast for AOC agricultural food products, as all these factors are included in the conception of product identity.

It is remarkable to see that in a period of hardly five years, the producers of AOC *Martinique* rum have learnt to profoundly change their commercial strategy and undertake the necessary innovations. Martinique rum appears ready to compete in an unprotected market by means of a broader conception of the meaning of quality and the unique characteristics of the *terroirs* found on the island of Martinique.

CONCLUSION

The accession of Martinique rum to the AOC system demonstrates how both technological and social innovation is necessary for the application of local customs and practices. This is because not all customs are strictly essential for the production of a characteristic product. It is necessary to identify those practices that have been proved over time, understand their basis and see how they can be transposed to modern practices. More precisely, innovations are required in all aspects of production that help reveal the different qualities tied to the particularities of a given natural milieu.

Since production is obliged to take account of the particular properties of the natural environment, it is customary to state that appellations of origin must imply

a connection to the *terroir*. This implies that the codified practices bestow on a product certain characteristics that are unique to the place of production. The sense of the word *terroir* covers all those factors relating to the natural environment (climate and soil characteristics of crop parcels and of the region) and their complex interactions with local customs.

The effect of the *terroir* can only be seen if these customs lead to an original product differentiated according to variation of the milieu. Such customs can be collectively defined and codified only if there is unceasing work to ensure the adhesion of all participants to the aim of developing a differentiated production system. Industry can be a driving force for traditional production processes, but in order to do so it must adopt a new strategy and modify its relationships before and after production so as to profit better from the characteristics and variation of the natural milieu.

The example of AOC *Martinique* rum is not a unique case even if it is exemplary of the speed in which innovations can be developed. The entire history of oenology is marked by innovation stimulated by respect of local customs in AOC wine production and the prospects for AOC dairy products are equally open to innovation for those who can adapt to the new production strategy.

The policy of price support for undifferentiated raw materials and the protection of certain markets by regulations which see no significance in processing methods appear to contradict consumer expectations. The traceability of raw materials and the monitoring of quality within the AOC framework encourage greater creativity and responsibility among all the production participants. Protection of the AOC geographical name allows healthy competition on an open market without it leading to the deception of consumers about the essential quality of food.

The examples given have demonstrated the importance of the innovations needed to pass from industrial production using undifferentiated raw materials, to a production that takes account of all variation found in the production environment and that renders all the participants responsible for the quality of production. The right to protection gives AOC producers the chance to develop their creativity and skills tied to their *terroir* to tempt consumers with a unique and exceptional product, without fear of imitation or fraud.

NOTES

- (1) *Appellations d'Origine Contrôlée* : the use of the word *origine* in the French language is legitimate as the etymology of the word implies a causal link between the place of production of raw materials and the characteristics of the finished product. It should not be confused with the word "provenance" which designates where the product comes from, without implying that characteristics of the product are related to its geographical provenance. This distinction between origin and provenance is important and confusion about the meaning of these words has been the source of numerous commercial and judicial disputes. The semantic confusion in France surrounding the word *origine* was denounced by the founder of INAO (Joseph Capus 1947). The adjective *contrôlé* refers to the semantic rigour with which an appellation of origin is used for an agricultural product and which requires essential characteristics of the AOC product to be tied to the region of production.
- (2) The sense of the word *terroir* covers all those factors relating to the natural environment (climate and soil characteristics of crop parcels and of the region) and their complex interactions with local customs.
- (3) *Typicité* could be translated as "typicality" but for the purposes of this discussion I prefer to use the French term.

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