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Deliverable: D5.4
Network of laboratories trained in spirit analysis and use of developed technologies

(Incorporates Milestone 16 – “Establish best options for training/certification schemes for spirit analysis labs”)

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Deliverable: D5.4 Part I - The Investigation of Options for Training and Accrediting Laboratories in Spirit Drinks Analysis

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1 Description of Deliverable

The aims of Deliverable 5.4 of Work Package 5 were to:

i) Investigate the options for training and certifying laboratories in spirit drink authentication methods and,

ii) Develop training/certification schemes to roll-out current & new technologies/protocols.

This would advance expertise in spirit drink analysis for the safety/authenticity of European spirits in important export markets. The impetus behind this deliverable was recognition that a number of laboratories outside those within the European spirit drinks industry analyse the sector’s products to determine authenticity. This work is often undertaken by analysts who do not specialise in the category of spirit drinks, and who do not have the knowledge and experience embedded within the spirit drinks production companies and associated laboratories.

2 Adaptation of Deliverable

Given that a key output of this Deliverable was an investigation into the options available for training and certifying laboratories, the title of the deliverable “Network of laboratories trained in spirit analysis and use of developed technologies” was too specific. It implies that an industry approved list of laboratories would receive individual one-to-one training on a variety of standard authentication techniques and new technologies identified in other Deliverables of this Work Package. However, whilst the aim of improving the capabilities and knowledge of non-industry laboratories in spirit drink analysis was the distinct goal of this Deliverable, the format of the network, the manner of training and suggested options for any certification were far from certain at the start of this work. What was certain, was that the outputs of the Deliverable, which had been initiated by the spirit drinks sector to further the authentication and protection of European spirit drinks, should also be acceptable to that industry.

The types of laboratories that would be targeted by any training were not particularly contentious. Within Deliverable 5.3, a network of interested stakeholders in spirit drinks authentication had been identified, including representatives from both spirit drinks sector laboratories as well as laboratories outside the industry which also undertook such work. External laboratories included: government food laboratories, local enforcement agents and commercial consultants. All legitimate stakeholders in spirit drinks authentication were considered appropriate recipients of any form of training developed. However, where issues of product authentication are involved, the spirit drinks sector has been highly protective of its authentication techniques and the basis for interpreting results derived from such approaches. It was known from the initiation of the Deliverable that the content and presentation of any training/certification would need to be identified and approved by the spirit drinks sector. Interviews with key industry and non-industry personnel were conducted to study the various training/certification options.

The interviews provided a highly detailed and instructive insight into the different attitudes of the stakeholders involved in spirit drinks authentication. The outcome from the interviews identified a clear reluctance from the spirit drinks sector to develop a formal approved and certified network of
trained external laboratories. Instead, the obvious preference was to provide industry approved training resources that would be made available to appropriate laboratories. It is these resources that now make up the developed training scheme.

Thus, whilst the target of the deliverable and its tasks have been achieved, any active training of a network of laboratories implied by the title has had to be adapted. Instead a range of training tools has been developed that can be used by laboratories involved in the Spirit Drinks Authenticity Network in their own time. These will be further developed and, with industry approval, be used in tailored, training sessions in the future. However, unless certain concerns can be addressed, this will not form part of an industry approved/certified group of external laboratories.

3 Methodology

The format, development and implementation of any training and certification schemes were not pre-determined prior to the initiation of Deliverable 5.4. It was recognised however that sharing expertise on the authentication of commercial products would raise issues of confidentiality around the composition of such products. Consequently, it was decided that the development of any training/certification resources would be dependent on the views of a) the industry, which would presumably hope to benefit from such work and b) the end-users, who would implement any output from this deliverable.

The deliverable is essentially separated into three pieces of work:

1) The first is the analysis of a range of interviews/discussions with key personnel from both within industry and from those associated with spirit drink authentication in non-industry laboratories. This section completes Milestone 16 of the FoodIntegrity project.

   • 7 respondents were chosen from industry to reflect potentially differing viewpoints. Six respondents were selected from 6 spirit drink producing companies. Whilst having headquarters spread over the world, all 6 companies produce European spirit drinks, all have spirit drinks interests outside Europe as well, and all, unsurprisingly, have laboratories dedicated to spirit drink profiling and brand protection. The 7th industry respondent represented the trade association for a European spirit drink category that has a legal team involved in inter alia the prosecution of counterfeits based on analytical evidence.

   • 5 respondents were chosen from non-industry organisations associated with spirit drink authentication in non-industry laboratories. It had been hoped to target a privately owned company undertaking ad hoc consultancy work, but all respondents were in fact government or quasi-governmental laboratories. However, the basis for undertaking spirit drink authentication work was notably varied and it was felt that an appropriate range of viewpoints had been collected from the non-industry interviewees.

   • Finally, two occasions prompted the availability of a collected group of industry personnel with direct interest in spirit drink authentication and product protection.
The first occasion was the 2015 FoodIntegrity Spirit Drink Authentication Seminar held at the Scotch Whisky Research Institute. On this occasion there was a general discussion about the aims of Deliverable 5.4. Comments were recorded and helped inform the creation of a set of questions to pose to the 12 individual respondents. A second smaller group of spirit drink producers were polled at a Scotch Whisky Research Institute Product Protection Group meeting, with this full set of questions.

Two sets of questions were developed to pose to selected stakeholders. It was recognised that the format of the interviews would need to be tailored, depending on whether the respondent represented a spirit drink producer, or was non-industry. The two interview scripts are reproduced in Appendices I and II.

In some cases, interviews were held face to face or via telephone/video conference. In other cases, the aims of the process and the interview questions were explained and the respondent preferred to fill in answers offline. This was notably the case for those respondents where English was not their first language. Face to face interviews tended to be more expansive and wide ranging than those where the recipient had provided answers offline, so all responses were adapted to a standard format. These can be found in Appendices 3 (a - n).

Due to the varied roles of the respondents, not all questions were answered in each case. For example, the questions relating to the sharing of spirit drink industry data and opinions were posed to non-industry stakeholders but were really for industry respondents.

The analysis of all the responses received can be found in Section 3.

2) Following the stakeholder analysis a number of conclusions and recommendations related to improving the analytical capabilities of non-spirit drink industry laboratories via training resources were made. These can be found in Sections 4 and 5.

3) Finally, a gap analysis was undertaken to determine where future work was required to improve the established training resources, or to further investigate some of the areas where a solution was currently problematic (Section 6).
4 Stakeholder Interviews Analysis

Introduction

The questions posed to the interviewees were grouped under three headings: Training / Accreditation, Counterfeit Identification and General. The first heading of “Training / Accreditation” posed questions relating to the analytical methods non-industry laboratories should be using to authenticate spirit drinks, the benefits improved capabilities in such methods would provide, and the training means by which such improvements could be delivered. The second heading “Counterfeit Identification” looked at how to interpret analytical results in order to successfully identify counterfeits by exploring means via which data on authentic/non-authentic samples can be shared amongst interested parties. A third catch-all heading of “General” was designed to collect any remaining points not adequately covered by the two previous headings.

Each of the individual areas of interest, as laid out in the adapted responses in Appendices III (a-n) is considered in turn to identify themes, communalities and points of diversion.

4.1 Analysis – Training/Accreditation

The following three questions are considered together, since there was considerable overlap in terms of the responses given.

Which Analyses Would Benefit Non-Industry Laboratories?
Should Non-Industry Laboratories only be trained in certain analyses?
Are some analyses too difficult/inappropriate for non-industry laboratories?

Industry Comments

It was noted that non-industry laboratories will tend to be generalists, experienced in both a range of techniques and a range of products, but with no specialist knowledge for spirit drinks. The general industry viewpoint was that training in spirit drink analysis methods should be restricted to certain methods. Opinions expressed pointed to the problem of accessing genuine data against which the analytical profiles of suspect samples can be measured. In addition, many laboratories will be restricted by the analytical capabilities they possess. Therefore, in terms of training, and the provision of guidance on best practice, key analytical methods were suggested for training purposes. These are the methods for which there is generally more available public data, most laboratories will have the required analytical equipment and there will be proficiency scheme available so that competence in analysis can be demonstrated.

The commonly referred to methods in which training could be given were: alcohol strength (which can be compared to regulatory values), volatile congeners, sugars (at both % and ppm levels of magnitude) and (for brown spirits) maturation related congeners, although a few notes of caution were expressed about the latter being a slightly more complicated analysis for spirit category authentication (e.g. whisky). All four of these analyses are standardised and validated reference methods recorded in EU Regulation 2870/2000. Methanol was mentioned as a key analyte several
times, since many non-industry laboratories are tasked with protecting consumer safety (this is one compound measured in the volatile congeners methodology).

It was however noted that newer, advanced techniques are more commonly being incorporated into industry profiling. Consequently, training in the application of new portable spectroscopy methods should also be provided, as well as more advanced profiling techniques such as multi-analyte/untargeted GC-MS. Industry respondents who supported training in flavour profiling/GC-MS have particular interest in flavoured spirit categories. However, the issue about availability of data becomes significant for such products, which are often numerous and individual according to the brand.

A couple of respondents noted the complexity associated with GC-MS analysis and interpretation. Another respondent suggested that training in the application of the GC-MS compositional profiling would be fine, so that people could identify good markers for counterfeits. However, it was felt that where markers and the levels that signified a counterfeit could be provided to non-industry laboratories, this should be avoided, unless access to such information could be secured.

Whilst provision of best practice and training in the use of a set of recommended spirit drink analysis methods was generally supported by industry respondents, a number of key points were referenced, in which non-industry laboratories should be sufficiently trained/educated:

- achieving robust results through internal and external quality control procedures;
- awareness of the importance of accredited results in undertaking authenticity analyses;
- understanding the variability of a spirit drink product (which is highly dependent on the spirit type) and how its composition is influenced by the production processes and environmental conditions post-bottling (e.g. colour fade);
- the subjectivity of sensory analysis;
- the use of common analytical units and required conversions for regulatory purposes, resulting from differences between official control requirements in various countries;
- the commercial sensitivity of results (i.e. the importance of maintaining confidentiality of brand or category profiles and the damage that sensational media reporting about non-authentic products can have on genuine goods).

The commonly iterated concern from industry respondents was that access to reference data is the key to the successful application of any recommended authentication model. Whilst minimum alcohol strengths are set in European Regulation 110/2008, many spirit drink categories do not have any additional analytical limits (although some do, e.g. anethole in pastis). This means that the authentication of spirit category or brand requires knowledge of how the production process dictates analytical profiles. Industry respondents noted repeatedly that, as a basic policy, they would not give out brand data to non-industry laboratories (although, in select cases, brand owners had contractual agreements in place with specially selected partners that permitted some data sharing). The responding trade organisation remarked that it currently only shares category based ranges when required to as part of a legal court case.

Given the above confidentiality associated with both brand and category based spirit drink analytical profiles, and the lack of publicly available reference data, it was noted that non-industry laboratories
are required to generate their own databases. The views as to whether constructing a category or a brand database would be harder were mixed. It was noted that compared to spirit type identification, the analytical profiles for brands would be tighter, given the reduced variability of the sample population. However, with brand authenticity it would be necessary that date relevant samples were present in the brand reference set. Non-industry laboratories do not have the appropriate access to a large supply of reference samples for a range of different brands. On this basis, it was recommended that non-industry laboratories should be specifically encouraged not to undertake brand authentication by one respondent. It was felt that a generic category database could be built up over time to reflect the variable output of a particular spirit type such as whisky, and would be considered more stable over time. Also, information about alcohol strengths and volatile congeners is publicly available for several common spirit categories.

Non-Industry Comments

In common with the industry viewpoint, it was noted that laboratories involved in spirit drink authentication should be capable of undertaking the basic analytical techniques employed (i.e. they should be experienced in LC/GC/spectroscopy etc.). Guidance was requested in the identification of industry recommended methods, as was training in their use for spirit drinks analysis, although one non-industry respondent requested training in all of the official recommended methods suitable for profiling regulatory parameters for various spirit drinks.

In line with some of the industry comments, respondents noted that several analytical techniques and authenticity questions might be considered more complicated, depending on the level of analytical experience/equipment within the laboratory and level of reference data available. Examples given included GC-MS and stable isotope analysis (for botanical origin assessment). On this basis, the recommendation of, and training in, simpler, cheaper, yet authoritative analytical methods would be preferred. A couple of respondents noted the benefit of training in new, rapid technologies (as identified by one of the industry respondents). The development of quick, specific tests for brand authentication, and training in such methods, was seen as a particular benefit by the respondent working on point of sale analysis.

As noted in the industry responses, recommended methods would need to take into account the analytical provision with laboratories. It was also obvious that the rationale behind the authentication work undertaken by the laboratory needs to be accommodated. Some non-industry laboratories focus on particular authentication areas as dictated by their remits and/or by the likelihood of successful identification of counterfeits. Hence, the UK Public Analyst and Trading Standards department focus on dilution and brand authenticity, the customs laboratory focuses on the identification of denatured alcohol entering the supply chain, and one of the state food laboratories focuses on generic and origin authenticity. It was observed that an official testing laboratory would need to implement official methods.

In direct contrast to industry stakeholders, the non-industry respondents desired the provision of analytical ranges for brands/spirit types to accompany any recommended methods. The provision of analytical ranges would prevent the need for establishing in-house databases, which may be inappropriate due to lack of knowledge about sample type or restrictions in accessing suitable samples. This lack of available reference data, particularly for brands, was a common complaint from
the non-industry laboratories. Despite the aversion of the spirit drinks sector to share brand information, brand authentication is obviously a common requirement for certain governmental laboratories in order to fulfil their remit to protect against consumer fraud.

**What are the benefits in improving the analytical capabilities of non-industry laboratories?**

The following benefits were noted.

- The availability of a network of local, trained, non-industry laboratories in market offers increased speed of response and additional resource.
- A wider network of trained/educated laboratories provides improved access to independent corroboration to any industry laboratory authentication work. This latter is particularly useful when laboratories are required to provide evidence to their national courts in legal cases involving spirit drink counterfeits. Having informed laboratories is vitally important in such instances. Laboratories often come to wrong conclusions about a sample because they undertake inappropriate analyses based on their ignorance of the spirit type and the counterfeit challenges that it faces.
- Increased protection for the consumer and for the reputation of the spirit drinks sector, leading to increased consumer confidence in these traditional products.
- Improved spirit drinks product knowledge in international markets. This could have the beneficial impacts of removing unnecessary legislative burdens and alerting more people to the issues involved in spirit drink fraud.

However, one spirit drinks company questioned whether having a wider range of generalist laboratories with increased expertise in spirit drink analysis was necessarily a benefit compared to its preferred route of using specialist, contracted and trusted laboratories, as required. Another spirit drinks company noted that encouraging non-industry analysis also brings the risk of third parties deriving confidential information (e.g. compositional information) which might benefit the counterfeiters.

**What tools would help support the analysis work of non-industry laboratories?**

The following tools were suggested as being beneficial in the training, education and support of the spirit drink analysis work of non-industry laboratories. The scope of such training (i.e. analytical methods, guidance etc.) has been outlined by the previous set of questions.

- **Training events.**
  Considered useful for dissemination of best practice and expertise in spirit drink authentication. Could be undertaken at individual non-industry laboratories or via conferences (e.g. Public Analyst or Customs Laboratory conferences).

- **Analytical methods information: recommendations, guidance, references to publicly available literature and peer-reviewed research.**
  It was noted that this could make some use of the Knowledgebase of analytical methods.
being developed under Work Package 2 of the FoodIntegrity project. Another observation was that such a tool would be important because it could constitute a basis for harmonised interpretations.

It was suggested that basic guidance on indicative markers for counterfeit spirit drinks be included e.g. presence of a particular marker for a flavouring or rogue spirit. It was felt by one respondent that it would be easier to convey the presence/absence of a particular compound and its relevance to spirit drink authentication rather than comparing levels of multiple analytes in a suspect product with appropriate ranges. The latter requires more expertise, especially when levels may not be as important as ratios. One respondent suggested that the provision of links to research into developing analytical methods would not be of interest to laboratories offering a general analytical service, since there would be no commercial benefit to such a laboratory employing non-validated technologies.

The importance of laboratory accreditation was noted throughout the industry comments. It was strongly suggested by one of the industry group responses that this should be reflected in any website guidance, for both methods and expression of opinions.

**Directory of industry contacts.**
This was considered useful for improved communication between non-industry laboratories and industry. It was clear that some of the non-industry laboratories were unaware of potential resources (e.g. the existence of the Scotch Whisky Association and its work on counterfeit whisky). If a non-industry laboratory has concerns about a product’s authenticity, it could contact the producer to obtain more information about the product thus leading to a better comprehension of analytical results.

It was recommended that such a directory should reflect the manner in which these organisations work, i.e. should follow the established routes via which concerns about potential counterfeit products are communicated. An appropriate, yet non-specific email address/telephone number was suggested as being useful, since this would require less regular updating. It was suggested that the use of verification schemes, associated with guaranteeing the quality of spirit drinks with geographical indications, might help in identifying industry contacts where fraud is suspected. For example, the Scotch Whisky Verification Scheme provides a website via which an approved Scotch Whisky brand can be verified and its owner identified.

**Website information hub.**
Approved as something that could provide a source of all the above information, including tools used in any training events. Several industry contacts stated that access to such a website would need to be controlled. It was observed that an approved list of non-industry laboratories that have access to the information contained on the website would be useful when the industry is looking at preparing for court cases in a particular market. A selected non-industry laboratory would then already have access to the appropriate information it needs to undertake a useful supporting analysis. If successful, one respondent noted, the website hub could become regarded as the “EU” approved reference tool for spirit drink authentication.
• **Information on spirit drinks regulations and embedded analytical parameters.**

  This was noted as an additional useful tool for laboratories undertaking spirit drink authentication. Regulations vary according to market. It was observed that whilst it may be problematical to keep such information current, with a sufficiently diverse community of approved laboratories, it may not be too onerous a task.

• **Information on spirit drink production processes, including spirit drink technical files and related verification schemes.**

  A number of non-industry laboratories felt that interpretation of analytical data and the correct construction of a reference samples database could benefit from a better understanding of spirit drink production methods. Technical Files are the approved specifications for spirit drinks that have a geographical indication. Technical files detail a spirit drinks’ characteristics and the production processes that entitle this spirit to a geographical indication.

• **Structured training programmes.**

  Only two of the industry respondents specifically considered the nature of an industry approved scheme whereby laboratories were selected for training in spirit drink analysis methods as part of a scheduled programme of laboratory training, in order to act as trusted partners. Most industry respondents saw training as a matter or the provision of tools via which third party laboratories could be educated in the spirit drink analysis and authentication, rather than a way of creating a “special” industry partner in a particular market. Of the two that did respond in this manner, one noted a number of concerns about the implementation of such a programme: its cost; the selection process for choosing individual laboratories; the management, remuneration and validation of the trained laboratories; and how commercial interests in confidential and sensitive information can be ensured.

• **e-Training tools**

• **Online interest groups**

  Information, best practice, results and samples could be exchanged via this route. The possibility of using such an online group to roll-out a small scale proficiency scheme was suggested.

• **Analytical ranges and guidance on interpretation.**

  Suggested as a means of ensuring correct and harmonised interpretation of results by non-industry laboratories, so long as access to such information is controlled. However, it is obvious that some industry respondents would not approve of such a sharing process, regarding even controlled access as being too liberal with data that is used to protect its products. Removing any level of data control would be regarded as increasing the risk of counterfeiters accessing and making use of industry data for their own benefit.

  A number of concerns were expressed about how easy such a system of training resources would be to maintain and keep updated. Again, the potential end result of having increased spirit drink
authentication expertise in generalist laboratories was contrasted with specialist, trusted providers by one industry respondent.

**Who do you think should be involved in creating any training tools for the FoodIntegrity Project? How should training be rolled out, and to whom?**

Several suggestions were put forward for the creators of the various formats of training tools recommended above. These included, in rough order of response frequency:

- Sector based research laboratories such as the Station Viticole of the Bureau National Interprofessionnel du Cognac (BNIC) and the Scotch Whisky Research Institute (SWRI).
- Brand owners and the spirit drinks industry.
- Organisations involved in spirit drinks authentication such as the International Federation of Spirit Producers (IFSP).
- Sector based trade organisations such as SWA and spiritsEUROPE.
- European bodies involved in the creation of analytical training tools (e.g. the Customs’ laboratories network and the committee of experts on isotopic analysis in wine/wine products).
- Any other public and private organisations with a reputation in analytical expertise and product knowledge, e.g. the Customs’ laboratories network.
- An independent organisation, such as a non-industry laboratory or agency.

It was stressed that any training resources would need to be sense checked by industry prior to rolling out them out. One suggested option for dissemination was a 2-3 days’ workshop to cover all the tools created.

Several respondents noted that care would need to be exercised when approving relevant laboratories, to ensure that they would make use of the training resources discussed in previous questions for the overall benefit of the industry.

As noted previously, two industry respondents considered the option of rolling out the training as part of a scheduled programme of work dedicated to establishing trusted laboratory partners that could be employed by the industry. In such a programme it was noted that laboratories need to be selected that have the appropriate resources, and that training is evaluated by the provision of samples and the analysis of results. Laboratories would be audited to ensure compliance, perhaps yearly, and possibly by an industry representative (e.g. brand owner). As noted generally, participation in a proficiency scheme would be recommended, in this case to demonstrate satisfactory performance in accordance with the training provided.

Other suggestions as to the target audience for the training resources were:

- Customs laboratories
- Trading Standards type bodies involved in consumer protection
- Laboratories that have given opinions in spirit drinks fraud cases
• Laboratories involved in OPSON (Operation OPSON is a Europol INTERPOL joint operation targeting fake and substandard food and beverages)
• New small scale distillers (i.e. those new to spirit drink profiling and authentication)

4.2 Analysis – Counterfeit Identification

This section was more heavily directed towards the industry respondents, since they currently hold much of the brand/category data that would be useful for non-industry laboratories to interpret authenticity data against. Hence, the industry viewpoint is more strongly reflected.

Sharing Data – Benefits, Issues and Potential Mechanisms

As already highlighted in the answers given under the Training/Accreditation section, industry generally will not share analytical data relating to their brands apart from, in some instances, under highly regulated conditions. An example of industry information sharing in practice was via the work undertaken by IFSP, a membership trade organisation that “exists to combat the counterfeiting of its members’ distilled spirits wherever it occurs in the world”.

Non-industry laboratories view industry restrictions on data sharing as highly counterproductive to anti-counterfeiting and consumer protection work. The increased difficulty non-industry laboratories have in interpreting the analytical data they generate for spirit drink authentication, due to lack of reference data, is a very common complaint. One respondent noted that brand owners often ignore requests for information, or take too long in replying to queries. The non-industry laboratories did not have any particular concerns about maintaining confidentiality of information. One respondent reported that such concerns are unjustified since steps are taken to ensure information of potential use to counterfeiters is never disseminated.

One respondent highlighted the various controls that are put in place before any information is shared by industry. Contracts need to be established, and only limited data is provided. Any shared information is assessed for the potential harm this could do the company’s and brands’ reputations. Consequently, sharing brand information as part of the FoodIntegrity Deliverable 5.4 outputs would be difficult to achieve. The representative of the spirit drink category trade organisation noted that collective approval of its membership would need to be given for any generic (spirit category) data to be shared.

Industry respondents expressed themselves as being more comfortable with providing opinions about the authenticity of a suspect sample on the basis of submitted analytical data. (It was noted that even when suspect brands are identified via IFSP, the brand owner will give the definitive answer on the authenticity of a suspected product.) In this way, the data can be compared with their confidential databases, which represent the best reference data set available, without opening up access to these resources. Even then, it was apparent that trust would need to be built up with such laboratories and contracts established in some cases.
The view of non-industry laboratories was that any improvement in accessing data against which interpretations could be made would be an improvement over the current situation.

Comments of sharing information via manual or automated process (if data remains secure)

Even assuming the concerns regarding trust and confidence were addressed, the general opinion from industry was that an automatic process of data submission to industry contacts for comment would be too difficult to manage effectively. The following concerns were noted:

- Interpretation of authenticity often requires more detail than just analytical data. Background information regarding the sample and the context for suspecting fraud is often informative.
- An automatic submission process could be abused by repeated data entries, in an attempt to identify the analytical limits for a particular brand.
- Care sometimes also needs to be taken in the manner in which an authenticity question is answered (e.g. if there is a public safety concern). Where there is an identified instance of non-compliance, there are always additional questions the organisation holding the reference data (e.g. brand owner) would want to ask.

Consequently, personal interaction via an established relationship was generally regarded as the most practical means of data submission for obtaining industry views on non-industry laboratory data, whether the holders of the information are brand owners or spirit category trade organisations.

It was noted that for this offering to be of practical use to non-industry laboratories, multiple brand owners would need to sign up to the scheme.

Submitting data for assessment – what checks would be required?

Before data was submitted, via either a manual or automatic process, all industry respondents noted that submitting laboratories would need to have appropriate methods in place and undergo some form of induction/accreditation process. Competency in performance would need to be assured, e.g. by training and auditing, and a level of internal and external validation (e.g. ISO 17025, participation in a proficiency scheme) would need to be shown.

Could some data be shared if it did not compromise brand IP?

It was generally agreed by industry that there was the potential for data to be shared, if the nature of that data could not compromise brand IP. For example, there are some dipstick tests that are used by Trading Standards departments in the UK that are approved for testing the authenticity of certain brands. The bar for such an assessment would, however, need to be set high and it was indicated that each analytical data set would need to be assessed individually to determine whether it could compromise brand IP.
Several respondents expressed the view that commercially sensitive information could still be derived from data that might be regarded as non-brand specific. For example, stable isotopes could be used to determine whether a Scotch whisky brand was actually bottled in Scotland. Would companies want to indicate which of their brands were or were not bottled in a particular location? Another example given was that whilst UV-Vis analysis data for matured products did not provide compositional information, uncontrolled sharing could make it easier for a counterfeiter to create an acceptable substitute.

It was remarked by both industry and non-industry respondents that even if non-IP data could be shared, it should be done in a controlled fashion, since this helps ensure credibility and relevance, and does not provide information to counterfeiting operations. The communication of marker compounds that should not be present in a particular category of spirit was suggested, more than once, as data that could be shared without concerns over brand IP and which would be easy to interpret. It was stated that sharing such information could dissuade non-industry laboratories from trying to generate their own, less robust, and therefore less, useful reference databases. The assessment as to whether data should be shared should not just encompass data security but also its ease of use. Some techniques, as noted previously, might be restricted to specialist laboratories.

4.3 Analysis – General

A number of additional points were made. The following have not been touched upon (or only mentioned in passing) in the previous analysis.

- Care needs to be taken by industry organisations when communicating with non-industry laboratories. The industry bodies need to consider how such contacts are received and monitored, and how information is communicated and used by the third parties.

- Consideration needs to be given to the security and accuracy of the outputs provided from Deliverable 5.4. To ensure relevance, a programme of maintenance will need to be established.

- The industrial laboratories need to continue to develop their analytical provision in spirit drink authentication, and communicate advances as appropriate to non-industry laboratories.

- Sensory analysis should be clearly recognised as a subjective analysis and utilised accordingly within any spirit drink authentication strategy. It should not be given the same emphasis as objective analytical data.
5 Conclusions from Stakeholder Interviews

In many areas the viewpoints of the industry and non-industry respondents polled in the interviews were similar. The key difference highlighted was the contrasting views towards the sharing of analytical data relating to spirit drink profiles. Non-industry laboratories obviously found the varied spirit drink authentication work they undertake extremely difficult without suitable reference data against which interpretations can be made. Industry organisations (whether brand owners or trade associations) have strong arguments against sharing such data: prevention of use by counterfeiters to create fraudulent products, prevention of incorrect use by non-industry laboratories with potentially damaging consequences to the brand/category.

It was recognised by all parties that non-industry laboratories are required, for a variety of reasons, to authenticate spirit drinks, and that improving their capability to perform this work could be of benefit to the industry. The interviews identified the means by which this improvement could be achieved, via training/accreditation tools and via the sharing of information.

The responses indicated that there were two different attitudes as to how training/data sharing could be achieved. The first potential route would be via an industry managed scheme which would select appropriate non-industry laboratories, establish relationships, and undertake training in spirit drinks production and selected analyses. The performance and capabilities of the laboratory would be validated via an appropriate auditing protocol. After ensuring the above, and establishing appropriate contracts and non-disclosure agreements, certain information could be shared. There were a number of concerns raised about a dedicated industry support network of approved laboratories. Whilst it has been adopted, to some extent, by individual brand owners, its potential to work as an industry initiative posed various questions around cost, laboratory selection, industry input and investment, maintenance etc. Such issues would need careful consideration by a wide range of spirit drinks producing companies. It was decided that constructing such a scheme, whilst beneficial, could not be achieved within the limitation of the FoodIntegrity Spirit Drinks Work Package. A similar model, it is noted, is already in existence in the form of the International Federation of Spirit Producers (IFSP) and potential overlap would also need to be considered.

The second approach was the development of a range of training tools that would provide non-industry laboratories with resources for spirit drink authentication. Such tools would help ensure that non-industry laboratories better understood the following: spirit production processes and their impacts on spirit drink profiles, the need for quality control systems and supporting accreditation, the types of spirit drink counterfeits being created, the recommended analysis methods and best practice in their use, the various sources of information on expected analytical profiles for spirit drinks. All these methods of sharing information were regarded as practical and without potential concerns about confidentiality of data. There was one note of caution questioning whether a small network of industry trained, accredited and approved laboratories was preferred to a larger network of more generalist laboratories. However, the majority viewpoint was that there was clearly a benefit in ensuring those laboratories that undertake this role, irrespective of the views of industry, are supported as much as possible to ensure sensible opinions are being given, on accurate results, from appropriate analytical methods.
The development of a range of training tools was also supported by the non-industry respondents. Several laboratories wanted education on spirit production, to understand its impact on results and interpretation. There was also the desire to understand which analytical methods were recommended by the industry and how these should be carried out. Such tools fall short of the non-industry requirements for the provision of both methods and reference data. However, it was obvious that this deliverable would not quickly change the industry’s firm antipathy to sharing analytical data profiling its brands or spirit categories. This is a well-recognised problem in food authentication and one which is being explored in a separate Work Package of the FoodIntegrity project (Work Package 17 - Feasibility study information sharing & analysis along the food chain to identify emerging food integrity issues). It will be interesting to study whether any outcomes from this Work Package can be applied to the concerns of the spirit drinks industry.

One method of sharing information between non-industry laboratories and industry was the option for submitting data on suspect samples to the appropriate brand owners or trade associations. Automated submission was discussed, but this again was deemed as requiring additional industry agreement and infrastructure development beyond the scope of this deliverable. The option of manual submission was more positively accepted by industry. However, caveats were noted. Laboratories would need to be able to demonstrate internal and external quality control and analytical method accreditation. The importance of these requirements should therefore be integrated into any training resource tools.

From all these conclusions a clear set of priorities for developing resource tools was outlined. This is laid out in Section 5. There was support for these tools to be embedded in a controlled access website that could be accessed by relevant non-industry laboratories. There was also support for these tools to be utilised in training sessions with non-industry laboratories undertaking spirit drink authentication. Suitable recipients of this training were identified, in particular government associated laboratories such as customs laboratories and state food laboratories. However, there were a few recommendations that the training resources should be assessed by the industry before any formalised training sessions were organised.

There was not a clear conclusion as to who should be developing the training resource tools. The preferred answer was that this should be undertaken by industry organisations such as SWRI and BNIC. However, it was clear that a number of other organisations might provide useful additions. It was decided that, as Work Package leaders with responsibility for this deliverable, the SWRI should create the initial training tools. It was recognised that, due to its experience and knowledge, whilst the SWRI would provide tools of relevance to European spirit drinks in general, there would be a bias towards whisky authentication. However, it was felt that when the format of the tools was established it would be possible to supplement as appropriate.

A last conclusion, not covered by the interview responses was that any developed training resources would also be useful in harmonising the approaches taken by industry laboratories. Expertise is well developed in those laboratories whose company has particular concerns about the protection of its brands, typically the larger companies whose brands have significant international recognition. However, depending on the size of the company, its resources, and the level of counterfeit risk to its brands, expertise in spirit drink authentication can vary across the industry.
6 Recommendations from Stakeholder Interviews and Developed Resources

5.1 Recommendations

The general objective of this deliverable is to improve the capabilities of non-industry laboratories in the authentication of spirit drinks. Following on from the stakeholder interviews, it was decided that the following key areas should be made available as both online training resources and as presentations that can be combined to provide training sessions.

1. General Background on Spirit Categories and their Production Methods
2. Common Modes of Adulteration for Detection
3. Recommended Analytical Methods
4. Interpretation - Literature References
5. Interpretation - Database Construction
6. Quality Control
7. Expert Opinions

The modular aspect of the presentations based on these individual areas will enable any training event to be tailored to the needs of the trainees.

5.2 Developed Resources

Section 1 – General Background on Spirit Categories and their Production Methods

Two resources have been developed under this section.

a) The first of these is a list of recommended text books and other literature dealing with different spirit drinks and their production methods. These have been split into recommended sources that deal with a range of spirits, and those which are the recommended books for specific spirit categories.

b) The second resource is a collection of publicly available summaries, posters and presentations outlining the production methods of various spirits.

Examples of these resources developed are given below.

![Figure 1. Example Slide from Presentation on Scotch Whisky Production](image)
Figure 2. Geographical Areas of Cognac Production

The professional organisation BNIC (Bureau National Interprofessionnel du Cognac) has been allowed by the French government to control movements and ages of Cognac since 1946. BNIC aims are also to promote Cognac, to defend it from counterfeiting (imitation), to ensure traditional production and to protect quality (monitoring technical development, scientific research, experimentation). Cognac wine growers and merchants have looked for the best spirit quality through the ages, continuously improving their processes with respect to traditions.

Legislative and practical implications

A fundamental legislative step for the reputation of Zivania was the enactment of the ‘Regulation and Control of the Wine Product Industry (Control of Zivania) Regulations of 1998’. This abolished the former British colonial decree no. 334 of 1949 that prohibited the production and distribution of Zivania, restricting its distillation to small quantities for personal consumption by the grape-growers and wine-makers. ‘Zivania’, ‘Zivania’, or ‘Zivana’ is the distillate taken from a single distillation of fermented grape marc, with or without a proportion of wine lees, and with or without a proportion of wine.

Wine or wine lees may be added to help avoid certain undesirable processing effects (e.g. Maillard caramelisation reactions), but cannot exceed more than 2% of the entire marc quantity in the alembic (still). The alcohol strength of the distillate may exceed 55% vol. but will be bottled at 43% to 52% vol. at 20°C. According to existing regulation, the fermented marc (zivana) should be used from the indigenous Cypriot cultivars ‘Local Mavro’ (black) and ‘Xynisteri’ (white).

‘Zivania’ can be produced only from the fermentation of healthy grapes that are not rotten, squashed or diseased. The primary method followed is the same as for the red wine-making process in which natural free-run must and grape skins are fermented together, without the addition of sulfur dioxide.

Figures 3a and 3b. Cypriot Zivania – Some Legislative Background and its Raw Materials
Section 2 – Common Modes of Adulteration for Detection

One of the noted complaints about non-industry laboratories undertaking spirit drink analysis is that they are often ill-informed about the types of counterfeiting that they should be looking for and thus employ the wrong methods for determining authenticity. The two topics covered in this section are the legal definitions that relate to spirit drinks, which define the conditions of manufacture against which counterfeits can be tested, and commonly reported counterfeiting techniques in the spirit drink sector.

a) Legal Definitions – List of principal spirit drinks legislation with appropriate references and links, including, where possible, pointers to the technical files and verification schemes in place to support spirit drink geographical indications.

b) Reported counterfeiting techniques in the scientific literature and media. Records of known concerns and incidents are provided to give examples of the types of spirit drink counterfeit seen in the marketplace and the consequences of their occurrence. Definitions of the various types of licit and illicit alcohol are also provided according to the IARD (International Alliance of Responsible Drinking) Toolkit (Figure 5).

Figure 4. Examples of Counterfeit Whiskies manufactured from “industrial alcohol “and flavouring.

Section 3 – Recommended Analytical Methods

This section outlines the following:

a) Established reference analytical methods for spirit drink authentication and where to find them. This section is designed to supplement the information that will be present in a searchable form in the Knowledgebase constructed within Work Package 2.

b) Developing technologies for those that are interested in exploring less validated areas (e.g. links to new scientific papers). These are less likely to be included in the Knowledgebase as this should focus on official or industry recommended approaches. Some of this information will be derived from the work undertaken in Deliverables 5.1 and 5.2 looking at the application of both portable and laboratory based technologies to identifying spirit drink counterfeits.
Figure 5. Definitions of Licit and Illicit Alcohol from the International Alliance of Responsible Drinking

Source: This taxonomy was developed as part of a collaborative effort among the following organizations: Anheuser-Busch InBev (AB), Associação Brasileira de Beldades (ASBRABE), Brown-Forman, Cámara Nacional de la Industria Tequilera, The Commission of the Wine and Spirit Industry (CVIL), Diageo, Euromonitor International, Heineken, The International Alliance for Responsible Drinking (IARD), Pernod Ricard, SABMiller, and spiritsEUROPE.
c) Guidance on appropriate methods for specific authentication challenges (e.g. category authentication, screening technologies etc.).

For example, this topic will consider: when methods are useful, and when are they not; common misconceptions or mistakes inherent in certain methods; confounding factors for the application of methods to certain spirit types. Best practice and guidance will also be given on developing a spirit drink authentication strategy. For example, clarity on the difference between consistency and authenticity will be stressed. (Whist a measurement of alcohol strength may show that a suspect product is consistent with a particular spirit type, it does not mean that it is authentic, as a more detailed analysis of volatile congeners may demonstrate.) Guidance will also be given on the interpretation of analytical results and availability of reference databases, where such information is in the public domain. Reference will be made to those papers on authentication strategies for specific spirit types (also included within the literature references section).

d) A resource for conversion of measurement units. Particularly useful as the units employed in the regulations of different countries are often confusingly varied. Definitions of commonly used terms can also be variable and recommended interpretations are provided.

The advice from the stakeholder interviews suggested that standard analytical methods that non-industry laboratories should undertake are the following: alcohol strength, volatile congeners, sugars (both high concentrations for intended addition for products such as liqueur, and low concentrations for detection of illegal sweetening) and maturation related congeners (for matured spirits). Hence, there is a focus on these methods.

Recommended methods will vary to some extent on the spirit product category. This section uses, as an example, the recommended methods for whisky authentication and provides best practice guidance on this basis. Much of this advice will be applicable to other spirit categories, but more individual recommendations should be developed on the basis of key spirit categories. Input from additional stakeholders, such as spirit drink producers of these products, or associated trade organisations, will be requested.

Section 4 – Interpretation - Literature References

Spirit drink authentication is well represented in the scientific literature and technical textbooks. A bibliography of useful background reading for established methods and developing techniques is provided, indexed according to common themes such as spirit drink category and analytical method. The references are provided in 2 common formats for import into bibliographic databases – Endnote and Reference Manager (RIS). Links to publicly available documents or sources from which the literature can be purchased are provided where available.

A section of the Literature References is illustrated in Figure 6.
Section 5  Interpretation - Databases

The stakeholder interviews clearly stated that the spirit drinks industry is averse to sharing analytical reference data on its products. Hence, whilst there are some publicly available sources of reference data for certain spirits, non-industry laboratories have will have to generate their own reference databases until a solution to the industry’s data sharing concerns is developed. This section provides thoughts on constructing a spirit drinks reference database. Although it provides examples from the whisky category it is designed to be applicable to all spirit types (and may be rounded out with examples relevant to other spirits, after the views of stakeholders in different spirit categories are requested). It is also designed to act as a comparison piece to the Scientific Opinion on “Sampling guidelines for building and curating food authenticity databases” developed within Work Package 1.

Section 6  Quality Control

The need for quality control and accreditation in analytical methodology, as a preface to any successful data sharing between laboratories (whether industry or non-industry), was remarked upon repeatedly in the stakeholder interview. There are plenty of texts available on quality control within analytical laboratories, but it was decided that a reference tool should be provided to outline the basics of quality control, especially anything specific to spirit drink analysis.

The following subjects are covered:

a)  Introduction to Quality Systems and Accreditation
There are multiple providers of PT schemes worldwide, giving coverage of different analytes in different matrices. The Scotch Whisky Research Institute uses a range of PT schemes to assess the performance of accredited methods, primarily focusing on alcohol strength, distillation compounds and maturation compounds in a range of distilled spirits. The main PT scheme used is the Alcoholic Drinks Proficiency Testing Scheme (DAPS) from LGC, supported by samples from the BNIC and BPEA schemes. Where no suitable PT scheme for your matrix & analyte is available, analysing commercially available reference materials or setting up round-robin schemes with other labs should be considered.

Figure 7. Example section on Quality Control for Spirit Drinks Analysis

**PT Scheme Performance Over Time**

- Both types can be used to track performance over multiple rounds
- Useful to test if a method is starting to give a low or high bias or drift, even if individual points don’t get flagged as outside tolerances

Figure 8. Example slide from training presentation on Quality Control for Spirit Drinks Analysis
b) Aspects to Consider when Developing a Quality System such as:
   i. Quality of initial method
   ii. Consistency of results within the laboratory
   iii. Consistency of results between laboratories

An example section, dealing with external quality control, is provided in Figure 7. A slide from the associated presentation that could be used in a training presentation is provided in Figure 8.

Section 7 Expert Opinions

One of the complaints expressed by the non-industry laboratories in the stakeholder interviews was that it was difficult to identify contacts within the spirit drinks industry when there were questions to ask about a category or brand, or suspicions about the authenticity of a sample based on their analytical profiling. Whilst industry respondents were unwilling to share data, various organisations expressed willingness, or even a desire, to engage with non-industry laboratories. The analytical methods survey carried out as part of Deliverable 5.3 also identified a number of contacts willing to have their name placed on an expert/contact database.

This section will contain two lists:

a) A list of contacts willing to be contacted by non-industry laboratories, with a small profile to help the user target the correct people. An example can be seen in Figure 9. Potential contacts include representatives from industry such as brand managers, trade association representatives and research institute staff, as well as appropriate government laboratory experts and consultants. A demonstrable track record in spirit drink authentication will be required.

b) Additional information on useful online sources of information with appropriate links.

<table>
<thead>
<tr>
<th>Company, brand or category of spirits</th>
<th>Scotch Whisky.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Ian Goodall</td>
</tr>
<tr>
<td>Job Title/ Company</td>
<td>Senior Scientist at the Scotch Whisky Research Institute</td>
</tr>
<tr>
<td>Contact information</td>
<td><a href="mailto:ian.goodall@swri.co.uk">ian.goodall@swri.co.uk</a> +44 (0)131 449 8900</td>
</tr>
<tr>
<td>Area of expertise/small biography</td>
<td>Expertise in the analysis and authentication of whisky, in particular Scotch Whisky, with over 20 years’ experience. Senior Scientist in charge of research and development into spirit drink authentication. Accredited to give opinions on the authenticity of whisky, based on a suite of analysis that is also accredited by the United Kingdom Accreditation Service. Member of the Royal Society of Chemistry and the Institute of Brewing and Distilling. PhD in Chemistry, LLM in Food Law.</td>
</tr>
<tr>
<td>Alternative contact</td>
<td><a href="mailto:general.swri@swri.co.uk">general.swri@swri.co.uk</a> – Standard company email address.</td>
</tr>
<tr>
<td>Company website</td>
<td><a href="http://www.swri.co.uk">www.swri.co.uk</a></td>
</tr>
</tbody>
</table>

Figure 9. Example Contact for Expert Opinions List
7 Gap Analysis – Recommendations for Future Work

Gaps

As recorded in Section 4, there are a number of recommendations that were made within the stakeholder interviews that could not be developed within the limitations of this deliverable, either due to unresolved conflicts in opinion, or restrictions in available resources. These gaps are summarised below.

- Training events.

  It had been hoped that the developed resources could be tested on some of the identified laboratories who would benefit. However, it was clear that industry wanted a view of the proposed training tools prior to such a process taking place.

- Other spirits.

  Whilst the focus of the training tools has been on spirit drinks in general, there is a bias, particularly in the provision of examples, towards Scotch Whisky. Having outlined the format and contents of the different resource tools, it will be necessary to supplement the information already provided on other European spirit drinks. Work in this area has already begun in collaboration with spiritsEUROPE.

- Formalised training programmes.

  There is also a discussion to have, initially perhaps with some key brand owners, about whether the same tools that would be used in training events can be used in a formalised training programme. This would be a larger commitment, directed at establishing a larger network of integrated third-party laboratories into the authentication work of the spirit drinks industry. Work would first be needed to determine if such a programme is desired. If it was decided that such a programme would be of benefit to the industry, it would need to be developed to incorporate not just training, but also the selection of the laboratories, accreditation, confidentiality and a protocol for its financing. E-Training tools might need to be developed.

Maintenance

A number of stakeholder comments also referred to the maintenance of the training resources. These have been designed to be of benefit not just to non-industry laboratories, but also to industry laboratories. Thus, as far as the principle author (the Scotch Whisky Research Institute) is concerned, ensuring the content, links and references are kept current is of benefit both to its staff and their research, and also to its member companies and their own laboratories. It is hoped that users of the resources will also ensure the content is kept current, by pointing out required changes.

One concern surrounds the longevity of the FoodIntegrity website. This will be explored with the FoodIntegrity management committee. However, the website contents are non-complex and will be easily transferrable to any other site, so long as access can be controlled.
8 References


Appendix I – Interview Questions for Representatives of the Spirit Drinks Industry

FoodIntegrity Deliverable 5.4

“The Investigation of Options for Training and Accrediting Laboratories in Spirit Drinks Analysis and the Development of Training Schemes”

There are two principal subtasks associated with Deliverable 5.4 within the FoodIntegrity Spirit Drink Work Package. These are as follows:

a) Investigate options for training laboratories in spirit drink analysis according to recommended guidance stored on a legacy platform (e.g. website).

b) Develop training/certification schemes to roll-out current & new technologies/protocols.

To aid in the provision of these deliverables, opinions are required from interviewees on the subject of the training and accreditation of non-industry laboratories for spirit drink authentication (although there may be some points of relevance to industry laboratories as well). By non-industry, we mean laboratories other than those of spirit producers, or spirit sector laboratories such as the Scotch Whisky Research Institute. This will tend to be laboratories offering some form of enforcement or consultancy role within their country.

Training/Accreditation – Questions

Please respond to each of the questions in the section below.

• What are the analyses for which you think non-industry laboratories would benefit from training in the analysis of spirit drinks?

• Are there only certain types of analysis you think non-industry laboratories should be trained in and if so which ones?

• Are some analyses considered too difficult to run or interpret for effective non-industry laboratory training to be given?

• Should non-industry laboratories be undertaking brand authenticity, generic authenticity (i.e. conforming to a spirit category such as whisky) or both? An issue here will be that laboratories will be tasked with undertaking different policing roles in accordance with their individual remits, other than specifically supporting industry: e.g. consumer protection for food safety, protection against consumer fraud, defending litigants in civil court cases.

• What are the benefits in improving the analytical capabilities of non-industry laboratories in spirit drink authentication?

• What tools do you think would help support the analysis work of non-industry laboratories and how do you think they should be employed. For example, consider the following:
a) Industry approved training day covering suitable background to issues in spirit drink sectors, analysis methods, equipment, means of interpretation
b) Database of methods used in spirit drink authentication (which is being developed under Work Package 2 in the FoodIntegrity project)
c) Details and list of publicly available literature on spirit drink analysis methods
d) References to application notes and papers looking at evolving techniques
e) A handy reference (and updated) directory to industry contacts (within companies or trade associations) with whom it is possible to make contact with regards to counterfeit and authenticity issues
f) A dedicated website covering or linking to all these areas (which is being developed under FoodIntegrity website)

- Who do you think should be involved in creating any tools for training purposes under the FoodIntegrity Project?
- How should we go about rolling the training out? Who would you recommend as a target audience?

Counterfeit Identification

The following questions are being posed to respondents from the spirit drink industry. Essentially, they tackle potential concerns that industry may have on the subject of improving data sharing between producers and enforcers.

*Please provide comments, if you have them, to each of the subject areas considered.*

- Is there a benefit in the sharing of data between industry and non-industry laboratories? Is there a bar to this based on industry intellectual property? Could such a sharing mechanism be undertaken on an industry scale with a large number of brand owner sign-ups (e.g. via IFSP, FoodIntegrity etc.), or a category level by say relevant trade organisations, or at a member company level via selected sharing with selected third parties?

- If an industry based scheme was established for “sharing data” what controls would be required to ensure brand owners or category experts would be happy that information sharing is controlled and secure? For example, at an industry level a protocol via which analytical data could be submitted for interpretation could be established. Would only certain approved organisations be able to use? Would it provide an automatic answer, or would this be provided manually? If automatic, how would the prevention of multiple submissions, via which limits could be inferred, need to be controlled. Are there other concerns you could see being relevant to such a system?

- If an industry based scheme to “share data” was established, or some more specific relationship, what requirements or recommendations do you think would be necessary before a non-industry laboratory was allowed to submit data for interpretation?
For example: training according to points discussed in first set of questions, accreditation to ISO17025 standard, satisfactory performance in a recognised proficiency scheme for those analyses that are submitted for interpretation, regular audit by industry, exchange of samples.

- Certain authentication techniques are not based on brand IP (i.e. specific concentrations of constituents) but are either based on spectroscopic profiles that are hard to relate back to specific compounds (e.g. UV/VIS) or are based on isotopic profiles, that are geographically specific rather than brand specific. Would these methods and data, where relevant, be considered easier to share by brand owners (e.g. isotopic water values for products bottled in Scotland, conductivity measurements, dipstick for brand markers)? Even then do you think controls would be required for preventing uncontrolled dissemination?

**General**

Are there any other points on the subject of spirit drink authentication by non-industry laboratories, e.g.

- their role
- their contribution to spirit drink authentication
- the tools that would help them in their work
- the means by which communication could be improved between them and industry experts

_Please record any additional comments._

_Many thanks for your time and consideration._

_Ian Goodall_

_ian.goodall@swri.co.uk_

_+44 (0)131 449 8900_
Appendix II - Interview Questions for Non-Industry Stakeholders Undertaking Spirit Drink Authentication

“The Investigation of Options for Training and Accrediting Laboratories in Spirit Drinks Analysis and the Development of Training Schemes”

There are two principal subtasks associated with Deliverable 5.4 within the FoodIntegrity Spirit Drink Work Package. These are as follows:

a) Investigate options for training laboratories in spirit drink analysis according to recommended guidance stored on a legacy platform (e.g. website).

b) Develop training/certification schemes to roll-out current & new technologies/protocols.

To aid in the provision of these deliverables, opinions are required from interviewees on the subject of the training and accreditation of non-industry laboratories for spirit drink authentication (although there may be some points of relevance to industry laboratories as well). By non-industry, we mean laboratories other than those of spirit producers, or spirit sector laboratories such as the Scotch Whisky Research Institute. This will tend to be laboratories offering some form of enforcement or consultancy role within their country.

Training/Accreditation

Please respond to each of the questions in the section below.

- What are the analyses for which you think non-industry laboratories would benefit from training in the analysis of spirit drinks?

- Are there only certain types of analysis you think non-industry laboratories should be trained in and if so which ones?

- Do you consider some analyses too difficult to run or interpret for effective non-industry laboratory training to be given?

- Should non-industry laboratories be undertaking brand authenticity, generic authenticity (i.e. conforming to a spirit category such as whisky) or both? The issue here will be that laboratories will be tasked with undertaking different policing roles in accordance with their individual remits, other than specifically supporting industry: e.g. consumer protection for food safety, protection against consumer fraud, defending litigants in civil court cases.

- What are the benefits in improving the analytical capabilities of non-industry laboratories in spirit drink authentication?
• What tools do you think would help support the analysis work of non-industry laboratories and how do you think they should be employed. For example, consider the following:
  a) Industry approved training day covering suitable background to issues in spirit drink sectors, analysis methods, equipment, means of interpretation.
  b) Database of methods used in spirit drink authentication (which is being developed under Work Package 2 in the Food Integrity project)
  c) Details and list of publicly available literature on spirit drink analysis methods
  d) References to application notes and papers looking at evolving techniques
  e) A handy reference (and updated) directory to industry contacts (within companies or trade associations) with whom it is possible to make contact with regards to counterfeit and authenticity issues
  f) A dedicated website covering or linking to all these areas (which is being developed under FoodIntegrity website)

• Who do you think should be involved in creating any tools for training purposes under the Food Integrity Project?

• How should we go about rolling the training out? Who would you recommend as a target audience?

Counterfeit Identification

The following questions are being posed to respondents from the spirit drink industry. Essentially, they tackle potential concerns that industry may have on the subject of improving data sharing between producers and enforcers. It would be very helpful, although the questions are aimed to industry, to get input on the issues raised from the potential non-industry partners in such an enterprise.

Please provide comments on each of the subject areas considered.

• Is there benefit in the sharing of data between industry and non-industry laboratories? Is there a bar to this based on industry intellectual property? Could such a sharing mechanism be undertaken on an industry scale with a large number of brand owner sign-ups (e.g. via IFSP, FoodIntegrity etc.), or a category level by say relevant trade organisations, or at a member company level via selected sharing with selected third parties?

• If an industry based scheme was established for “sharing data” what controls would be required to ensure brand owners or category experts, would be happy that information sharing is controlled and secure? For example, at an industry level a protocol via which analytical data could be submitted for interpretation could be established. Would only certain approved organisations be able to use? Would it provide an automatic answer, or would this be provided manually? If automatic, how would the prevention of multiple submissions, via which limits could be inferred, need to be controlled. Are there other concerns you could see being relevant to such a system?
• If an industry based scheme to “share data” was established, or some more specific relationship, what requirements or recommendations do you think would be necessary before a third party laboratory was allowed to submit data for interpretation?
  For example: training according to points discussed in first set of questions, accreditation to ISO17025 standard, satisfactory performance in a recognised proficiency scheme for those analyses that are submitted for interpretation, regular audit by industry, exchange of samples.

• Certain authentication techniques are not based on brand IP (i.e. specific concentrations of constituents) but are either based on spectroscopic profiles that are hard to relate back to specific compounds (e.g. UV/VIS) or are based on isotopic profiles, that are geographically specific rather than brand specific? Would these methods and data, where relevant, be considered easier to share by brand owners (e.g. isotopic water values for products bottled in Scotland, conductivity measurements, dipstick for brand markers)? Even then do you think controls would be required for preventing uncontrolled dissemination?

General

Are there any other points on the subject of spirit drink authentication by non-industry laboratories, e.g.

  their role
  their contribution to spirit drink authentication
  the tools that would help them in their work
  the means by which communication could be improved between them and industry experts

Please record any additional comments.

Many thanks for your time and consideration.

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Appendix III(a) - Responses to Interviews – Industry Viewpoint - Respondent 1

Opinions given by this respondent represent the views of two representatives from a privately owned international spirits company, based in the UK. All opinions expressed are those of the Respondent 1a, laboratory manager, apart from those given in red, which represent Respondent 1b, brand protection manager (both based in the UK).

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- Whilst training laboratories in methods is good, this presents difficulties for the industry. Non-industry laboratories can produce numbers, but without reference data these lack any real value. Methods for which it would be beneficial for third party laboratories to be trained are: strength, volatile congeners, sugars and maturation related congeners.

Should Non-Industry Laboratories only be trained in certain analyses?

- Yes. In addition to the list given in the previous answer the following were discussed.

  Phenols analysis – possibly, but this needs to be correctly interpreted. Is the laboratory looking for phenols or polyphenols? More specific analysis should be recommended.

  UV-Vis training – not really required. The software (should be) designed to be user proof. The brand profiling facility in the Ocean Optics spirit sampler is quite intuitive.

It was noted that the analyses a laboratory should be trained in was difficult to answer, and would to a certain extent be laboratory specific and dependent on equipment availability. Most laboratories, for example, would have LC/GC methods and would not need much training in such methods. However, it would be recommended that training in achieving robust results is important. Are all the right requirements for in place for measuring how well a method is performing (e.g. Quality Controls, external quality controls, maintenance procedures)?

Consideration should also be given, when recommending training for analysts, as to what the objectives are for the laboratory. For example, if just considering brands, some analyses, like maturation related congeners in Scotch Whisky, are not too problematic. In such cases, what is important (in training) is the performance of the analysis and knowing the variability of the product. (Any training would certainly need to address how you train someone to accommodate such variability.) However, the use of maturation related congeners for generic Scotch whisky authentication would present difficulty.

Thus, in summary, Respondent 1a had no particular issue with the types of method in which a non-industry laboratory may be trained, but was concerned about the training relating to analytical precision and knowledge of the variability of brand and categories. That said, he
did indicate that he would prefer training was restricted to those compounds specified in EC Regulation 2870/2000 (apart from the analysis of sugars at low levels). When asked about the analysis of flavourings, Respondent 1a felt that training in approach would be fine (e.g. find potential marker compound, identify levels, if any in authentic product and check with references to the scientific literature). He felt that the direct provision of information as to markers and levels that signify a counterfeit, should be avoided, unless some measure of control over this information could be assured.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- This would depend on the laboratory and their capability to undertake the method. Information as to reference data is key, and there are confidentiality issues associated with such. If someone contacts the respondent’s company it is possible to confirm whether a product is consistent with a particular brand. However, they will never give out brand specific ranges.

- Respondent 1b concurred that those analyses that relate to brand specific products or where confidentiality may be required to fully and properly interpret results may be too difficult for non-industry laboratories.

- Category identification was noted as being troublesome. Confirmation of an external inquiry regarding brand authenticity is harder to replicate when considering the authentication of a category. Thus, Respondent 1a noted that the identification of available public references may be useful, which refer to compounds and their concentrations in Scotch Whisky and other spirits. Provision of a web inquiry option may also be possible, to determine whether a particular compound is present in a category of spirit such as Scotch Whisky, but Respondent 1a did not feel that provision of any sort of definitive list would be a good idea.

- For generic authentication, it was noted that adulteration/substitution with flavourings/different spirits was key. Some basic information can be used in such circumstances. For example, if the methanol level is too high for a Scotch Whisky, or if a compound that cannot be detected in a particular category is found. However, comparing levels of known compounds with acceptable ranges is in most cases difficult and more in-depth expertise is required.

In conclusion, in terms of training, Respondent 1a felt that quality of data and available public references of which use could be used for interpretation were important points.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- No additional points were offered to this question. Respondent 1b noted that the speed of response (being local) and additional resource of the local facility were of benefit. The fact that such analyses would be from a third-party, independent source and thus able to provide positive/negative corroboration were noted.

What tools would help support the analysis work of non-industry laboratories?
Respondent 1a questioned how much information should be given away for generic authenticity work. He noted that, for Scotch Whisky, the Aylott and Mackenzie paper is the major tool, and other publications are available. The following were noted as appropriate tools:

- Guidance as to best practice in analytical methodology for authentication (e.g. keeping databases up to date).
- Guidance as to the right approach to undertaking generic authenticity.
- A list of approved reference papers containing analytical data (or at least available papers).

A consistent set of methods and data sources was noted as being useful for referencing in court cases relating to counterfeit products.

Responding to the suggested options for training tools, the following points were noted:

- a) Training events - were considered useful for dissemination of best practice and expertise in spirit drink authentication. Respondent 1a was unsure whether hosting or visiting laboratories would be the best option, although he noted that presentations at relevant conferences (e.g. distilled spirits conferences) was a useful way of covering many interested parties. Question and Answer sessions that can be conducted face-to-face allow for better understanding and strengthens the relationship between industry and non-industry analysts.

- b-d) A Database of Methods - details of publicly available literature and references to applications notes and papers on evolving techniques were all considered useful resources.

- e) A directory of industry contacts – was considered a useful tool, but should reflect the protocols currently in place at spirit drink companies. Any external inquiry relating to a spirit company’s brands should be made through the establish channels to ensure the inquiry is logged and treated correctly, in accordance with company policy. For example, an inquiry emanating from Taiwan may need to be routed through the Taiwanese office. However, it was worth exploring as a possibility, although might need to be approved higher up the individual corporate structures.

- f) A training tool on a private website - was considered a useful approach and something that could be used to provide guidance as to best practice, generic authentication protocol and approved scientific papers with appropriate analytical data. Having such an information hub was considered a good idea in itself, but it was also noted that knowing who was accessing such information, i.e. having an improved network of contacts, would be useful when preparing affidavits for court cases.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

- SWRI should be the organisation creating such tools, but they need to be sense-checked by the industry. This was seconded by Respondent 1a, who indicated that tools should be created collaboratively by the SWRI and industry.
How should training be rolled out, and to whom?

• SWRI should undertake an appropriate search to find out the target audience and their preferred method of interaction.

Counterfeit Identification


• As Respondent 1a had already noted, sharing data with third parties is very problematical for industry and his company would not specifically do this. However, the company would generally be happy providing information as to whether a suspect product is consistent with a particular brand. Whilst Respondent 1a would not rule out answering questions as to consistency via an automated process – he noted issues (see below). Respondent 1b supported this view, highlighting that confidentiality issues often exist when it comes to brand and brand-extensions. Confidential information would need to be carefully protected/controlled. Trust would need to be built with any non-industry labs with which industry collaborates and/or protocols developed that accredited non-industry labs must agree to comply with regards (a) use, (b) release and (c) communication of information and results of analyses.

Comments on sharing information via manual or automated process (if data remains secure)

• It was felt that the use of an automated process for a company to provide confirmation as to whether a suspect product’s profile is authentic would be too difficult to manage effectively. It would need to be very carefully established and controlled. Judgement as to the exact nature and motivation behind the question being asked is often required. And care is need when determining how to answer a question of authenticity. Respondent 1b reiterated the need to have strict protocols in place.

Submitting data for assessment – what checks would be required?

• Some questions about the methods being used to obtain the submitted data would need to be made. For example, 2- and 3-methyl-1-butanol: are these being measured individually or as a total. Competency in undertaking the analytical methods would need to be assured. A certain level of internal and external validation would need to be demonstrated.

Respondent 1b once again stressed the need to have strict protocols in place, whatever data sharing mechanism might be employed.

Could some data be shared if it did not compromise brand IP?

• It was felt that there was potential for such data to be shared, but care would need to be taken. Some parameters which might be considered as IP neutral, may contain brand specific elements. For example, with UV/Vis samples, the provision of spectral data may make it easier for counterfeiters to find an acceptable substitute. However, the use of
isotopes to indicate, say whether a product was bottled in Scotland would probably be less problematic. A test to confirm E150a caramel has been used, rather than any other exogenous colour, would not cause problems in being shared. Each potential analysis data set that could be shared would need to be considered on a case by case basis. Respondent 1b again noted that before any information/analysis tests/results data could be shared, clear protocols would still probably be required. This would apply whether the analyses related to brands or were non-brand specific. Contractual agreements would need to be put in place before sharing any brand specific authentication information/data.

General

The following additional points were made about spirit drink authentication by non-industry laboratories:

- Care needs to be taken when making contacts with non-industry laboratories. How do you receive such contacts? How do you monitor interactions? How is information provided being used/presented by others?

- The security and accuracy of information provided to non-industry laboratories needs to be maintained. It should be kept updated, relevant and protected against inadvertent and deliberate misuse.

- For any conclusions given to non-industry laboratories on the basis of analytical data, the following needs to be considered: validation of analysis, appropriate training and guidance, the use of an NDA, and some form of audit to ensure these points.

- Respondent 1b noted that any collaboration between industry and non-industry laboratories would need clarity on use, release and communication of information and results.
Appendix III(b) - Responses to Interviews – Industry Viewpoint - Respondent 2

Opinions given by this respondent represent the views of a family-owned international spirits company, based in the UK. All opinions expressed are those of the Respondent 2, technical development area leader (based in the UK).

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- As a minimum it was noted that strength, on the basis of distillation and densitometry should be undertaken and sufficient training provided. Again, issues with correct analysis and interpretation should be stressed. An example given was a Taiwanese laboratory where high obscuration had not been accounted for, resulting in an inaccurately low strength measurement. Other useful analysis techniques highlighted, aside from true and apparent strength, were based on common requests from customers and included: major volatile congeners and methanol, furfural, dry extract, esters, acidities, metals.

- It was also felt that training should adequately cover the interpretation of measurement units. Units such as g/100 l (or g/ml) absolute alcohol are potentially confusing. Knowing how to convert results between units is important. It was noted that parameter classes are also poorly understood, for example, reporting aldehyde values (sum of acetaldehyde and adjusted acetal concentrations).

Should Non-Industry Laboratories only be trained in certain analyses?

- The following analyses were identified as being problematical for training and the provision of guidance: cask extractives – this is a difficult analysis with a noisy baseline and some people view cask extractive information as being usefully kept confidential and thus more effective for industry protection; sensory – this is a subjective analysis, hard to use objectively in terms of prosecutions and is often based on limited assessment of suitable reference samples; colour – issues surrounding potential colour fade need to be understood. It was noted that any training information should be careful to outline the difficulties and concerns surrounding certain analysis techniques (e.g. colour fade) and their correct interpretation. Such training advice should extend to different matrices. For example, liqueurs offer their own individual challenges as a matrix compared to vodka or whisky.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- Demonstration of proficiency is important and should be stressed in any training. This is important, especially when different analytical methods are being employed to measure the same parameters, possibly as a result of the laboratories not having the same capabilities in terms of equipment. In general, it would be best to advise those undertaking analyses that if they cannot base their method on the EU reference methods, and show comparability, they should avoid analysing the parameters concerned.
• It was felt that brand authenticity is particularly difficult for non-industry laboratories. It is possible to build up a tool for generic authenticity, with or without the use of publicly available literature, for the spirit category. However, with brand authenticity, the problem of ensuring current and appropriate reference samples was noted. Non-industry laboratories simply do not have a huge supply of reference samples. Lack of communication from analytical laboratories undertaking brand authentication was also referenced. Trading Standards will inform the respondent’s company when samples of its brands are taken for the purpose of a case; however, there is little, if any, follow up. The respondent’s company has never been asked to provide appropriate sample sets of standard brands or ranges of analytical data (although the latter would never be given out). A concern was raised that even if third party laboratories are using the Spirit Sampler (or alternative) for profiling blends, the number of samples used to construct a model might be insufficient to properly profile the brand.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

• Several benefits of improving the analytical capabilities of non-industry laboratories were noted. These included the establishment of a network of laboratories on which the industry can rely (which is useful for a trade organisation in protecting the interests of its spirit category, or categories, worldwide), as well as increased protection for the consumer and industry. It was also suggested that better product knowledge within governmental laboratories in international markets might also help in preventing excessive responses when health issues are raised (see phthalates in China).

What tools would help support the analysis work of non-industry laboratories?

• All the proposed tools listed in the interview questions were considered of benefit in training non-industry laboratories: training days, method databases, collation of publicly available literature, references to application notes, an “expert” directory, a dedicated website. The creation of e-learning tools was suggested, as was the generation of fora via which participants could exchange information, swap results and samples. The possibility of being able to establish/support mini-proficiency schemes amongst interested parties was noted.

• On the subject of who would represent the respondent’s company in an “expert” directory, it was noted that consideration would need to be given to ensure any contact from a non-industry laboratory was routed through the appropriate channels (e.g. if a non-industry laboratory wished to discuss the analysis results from a suspected counterfeit product). It was suggested that a phone number and generic title be provided (e.g. ‘Head of Legal’) so that regular updating is not required when people change job role.

• An additional useful source of information suggested for training purposes and industry use was the collation of analysis based spirit drinks regulations in different countries. It may be problematical to ensure the information is kept up to date, but with a sufficient community helping to ensure relevance, this may not be so onerous.
Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

- The suggested contributors to any training programme were the sector based research laboratories (SWRI and BNIC), the trade organisations (SWA, spiritsEUROPE) and associated organisations involved in spirit drink authentication such as IFSP. Industry should be consulted and advise on suggested tools from the position of a potential user. The target audience for training would be Trading Standards type bodies. However, it would be useful to consider who may be trying, or keen, to undertake spirit drink profiling, but lack the capability to produce such results or the know-how to assess the results provided by others. It was suggested that the craft distilling industry might be a good target audience.

How should training be rolled out, and to whom?

- As to the best instructors for any training, the SWRI would be suitable but could not be expected to act as trainer outside the duration of the Food Integrity Project. The SWRI could certainly “test-drive” any training. It was suggested that online training might be best for reducing costs, although face-to-face training is always preferred to ensure the messages have been successfully transferred. Any road-testing may help better define: 1) who requires training, 2) how to tailor the training and 3) how to maintain and undertake the training, if successful.

Counterfeit Identification


- As noted, the respondent’s company would not give out any analytical information relating to their products to a third party. However, the ability to advise on data was seen as being a useful activity, although this currently does not take place. Such a practice could act in a similar way to a customer complaint inquiry and could easily fit into standard operating procedures. The manufacturer of the brands will always have the best reference data set available and the best understanding of the appropriate analytical ranges for their product, based on their intimate understanding of its production process.

Comments on sharing information via manual or automated process (if data remains secure)

- The possibility of an automatic (e.g. web based) portal via which data could be submitted for authentication was discussed. Even given the issues involved with developing such a portal, a number of concerns were noted. Firstly, abuse of the submission process, to attempt to identify approved analytical ranges, should be prevented. Secondly, some form of induction process would need to be undertaken, i.e. has the organisation/individual providing data understood any requisite training (such as e-learning) and has the laboratory providing the data demonstrated its proficiency, either via accreditation or some other approved process? Even then, an automatic process lacks the interaction that would be seen via some manual submission of data and a personal response. Where non-compliance is seen, there are nearly always additional questions to be asked.
Submitting data for assessment – what checks would be required?

- Should the approach for submission of data for suspect samples proceed via direct contact, it was noted that there would still be a requirement to undergo some form of induction process.

Could some data be shared if it did not compromise brand IP?

- The benefit of sharing “non-brand” analytical data to help non-industry laboratories identify counterfeit products (e.g. stable isotopes values for water) was recognised. However, it was suggested that care would need to be taken to prevent commercially sensitive information being derived from such provision. For example, if water isotopes are to be useful, then a list of brands bottled in Scotland (along with an appropriate database for Scottish water isotopes) would need to be provided. Would companies wish non-industry organisations to know (or infer) which brands are not bottled in Scotland? Even sharing profiles such as those produced by the Spirit Sampler may provide a potential counterfeiter with too much information. Ensuring such tools remain current and the limitations understood, also presents problems.

General

The following additional points were made about spirit drink authentication by non-industry laboratories:

- It was suggested that more information be sourced regarding possible additives and their detection. Could these be better used (where allowed) to authenticate products by third parties?

- New analytical equipment should be evaluated when it comes out and improvements noted, but in order to keep consistency it was suggested that a “sensible” set of standard reference methods be targeted, taking into account a range of laboratory budgets.

- Despite the point made above, the industry should ensure it is matching the analytical expertise and equipment available to enforcers in international markets, e.g. China.
Appendix III(c) - Responses to Interviews – Industry Viewpoint - Respondent 3

Opinions given by this respondent represent the views of a large, multinational, yet privately held, family-owned spirits company, whose headquarters are outside Europe, but whose portfolio includes European spirits. All opinions expressed are those of the Respondent 3, technical director, based in mainland Europe.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- The application of non-destructive spectroscopy technologies like NIR and Raman spectroscopy (which can both be applied through bottle) were highlighted as techniques that would become more and more relevant to spirit drink analysis.

- It was also felt that non-industry laboratories would benefit from more sophisticated laboratory techniques, such as the automatisation of sample preparation/concentration with systems such as those manufactured by Gerstel.

Should Non-Industry Laboratories only be trained in certain analyses?

- Training in all the above analyses (essentially both “in-field” and more sophisticated laboratory analyses) was suggested.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- The respondent felt that GC/MS can provide potential errors for the inexperienced analyst. Whilst the increased sensitivity of GC/MS was considered important for spirit drink analysis, it was noted that analyst must be able to correctly interpret/confirm compound identification and not rely on that provided by the analytical software. This will avoid possible mistakes and generation of incorrect results and opinions based on those results.

- It was felt that generic authentication would be more suitable for non-industry laboratories.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- Improving the analytical capabilities of non-industry laboratories will increase the level of protection against the marketing of counterfeit spirit drinks. This would also help prevent health issues that can negatively and severely impact on the industry in general.

What tools would help support the analysis work of non-industry laboratories?

- The following tools were highlighted as being of particular relevance: a database of methods used in spirit drink authentication, references to application notes and papers looking at evolving techniques, a handy reference directory to industry contacts, a dedicated website covering or linking to all these areas.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?
Public and private entities that are internationally recognized for their expertise in analytical and product knowledge.

How should training be rolled out, and to whom?

- No opinion given.

**Counterfeit Identification**

**Sharing Data – Benefits, Issues and Potential Mechanisms.**

- It was noted that identifying counterfeits helps protect the industry and consequently it must be accepted that certain information should be shared. The mechanism already in place with IFSP (solely involved with brand protection) was noted as a good way to tackle the problem.

**Comments on sharing information via manual or automated process (if data remains secure)**

- Again, it was noted that the system established by IFSP is working. However, in this case any shared data in possession of this organisation will only allow the identification of possible counterfeits. The definitive answer on the authentication of a spirit sample will be provided by the brand owner involved.

**Submitting data for assessment – what checks would be required?**

- Participation in an accreditation and recognized proficiency schemes was recommended.

**Could some data be shared if it did not compromise brand IP?**

- Whilst acknowledging that the types of data given as examples would, effectively, be more easily shared by companies due to less concern over IP, it was felt that the prevention of uncontrolled dissemination is mandatory to ensure the credibility of any established system.

**General**

No additional points were made about spirit drink authentication by non-industry laboratories.
Appendix III(d) - Responses to Interviews – Industry Viewpoint - Respondent 4

Opinions given by this respondent represent the views of a large multinational spirit drinks company, based in the UK. All opinions expressed are those of the Respondent 4, brands assurance manager, based in the UK.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- Those that deal with product safety – methanol levels.
- Basic product authentication (generic authenticity) to verify spirit category e.g. Scotch.

Should Non-Industry Laboratories only be trained in certain analyses?

- Again, analyses that relate to product safety, such as methanol levels, was noted.
- It was noted that there is a challenge in the training of any laboratory. How can you appropriately ‘calibrate’ an independent laboratory to be certain of what they are checking, which standards they are using and how they are verifying their results? In addition, there is an important concern about confidentiality. In order to correctly authenticate a sample, particularly a brand, a laboratory needs to be trusted with commercially sensitive data.
- A number of questions relating to the training of non-industry laboratories in the identification of counterfeit samples were identified:
  - Commercial sensitivity. Need to consider cases where trained laboratories need to deal with sensitive data or cases which need to be kept confidential to avoid media scare stories.
  - Confidentiality. Can the laboratory be trusted with commercially sensitive data (particularly for brand authentication)?
  - Cost. Who is going to pay for the training and to audit capability?
  - Selection. Who identifies which laboratories will be trained? It was also noted that diluting the exclusivity and value of current laboratory evidence could erode the validity of the results. The specialist nature of “industry” labs, and the fact that they have gone through a rigorous process to become validated, builds trust.
  - Frequency. It would be difficult to cope with multiple ad hoc requests for training.
  - Maintenance. Who manages and validates these laboratories on an on-going basis?
Validation. How do customers know that these general lab services can be trusted? An accepted form of validation and control would be required, to ensure that results will be accepted as robust evidence.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- Concern was not expressed over any type of analysis, but as to how non-industry laboratories could be appropriately trained and validated (see above question).

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- The respondent for this company questioned whether there were suitable benefits in improving the capabilities of non-industry laboratories. It was noted that the respondent’s company would always seek out a reputable and validated service provider with a proven track record, where the results could be trusted. Because of the specific and specialist nature of the company’s requirement a general provider would be the last port of call.

What tools would help support the analysis work of non-industry laboratories?

- Respondent 4 felt that a number of the tools proposed in the question were possibly useful, but required more clarification on these options. Concerns were expressed about how the effectiveness of training could be judged, the merits of providing information to a large number of non-industry service providers, and the manner in which tools could be maintained and updated. The point was made that it might be better to have a few specialists with robust results rather than many generalists where the results are not assured.

- The following points/question were made about specific tools:
  - Training days: Would these be enough? How would they be audited? What form of qualification would they require?
  - Publicly available literature on spirit drink analysis methods: Such information could be usefully shared.
  - References to application notes and papers looking at evolving techniques: It was noted that such references would need to be managed to maintain the deployment of cutting edge technology. The commercial advantage of general service providers using such techniques was also questioned.
  - A handy reference directory to industry contacts: Concern was expressed over how this would be implemented, and who would be responsible for its maintenance.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

- The Scotch Whisky Research Institute.

How should training be rolled out, and to whom?
• Respondent 4 reiterated the need for careful selection of laboratories that would be trained/educated/trusted by industry partners in answer to this question. It was noted that scale of roll out would be dependent on funding and that the selection process of any industry collaborators would need to ensure that only capable long-term partners were identified. Training should also be part of a scheduled programme of work.

Counterfeit Identification


The following points were made about how Respondent 4’s company interacts with external organisations on the subject of spirit drink authentication. This area is tightly controlled, in order to protect the equity associated with its brands. It was stated that the company:

• Does not share (communicate) its brand protection strategy. It was felt that such messaging as suggested here could be seized upon by the media and used against the brand.

• Controls messaging with external bodies, such as Customs, to reassure and avoid risk to reputation.

• Delivers training only to specific 3rd parties, carefully vetted. Its data is not widely available for the reasons mentioned above.

Comments on sharing information via manual or automated process (if data remains secure)

The following controls were put forward as requirements before a brand owner would be prepared to share information on products:

• No mention of either brand name or company name

• No images of brands or images which might be associated with particular brands

• No data regarding the scale of the counterfeit risk

• No information regarding what secure measures are deployed to protect particular brands

• No sharing of any scientific data measurement files without a Non-Disclosure Agreement (NDA); these would not be allowed to be openly shared

Submitting data for assessment – what checks would be required?

• As indicated in the previous questions, the attitude of the respondent’s company would be to have very specific contracts and NDAs in place. These would be with a selected few, rather than a more general approach. Potential partners would have to be audited and agree to confidentiality, compliance and code of conduct policies. They would also be audited to ensure that their laboratories were of a specific standard, with calibration and maintenance programmes in place.
Could some data be shared if it did not compromise brand IP?

- Respondent 4’s company would not share its spectroscopic profiles with a list of general service providers. Such information is only shared with specific secure partners such as the IFSP who are under NDA to maintain strict confidentiality.

- Respondent 4’s company would also challenge the validity of any profiles produced independently; it would not rely upon these results as it would be unable to guarantee the methodology used to create them.

General

The following additional points were made about spirit drink authentication by non-industry laboratories:

- Respondent 4 raised a number of key concerns about an official training programme for non-industry laboratories. These centred around the following questions:
  
  o Who are the laboratories?
  o Who identifies them?
  o Who validates them?
  o Who trains them?
  o Who validates their results?
  o Who audits them?
  o Who pays for them?

- The respondent felt that there was a risk of diluting the value of interactions the industry has with select specialist laboratories by having multiple generalists. It was noted that schemes such as the public analyst service in the UK are supported because they assured of being impartial, accurate, using validated and calibrated equipment, and funded without the need to bend to commercial requirements. This ensures credibility of results, which is critical.
Appendix III(e) - Responses to Interviews – Industry Viewpoint - Respondent 5

Opinions given by this respondent represent the views of one of the subsidiaries of a large multinational spirit drinks company, based in Europe. All opinions expressed are those of the Respondent 5, chief chemist within that subsidiary.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- Respondent 5’s company would not train third party users on anything other than alcohol strength and higher alcohols (volatile congeners, see EU Regulation 2870/2000, Annex III.2). Alcohol strength can easily be employed as a legislative lever, since this will be defined appropriate for different spirit categories in most markets. Higher alcohols data can be compared with data available in the public domain and publicly available literature.

Should Non-Industry Laboratories only be trained in certain analyses?

- See previous question. Respondent 5 felt that any more complex chemistry and interpretation should be avoided, through difficulties in training and interpretation against publicly available information.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- Third party laboratories should be encouraged not to undertake brand authentication. This requires IP data, which brand owners will not provide. Instead, the identification of counterfeit spirits (e.g. whiskies) would be preferred, using alcohol strength and higher alcohols; the use of these two methods, it is felt, would allow the identification of a large number of counterfeit samples.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- The benefit in providing national courts with information they require for spirits analysis was referenced, in relation to work undertaken in a non-EU country through IFSP.

What tools would help support the analysis work of non-industry laboratories?

- It was noted that a suitable “training day” for Scotch Whisky could easily be provided based on current industry presentations and recommendations for reference literature. However, this would not accommodate the auditing and validating aspects required.

- Respondent 5 felt that the training should focus on the food safety aspects of authentication, i.e. non-authentic products (products that do not meet category requirements) are therefore non-genuine and pose a safety risk. It was noted that work on denaturant identification, examined as part of the FoodIntegrity project, could be useful as part of this training.
• Information should be identified for a range of commonly counterfeited spirits (rather than just Scotch Whisky, respondent 5’s main interest). Other organisations with expertise in these areas would need to be contacted.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

• Not answered.

How should training be rolled out, and to whom?

• In regard to the IFSP training of a non-EU laboratory, referred to in the previous question, the following points were made:

  o It was made sure that the laboratory concerned had the appropriate equipment (density meter and GC) and appropriate method details.

  o Samples were provided for testing purposes and the resulting chromatography evaluated.

This would be the preferred approach to training a third-party laboratory. Ideally some form of annual audit would be undertaken, possibly by a brand owner. Accreditation to ISO17025 and performance in a proficiency scheme such as DAPS or Bipea should be highly recommended.

Counterfeit Identification


• As noted, Respondent 5’s company believes that third party laboratories should not be encouraged to undertake brand authentication, but to look to identify counterfeit spirits (i.e. counterfeit categories).

• It was highlighted that third party laboratories in the UK and around the world will undertake brand counterfeit analysis without brand owners asking them to. Given this fact (despite the company’s preference against this type of work) the possible best use of data collated by third parties on brands was discussed. Sharing of IP data was obviously not an option.

• The possibility of the use of some form of data submission tool (via which brand owners could evaluate data submitted electronically – whether to be given an instant response via a locked down macro or to be assessed by an expert) was not ruled out as an option in improving communication and making better use of authenticity production data collated by third parties.
Comments on sharing information via manual or automated process (if data remains secure)

- The following caveats were noted:
  1) Obviously the company policy of not requesting third parties to undertake brand authentication would count against such a scheme.
  2) Such a scheme would require multiple brand owners to sign-up and industry approval.
  3) Care would need to be taken to prevent people repeatedly entering data in order to determine IP data by trial and error.
  4) Some form of accreditation would be required to ensure that the data being submitted was of an appropriate quality on which to base judgements (either electronically or manually).

Submitting data for assessment – what checks would be required?

- A training session, as identified above, with a recommendation for ISO17025 accreditation and adequate performance in a recognised proficiency scheme would again be required. Industry auditing or successful sample exchange and analysis would also be required.

Could some data be shared if it did not compromise brand IP?

- In addition to alcohol strength and higher alcohols data for generic authentication, the employment of analysis techniques that avoid compositional IP data, were also seen as being suitable for promotion. For example, the use of the Spirit Sampler with approved laboratories such as Trading Standards within local authorities in the UK. However, it was noted again that third party users of such tools should not be encouraged to build their own brand profiles but should use the profiles provided (in whatever secure fashion is deemed appropriate).

- It was also noted that there are some brand specific analysis tools (dipsticks) that can be employed by trusted laboratories for particular spirit brands.

- The interviewer wondered whether more sophisticated third-party laboratories that analyse alcoholic products using stable isotopes could be guided as to the use of certain non-brand specific isotopic indicators of counterfeits. For example, if a product is bottled in Scotland its δD and δ18O values could be used to help identify non-compliant products without giving away IP data. (Similarly Cognac, by virtue of its tight geographic requirements could be usefully targeted using this method.) Respondent 5 felt that stable isotope analysis is probably quite sophisticated, particularly where training is involved, and that alcohol strengths and higher alcohols would be generally sufficient for authentication. (It was pointed out that the Scotch Whisky Verification Scheme might help identify which products are bottled in Scotland to third parties.)

General

No additional points were made about spirit drink authentication by non-industry laboratories.
Appendix III(f) - Responses to Interviews – Industry Viewpoint - Respondent 6

Opinions given by this respondent represent the views of an international drinks company producing spirits and wines, based in Europe. All opinions expressed are those of the Respondent 6, its global analytical manager, based in Europe.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- The following analyses were listed in response:
  - Alcoholic strength
  - Volatile congeners
  - Maturation congeners
  - Determination of colorants
  - Flavour profiling
  - Determination of ions
  - Sugars analysis

Should Non-Industry Laboratories only be trained in certain analyses?

- The respondent did not note any analyses in which non-laboratories shouldn’t be trained. All the analysis listed above were regarded as important.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- It was noted that flavour profile analysis is difficult, especially in the interpretation, but that in some cases this can be a crucial analysis to identify counterfeits.

- It was felt that non-industry laboratories could undertake both brand and generic spirit drinks authentication. It was noted that in some cases (e.g. whiskies, Cognac) you have a homogeneous category, that allows for generic authenticity to be undertaken. In other cases (such as liqueurs), brands can offer very different compositions.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- The support this can bring to the industry in defending brands/product categories was noted. However, so was the potential risk that they could derive confidential information. Respondent 6 felt that the industry must balance the benefits that improving the analytical capabilities of non-industry laboratories could bring against the potential risks.

What tools would help support the analysis work of non-industry laboratories?
All the proposed tools listed in the interview questions were considered of benefit in training non-industry laboratories: training days, method databases, collation of publicly available literature, references to application notes, an “expert” directory, a dedicated website.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

- Laboratories such as the Scotch Whisky Research Institute or the Station Viticole in Cognac, which represent particular spirit beverages, were recommended in the first instance. When these laboratories could not cover particular topics, laboratories within spirit drink companies were recommended.

How should training be rolled out, and to whom?

- Lab managers and senior scientists within laboratories were suggested as recipients of the training.

Counterfeit Identification


- Respondent 6 had previously noted that some categories of spirit would be more amenable to generic authentication, whereas others would only suit brand authentication. As a result, it was noted that the mechanism for sharing information needs to be established on a case by case basis. The preferred choice would be for relationships to be maintained at a trade organization level, but in some cases, that would not be possible.

Comments on sharing information via manual or automated process (if data remains secure)

- In some basic cases, it was felt that automated data processing could be used to confirm authenticity. However, in many cases the use of automatic answers could compromise the protection of industry data and might also be too simplistic when a complicated explanation is required to justify a conclusion as to authenticity.

Submitting data for assessment – what checks would be required?

- Training/Validation options such as: training, accreditation to ISO17025 standard, proficiency scheme participation, audit by industry and exchange of samples were all approved.

Could some data be shared if it did not compromise brand IP?

- It was felt that this would be possible and would not need tight controls as to distribution, so long the data was managed by trade organisations or official bodies.

General

No additional points were made about spirit drink authentication by non-industry laboratories.
Appendix III(g) - Responses to Interviews – Non-Industry Viewpoint - Respondent 7

Opinions given by this respondent represent the views of one of the spirit drink industry trade associations. All opinions expressed are those of the Respondent 7, senior legal counsel at the trade organisation.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- For the particular spirit category of interest to the respondent, the following would be regarded as the principal four analysis methods (see EU Regulation 2870/2000): alcohol strength, sugars (to low levels, i.e. mg/l to g/l), maturation related compounds, volatile congeners.

Should Non-Industry Laboratories only be trained in certain analyses?

- See previous answer.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- It was observed that the decision about whether non-industry laboratories should be undertaking brand authentication was that of the brand owners. However, for generic authenticity, the education of non-industry laboratories was a necessity for court cases where external expertise is required.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- Two specific benefits were noted, based on experience with non-industry laboratories using analysis to authenticate spirit products. Improved analytical capability would help address the following:
  
  1) Laboratories often focus on the wrong analyses, based on ignorance about what are common frauds employed in counterfeits. Alcohol strength and general appearance (look, sensory) have been used to support a suspect product as being consistent with a particular spirit category. To combat the most common frauds the analysis of a product’s major volatile congeners and maturation related compounds (for a mature spirit) would also be recommended.
  
  2) Courts arbitrating on counterfeit spirit drink prosecutions in certain jurisdictions often have to, or want to, appoint their own analysts to confirm analyses and interpretations. Often these laboratories are inexperienced in the analysis of the particular spirit category to which the product belongs, or spirit drinks in general (having expertise in wine analysis for example). As a result, the appointed
laboratories must often have a considerable amount of information supplied to them, in order for them to be able to arrive at a conclusion.

- It was also pointed out that improving the analytical capabilities of non-industry laboratories is a means of alerting more people about the issues involved in spirit drink fraud.

What tools would help support the analysis work of non-industry laboratories?

- It was observed that, for the spirit category in which the respondent worked, guidance on the use and interpretation of the four main analysis methods already noted (strength, major volatile congeners, maturation related compounds and sugars) would be useful if stored on a shared, but controlled access, platform (website). A recognised expert (e.g. by the courts) could then be pointed to the relevant sources of information. Such a tool could include a basic Q&A section on the analysis of interest, peer reviewed papers and other expanding sources of information and would be seen as the “EU” approved tool for reference.

It was noted that such a controlled access website could possibly include a database of analytical ranges for bottled products against which conclusions could be made. A protocol would need to be established as to how such a database could be updated. However, it was recognised that sharing such a database might be controversial. Some members of the spirit drinks industry would be likely to think this collected information provided an analytical specification for a counterfeiter to follow.

- Additional tools suggested included:
  - the provision of information about the definitions of spirit drink products, and links to the relevant legislation;
  - links to technical files submitted to the EU for the registration of spirit drinks as geographical indications (which will tend to be the premium and thus counterfeited products) and any associated verification schemes;
  - better alerting capabilities for suspect samples; and
  - standardised training (but this would need to be regular).

- The FoodIntegrity Knowledgebase was discussed as a source of information on spirit drinks analysis methods and it was suggested that it is used as a reference tool, rather than duplicated on a platform specific to spirit drinks. It was noted that care would need to be taken with the inclusion of evolving techniques on such a database. Consideration needs to be given to whether they are statistically valid or relevant to industry problems. Guidance in this area would be useful.

- It was observed that Respondent 7’s trade organisation would want to know about any issues related to their spirit product category, identified by analysts or interested parties. Such alerts were already beneficial for the work the organisation undertook in investigating and prosecuting counterfeit operations. It was also felt that brands would benefit from
being alerted to any suspect products. Verification schemes might help with analysts identifying brand owners and following up on potential frauds.

**Who do you think should be involved in creating any training tools for the FoodIntegrity Project?**

- The following organisations were deemed to have the appropriate knowledge and expertise:
  - SWRI
  - BNIC
  - Other laboratories responsible for protecting national spirits
  - Brand owners
  - SWA/spiritsEUROPE/other trade organisation — for information that tended to the non-technical

**How should training be rolled out, and to whom?**

- Suggested organisations for which training might be useful included: Trading Standards (UK), OPSON, World Customs Organisation. The possibility of approaching laboratories that have been involved in giving opinions in spirit drink fraud court cases was considered. It was noted that in this case, it would be necessary to prevent any conflicts of interest and that government associated laboratories should be the first port of call.

- It was suggested that a training scheme, based on the information collated to provide the resource tools suggested above, should be constructed and approved by the industry for roll-out.

**Counterfeit Identification**

**Sharing Data – Benefits, Issues and Potential Mechanisms.**

- There was a common concern for laboratories, especially those with no specific expertise in a particular spirit category, that unless they have something to measure suspect products against then it is not possible to interpret results with any certainty. It would be very useful, particularly for court experts, to have one recognised source of information about a particular category or brand (hence a list of experts for categories or brands would be constructive).

However, there was also an often cited counter argument provided by some in the spirit drinks industry. Providing too much information could potentially play into the hands of the counterfeiters, providing them with recipes for counterfeiting.

Industry approval would need to be obtained before any additional sharing of information takes place, over that which is currently provided by communications in various approved
publications. However, support for sharing of information would be given, where this was deemed possible.

• It was remarked that some data that related to spirit categories might be more readily shared. For example, the detection of flavouring compounds that should not be present in a certain category of spirit can easily identify a counterfeit, where reference ranges can present more difficulties for interpretation.

Comments on sharing information via manual or automated process (if data remains secure)

• Possible options for sharing information were noted:
  o Establishing relationships with specific organisations to allow select data transfer;
  o Macro type tool, whereby no data is given out to third parties, but the authenticity of a sample is given based on inputted data; and,
  o For brands, provision of data to the brand owner for analysis.

• All the above options would be possible if a) industry approved and b) the data could be guaranteed secure.

• It was stated that the issue with the sharing of any data was loss of control, and that there should be an acceptance of the risk that data may be transmitted beyond those who have been given permission to see it. If an organisation is comfortable with this risk, then they should share the data. Otherwise, it should not be shared or appropriate protections put in place to reduce the risk of unintended wider distribution to an acceptable level.

Submitting data for assessment – what checks would be required?

• It was agreed that some level of protection would need to be put in place to ensure that anyone submitting data to an organisation for consideration of a potentially fraudulent was appropriately accredited.

Could some data be shared if it did not compromise brand IP?

• No opinion given.

General

The following additional points were made about spirit drink authentication by non-industry laboratories:

• It was pointed out that sensory analysis is subjective and should be treated with appropriate caution when making interpretations as to authenticity, compared to the objectivity of standard analytical methods.
Appendix III(h) - Responses to Interviews – Non-Industry Viewpoint - Respondent 8

Opinions given by this respondent represent the views of a UK Public Analyst. Public Analyst laboratories specialise in the science of Public Protection, testing food, water, feeds, toys, cosmetics, etc., to confirm compliance with current regulations. They are the internationally recognised official EC food control laboratories, within the United Kingdom.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- Respondent 8 was unsure of what spirit drink analysis methods in which the Public Analysts would be trained. However, they will be appropriately accredited for the methods that they undertake. For those methods that are employed, the provision by brand owners of analytical ranges for branded spirits, against which suspect samples could be tested, would prevent the need to create profiles in house.

- Information on methods to test for substitution of a product (e.g. high profile/premium vodka) when there are no authenticity markers deliberately added was perceived as being useful.

Should Non-Industry Laboratories only be trained in certain analyses?

- It was noted that Public Analysts would not be interested in training in, or information on, the more sophisticated and expensive analysis methods (e.g. stable isotopes).

Are some analyses too difficult/inappropriate for non-industry laboratories?

- Respondent was aware measuring maturation by liquid chromatography was regarded as being a more challenging analysis method. However, whilst not really undertaken by this Public Analyst, it could be performed if needed.

- The requirement for current reliable brand profiles in order to make analysis easier was reiterated.

- Public analysts undertake brand authentication rather than generic (spirit type) authentication. This is not related to level of difficulty however, but is based on what the Trading Standards departments of Local Authorities in the UK ask them to do. Typically, they test for brand substitution, e.g. low value product replacing the content of a higher value brand. Given that the funding received by both Trading Standards and the public analyst is restrictive, no extra work is undertaken on samples.

Despite this point, it was remarked that alcohol strength measurements can quickly identify whether a sample is inconsistent with the claimed spirit category. Since this measurement is undertaken on all spirits, identifying whether a sample is consistent with its category
definition is sometimes done by chance.

- The respondent was unaware that there are organisations such as the Scotch Whisky Research Institute that authenticate against category definitions. Also, the respondent hadn’t heard of the related trade organisation that will prosecute Scotch Whisky counterfeiters worldwide.

- Discussion about whether or not generic authenticity could be undertaken resulted in the suggestion that we also interview a representative from Trading Standards. A contact who regularly uses Respondent 8’s organisation for spirit drink authentication was provided (see Response IIIi).

**What are the benefits in improving the analytical capabilities of non-industry laboratories?**

- No opinion given.

**What tools would help support the analysis work of non-industry laboratories?**

- The respondent noted that a central resource of information would be very useful. However, the level of training in analysis methods was currently sufficient and additional training would not be required.

**Who do you think should be involved in creating any training tools for the FoodIntegrity Project?**

- Respondent was unsure.

**How should training be rolled out, and to whom?**

- Respondent was unsure.

**Counterfeit Identification**

**Sharing Data – Benefits, Issues and Potential Mechanisms.**

- The respondent felt very strongly that the public analysts are trying to protect the same brands as the brand owners. However, brand owners often ignore requests for information, and sometimes take far too long to reply, meaning that the reports have already been sent back to Trading Standards. As previously noted, the interpretation of results would be considerably easier if brand profiles were made available by brand owners.

- In relation to concerns over potential disclosure of analytical range information it was noted that Respondent 8’s organisation never puts any ranges on the reports given to Trading Standards, only the conclusions. (Such ranges will be internally generated rather than supplied by brand owners). Even then, the reports are marked as confidential.

**Comments on sharing information via manual or automated process (if data remains secure)**
• It was noted that even if sets of brand profiles were held at a central location, this would be a huge improvement to the lack of information currently available.

**Submitting data for assessment – what checks would be required?**

• No response given.

**Could some data be shared if it did not compromise brand IP?**

• Whilst more of a question for brand owners, Respondent 8 noted the following about two techniques suggested as possibly useful for producing data that would not compromise brand IP.
  
  o UV-VIS devices have been tested in the past for brand authentication. Whilst the technique performed adequately, other analyses were still required for reporting purposes. Like these other analyses, the brand profile had to be created in house and no guidance over wavelength selection was given. It was noted that the respondent had not heard of the Spirit Sampler, a device used by spirit drink companies to undertake UV-Vis testing of products in the field.
  
  o As noted previously, Public Analysts are unlikely to be interested in stable isotope measurements.

**General**

No additional points were made about spirit drink authentication by non-industry laboratories.
Appendix III(i) - Responses to Interviews – Non-Industry Viewpoint - Respondent 9

Opinions given by this respondent represent the views of a representative of a UK Trading Standards department. In the UK, this is the local government department responsible for protecting the rights of consumers, by checking that trading is fair, goods are safe etc.

Given that Trading Standards Officers are principally concerned with sampling and identifying counterfeit samples by non-analytical means, many of the questions in the standard script were inappropriate. They do not have their own laboratories. However, Trading Standards Officers are knowledgeable in the identification of spirit drink counterfeits, may use certain in-field tests at point of sale, and work in close co-operation with Public Analysts. Consequently, the views of a Trading Standards Officer on mechanisms for spirit drink authentication and any surrounding issues were sought to inform this investigation into training schemes for non-industry laboratories. These were recorded under the General observations heading.

General

• It was noted that the Respondent’s Trading Standards Department has a specific budget for food sampling. Given that alcohol sampling usually identifies suspect samples, it is easy to justify spending a proportion of this budget on alcohol analysis.

• The two principle issues in spirit drink authentication with which Trading Standards are concerned are brand authentication (particularly substitution) and dilution (in the on-trade such as pubs and restaurants).

• In terms of spirit drink analysis for suspected dilution in public houses, there is concern that the current trend in pubs is for pourers not optics. Optics should suffer less evaporation than pourers. It is common to find open bottles with pourers to be below the cut-off point for the bottling tolerance (0.3% in the UK) but there is no guidance on how low it should be before assuming the product has been diluted.

• Brand authentication tests can be used at point of sale. For example, the respondent’s organisation currently uses a dipstick device to detect a brand marker for a popular vodka. However, the respondent believes that counterfeiters are now aware of this practice and hence its usefulness has been devalued. (The respondent was also concerned that using a marker that could be created by breakdown of other compounds a counterfeit may use might also falsely indicate a counterfeit sample was genuine.) The mechanism for testing this particular brand of spirits via the dipsticks is through collaboration with IFSP, the International Federation of Spirit Producers, who provide the dipsticks in support of the work for its members’ brands.
• It was noted that Trading Standards have a legal obligation to be associated with a public analyst. They don’t use external laboratories. The respondent hadn’t heard, for example of the Scotch Whisky Association of other trade bodies interested in spirit drinks authenticity.

• Respondent 9 observed that occasionally Trading Standards will try to contact the brand owners, but the main responsibility is for them to send the information gathered from market surveys to the IFSP.

• The point was made that it should be recognised that Trading Standards, public analysts and the brand owners are on the same side; all are trying to protect the brands from counterfeiting.
Appendix III(j) - Responses to Interviews – Non-Industry Viewpoint - Respondent 10

Opinions given by this respondent represent the views of an analytical service provider designated by relevant government institutions to operate as an approved laboratory in the field of food and raw material for food and alcohol analyses. Opinions expressed represent the views of the head of the laboratory as well as a senior chemist. Whilst the organisation provides a broad range of chemical and physical testing services, part of its work is the analysis of alcoholic beverages to identify cases of illegal production.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- The respondents currently use GC-FID for spirit drink authentication. It was observed that if other techniques were available and within the capability of the laboratory then training on these would be useful. An example would be HPLC.

- More training was requested on how to interpret data with regards to what compounds are important to a particular spirit category and how their relative concentration may affect interpretation of the data.

Should Non-Industry Laboratories only be trained in certain analyses?

- It was felt that providing the laboratory had the equipment and the appropriate expertise in its use, then appropriate training on a recommended spirit drink authentication analyses would be useful.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- It was noted that some techniques such as FTIR and GC-MS/MS can be difficult to interpret and possibly not so effective for authenticity work. This however was more a comment on appropriate methodology to use for spirit drink authenticity, rather than a comment on restrictions that might be sensibly placed on the activities of non-industry laboratories. It was however remarked that cheaper and simpler techniques that are easier to interpret would be preferred.

- Respondents’ laboratory was not currently working on brand or generic authenticity specifically. Its main remit is to identify instances of illegal “moonshine”. However, this is a particularly type of fraud that could presumably be a brand or generic counterfeit, depending on how the product is marketed.

- Whilst direct targeting of brand or generic authenticity was not specifically within remit of the responding laboratory, it was observed that improving the knowledge and capabilities of the organisation would be beneficial.
What are the benefits in improving the analytical capabilities of non-industry laboratories?

- Non-industry laboratories (including governmental organisations such as Customs) are monitoring products in the market, and if they know specific information about different product analyses and quality parameters, they can identify “the fraud”.

What tools would help support the analysis work of non-industry laboratories?

- All the proposed tools listed in the interview questions were considered of benefit in training non-industry laboratories: training days, method databases, collation of publicly available literature, references to application notes, an “expert” directory, a dedicated website. Anything that facilitated information on analytical methods and how they should be applied was considered of use. Information on production processes and data interpretation were highlighted.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

- Input from the spirit drinks industry was considered the most logical choice in developing such tools.

How should training be rolled out, and to whom?

- It was suggested that any laboratories that undertake spirit drink analysis should be targeted. It was suggested that any roll-out should consider the fact that a lot of non-industry analytical and customs labs have a very wide remit in terms of the analyses they undertake. This could be a potential barrier for engagement.

Counterfeit Identification

- Generally, it was deemed hard to make or obtain contacts with industry laboratories. Any guidance that could be supplied would be good.

General

The following additional points were made about spirit drink authentication by non-industry laboratories:

- It was reported that instances have arisen where guidance from an industry laboratory might have been useful. It was also highlighted that methods for reporting and calculating results are sometimes hard to decipher, especially when considering regulatory requirements.
Appendix III(k) - Responses to Interviews – Non-Industry Viewpoint - Respondent 11

Opinions given by this respondent represent the views of a European government’s state laboratory service. Opinions expressed are those of the alcoholic beverage analysis head manager at one of the laboratories within this network.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- It was the opinion of the respondent that third party laboratories would benefit from training in all analyses carried out to verify compliance of product with the relevant regulations, since the first step in authentication is the acquisition of accurate results. Training was deemed important for the following analyses:
  
  o Real and raw alcoholic strength (also referred to as actual and apparent alcoholic strength)
  o Volatile substances: methanol, aldehyde, esters, higher alcohols...
  o Specific sweeteners and sugars content (fructose, glucose, sucrose, aspartame...)
  o Glycerol
  o Anethole, glycyrrhizic acid
  o Ethyl carbamate
  o Thujone
  o Maturation specific congeners
  o Isotopic analysis: $^{18}$O/$^{16}$O, D/H, $^{13}$C/$^{12}$C for geographic and botanic origin of the alcohol

- However, it was also noted that the regulations for spirit drinks not always very clear and some results must be interpreted.

Should Non-Industry Laboratories only be trained in certain analyses?

- See answer given above.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- The analyses listed below were considered difficult to run and could lead to variable results from one laboratory to another. Interpretation depends on databases and expertise established within the laboratory undertaking these analyses.
  
  o Aromatic profiles and the presence of forbidden aromas
  o Spectrophotometric profiles
  o Determination of the level of distillation
  o Determination of age/maturation and whether wood chips have been used (in some cases illegally depending on the spirit).
  o Determination of botanic origin of ethanol
• It was noted that it can sometimes be difficult to compare results between laboratories because analysis conditions (and hence analysis proficiencies) are different.

• It was also recorded that whilst each laboratory can build a proprietary database, non-industry laboratories will find the task of establishing an exhaustive database for every product analysed impossible, which increases the level of difficulty for authentication. Sharing information was regarded as being necessary to overcome such difficulties.

• It was felt that non-industry laboratories should be undertaking generic authenticity and origin authenticity. Whilst brand authenticity could be undertaken in specific cases to compare a suspicious product with an original one, this would only be to help a producer prove a counterfeit after a complaint or in the case of prosecution. It is not the role of non-industry laboratories to protect all brands.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

• The benefits observed were better protection for food safety and against consumer fraud. It was suggested that trained laboratories could also act as a new force to fight against fraud.

What tools would help support the analysis work of non-industry laboratories?

• A database of methods was deemed to be very useful; it would be easier and faster to answer a specific question on authenticity or security. This would be complementary with the suggested list of publicly available literature which can help to interpret results. This list is also important because it could constitute a basis for harmonised interpretations.

• A list of industry contacts was also regarded as advantageous because if the respondent’s organisation has doubts about the authenticity of a product, it could contact a producer to collect more information about the product. This could lead to a better comprehension of analytical results.

• It was noted that for the interpretation of complex results, there should be a consensus concerning the way these are interpreted. This could be achieved using a dedicated website with controlled access.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

• The respondent felt that an independent organisation, with no financial interest with a particular brand or with industry, would be best placed. For example, a non-industry laboratory or agency.

How should training be rolled out, and to whom?

• No answer provided.
Counterfeit Identification

This section was designed for members of the Spirit Drink Industry so no answers were provided by the respondent. However, the following points were noted in the previous section that are of relevance.

- Interpretation can be problematic, particularly when regulations aren’t very clear about what constitutes an authentic sample. Sharing of information, particularly databases of analysis results against which suspect samples can be compared, was regarded as being very important for non-industry laboratories. Advice on interpretation to accompany such data was also regarded as being highly beneficial.

- Different laboratories have different proficiencies in their analysis of spirit drink samples. This can make comparison of results problematic.

General

No additional points were made about spirit drink authentication by non-industry laboratories.
Appendix III(l) - Responses to Interviews – Non-Industry Viewpoint - Respondent 12

Opinions given by this respondent represent the views of a European government’s state laboratory service. Opinions expressed are those of the head of its NMR laboratory, who is also a research coordinator.

Training/Accreditation

Which Analyses Would Benefit Non-Industry Laboratories?

- The respondent’s laboratory is mainly active in isotopic analyses. It was therefore noted that training in other standard analytical methods would be beneficial, such as the determination of volatile compounds by gas chromatography.

- Another important gap in knowledge noted for the respondent’s laboratory was in the application of fast spectroscopic methods such as FT-IR and Raman spectroscopy. These methods can be used in the laboratory for a quick evaluation of the sample prior to high-tech, high-cost analysis (such as isotopic methods).

Should Non-Industry Laboratories only be trained in certain analyses?

- It was observed that the type of analysis that can be performed by a non-industry laboratory will depend on the role of the laboratory itself. For example, an official testing laboratory has to implement the legislation, so it is obliged to apply the official methods. It is these official methods in which it will need to be trained.

Are some analyses too difficult/inappropriate for non-industry laboratories?

- The main difficulty noted is in the interpretation of results, rather than the application of a particular method. Consequently, training in interpretation would be beneficial for non-industry laboratories.

- The respondent felt that, from the perspective of a non-industry laboratory undertaking spirit drink authentication, such laboratories can perform both brand and generic authentication. Certainly, the workload is large by assuming different policing roles, but at the same time a holistic approach to the analysis will be followed and control of spirit drinks will be more substantial and effective.

What are the benefits in improving the analytical capabilities of non-industry laboratories?

- By following a holistic approach to the analysis of alcoholic beverages, the perceived benefit for both consumers and producers will be increased market control, as a result of improved protection against fraud and food safety. Honest producers will be sufficiently supported and the sustainability of traditional products will be protected.
What tools would help support the analysis work of non-industry laboratories?

- All the proposed tools listed in the interview questions were considered of benefit in training non-industry laboratories by providing solutions to many of the problems they face: training days, method databases, collation of publicly available literature, references to application notes, an “expert” directory, a dedicated website. The existence of a website providing collated information on the other areas was deemed to be immediately helpful and effective.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

- Respondent 12 felt that the FoodIntegrity Project Coordinators should involve a European body in the creation of tools for training purposes. Suggested bodies were the Customs’ laboratories network and the committee of experts on isotopic analyses in wine/ wine products (under the JRC). It was noted that the latter body wishes to expand the Wine Data Bank to other alcoholic beverages, as well as the use of other non-isotopic methods for authentication.

How should training be rolled out, and to whom?

- The following options were suggested:
  - A first phase, which would involve the organisation of a 2-3 days’ workshop was suggested, to present the new tools created by the project and to cover the points addressed by the various suggested training tools above (including the accreditation of the methods using laboratory equipment). The audiences that should be targeted by training are analysts throughout the field of beverage authenticity (competent authorities and researchers) as well as European Committees (e.g. Customs).
  - The ultimate goal would be to continue the training in a second phase, which would concern the interpretation of the analytical results.

Counterfeit Identification


- The respondent clearly felt that sharing of data between industry and non-industry laboratories would be of great benefit, and that there was not barrier to the necessary exchange of information.

- One of the questions suggested options for sharing including a) on an industry scale with brand owners contributing to a hub organisation, b) on a category level via a trade organisation, or c) at a member company level with selected third parties. The respondent felt that sharing of data could be enacted via all 3 suggested routes, or by combining them. The first option, via an interface organisation such as IFSP, was suggested as the best option for testing the sharing of data.

Comments on sharing information via manual or automated process (if data remains secure)
• The respondent was of the opinion that a protocol for data submission for authentication by data holders could be established, through which authentication questions could be asked. The introduction of access control must be employed however; involvement could not be available to everyone, but only to officially recognised organisations.

• It was suggested that answers could be provided automatically using codes, to avoid multiple submissions to the company/organisation involved. In more complex cases, manual communication could also be made.

**Submitting data for assessment – what checks would be required?**

• All laboratories involved should possess a high level of proficiency in the relevant analysis method and should be accredited.

**Could some data be shared if it did not compromise brand IP?**

• It was agreed that specific techniques (especially spectroscopic/isotopic) could be a useful tool for sharing information, if databases are created and validated for products from different geographical areas. Even then, both industry and non-industry respondents felt that spectroscopic/isotopic profiles should not be widely disseminated, but only if access is requested by either a) a competent laboratory for the purpose of protecting the products themselves or b) the industry laboratories that produced the databases.

**General**

The respondent supported the implementation of all the above suggestions (training resource tools, effective but protected data sharing mechanisms). It was felt that these would help cover the gap between the industry and non-industry laboratories and refer to the new knowledge, statistics and other data processing, and opinions.
Appendix III(m) - Responses to Interviews – Collective Industry Viewpoint - Respondent 13

In May 2015 the Scotch Whisky Research Institute held a FoodIntegrity Spirit Drinks Authentication Seminar. Thirty-eight people attended from across Europe attended this event, 12 from technology providers and 26 representing a variety of stakeholders in spirit drinks authentication including analysts (industry and enforcement agencies), researchers and brand managers. The 26 stakeholders discussed a number of points, following a series of presentation from the technology providers. Compliance testing and training of laboratories external to the spirit drinks industry were briefly discussed. Opinions received are recorded below under the overarching headings of the previous interview questions.

Training/Accreditation

- Protocols for best practice in spirit analysis were suggested. The provision of guidance/protocols could be via online courses, perhaps linked to the IBD (Institute of Brewing and Distilling) or another training organisation such as a partner university.

Counterfeit Identification

- It was suggested that laboratories could be validated following training by the distribution of test samples, to ensure proficiency in spirit drink authentication

- Caution was still advised about providing too much information to third parties about methods of authentication, for fear of identifying ways in which counterfeits could circumvent conventional analysis.

- Brand authentication, it was stressed, is led by individual companies and sharing of authentication data would be unlikely as this is regarded as intellectual property.

General

- Guidance could certainly be provided to non-industry laboratories, but care would have to be taken to ensure disseminated information is controlled to the industry’s benefit.
Appendix III(n) - Responses to Interviews – Collective Industry Viewpoint - Respondent 14

The industry interview questions were also posed to a collective group of industry stakeholders who attended one of the biannual Scotch Whisky Research Institute Product Protection Technical Liaison Group meetings. Research on spirit drink authentication methods are discussed at these meetings. Eight representatives from 6 spirit drink companies provided the responses given below.

**Training/Accreditation**

**Which Analyses Would Benefit Non-Industry Laboratories?**

- It was noted that, from experience, non-industry laboratories (such as public analysts) struggle with the analysis of specific spirit matrices, as they are likely to be analysing a range of drink products such as whisky, wine and vodka, and are unable to specialise. Consequently, training in standard spirit drink analysis methods would be beneficial.

**Should Non-Industry Laboratories only be trained in certain analyses?**

- See answer above.

**Are some analyses too difficult/inappropriate for non-industry laboratories?**

- Brand authentication (where genuine products are compared to counterfeit products) was considered more useful and practical, compared to category (or generic) authentication. Third party laboratories (e.g. Trading Standards) are often more concerned with whether the consumer is being misled as to the identity of a particular brand. Brands also represent a smaller and more consistent sample population compared to a category. However, whilst non-industry laboratories could produce data on the counterfeit product, it was agreed that they would still struggle to undertake interpretation of the analytical data due to limited comparison data resulting from brand confidentiality concerns.

**What are the benefits in improving the analytical capabilities of non-industry laboratories?**

- Improving the capabilities of non-industry laboratories in spirit drink analysis is beneficial in that approved laboratories are often asked to give evidence in courts. It was also noted that having more laboratories analysing for suspect products could only be of benefit to the industry by identify more counterfeit samples, providing it was being undertaken correctly. Whilst it was recognised that all laboratories could not be at the desired level, in particular in relation to their access to comparison data, improving capabilities could only help the industry’s efforts.

- Questions were asked amongst the group about the number of state laboratories that provide data for prosecutions in court cases. It was also suggested that, since consultant laboratories will be paid for the samples analysed, there may be a conflict of interest in their provision of results and opinions.
• It was also noted that educating certain laboratories in global markets as to the composition of spirit drinks could also be useful in highlighting inappropriate regulatory limits.

What tools would help support the analysis work of non-industry laboratories?

• Education in methods and best practice for spirit analysis was recommended, since most laboratories will have sufficient expertise in standard laboratory techniques such as liquid chromatography and gas chromatography. Guidelines and information could be provided. The methods detailed within the 2010 MacKenzie and Aylott paper on whisky analysis (major volatile congeners, maturation related congeners, sugars), for example, were considered suitable for training purposes for this category of product.

• The importance of accreditation was stressed and should be incorporated into any given guidance. This can be for a compound or a method, but to be really worthwhile accreditation should also be given to the expression of opinions on spirit drink authenticity based on such data. This will be difficult without access to appropriate sample datasets for interpretation.

• For whisky, it was also noted that guidance had been generated in the past by the SWA legal department, in conjunction with the SWRI, to help third party laboratories involved in the SWA’s legal work in other countries.

• It was suggested that the Spirit Drinks Work Package section of the FoodIntegrity website be optimised to provide a reliable source of publicly available methods and data.

Who do you think should be involved in creating any training tools for the FoodIntegrity Project?

• No opinion expressed.

How should training be rolled out, and to whom?

• Customs laboratories were recognised as being particularly important since they are active in identifying counterfeit whisky. Public analysts and key approved laboratories used by the Scotch Whisky Association for prosecutions of counterfeiters were also deemed a good place to start.

Counterfeit Identification


• There was agreement that guidelines and protocols for the analysis of counterfeit whisky could be disseminated; the 2010 MacKenzie and Aylott paper was identified as a good place to start.

• As previously highlighted, brand owners would not share analytical information relating to their brands. However, the possibility of sending suspect samples to member companies for
analysis, with improved interactions with the non-industry laboratories as to outcomes, was suggested. It was also proposed that SWA/SWRI could similarly act as a translator of supplied data to confirm the authenticity of suspect samples.

Comments on sharing information via manual or automated process (if data remains secure)

- No opinion expressed.

Submitting data for assessment – what checks would be required?

- The importance of accreditation in analysis and interpretation has already been noted.

Could some data be shared if it did not compromise brand IP?

- No opinion expressed.

General

No additional points were made about spirit drink authentication by non-industry laboratories.