

STRATEGIES FOR THE AUTHENTICATION OF SPIRIT DRINKS AND PRODUCTS FROM THE WINE SECTOR

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State of the art

Food authentication and origin testing have become increasingly important in the last few years due to the growing concerns over food counterfeiting. Alcoholic beverages are among the products most susceptible to fraud because of their high demand and their significant impact on the economic sector of many countries. Developing analytical procedures that can guarantee the authenticity and traceability of these products can be of great interest for consumers, food producers, business operators and regulatory agencies. Currently, there are essentially two types of authentication methods for spirits and wine products (1,2) schematized in Fig. 1.

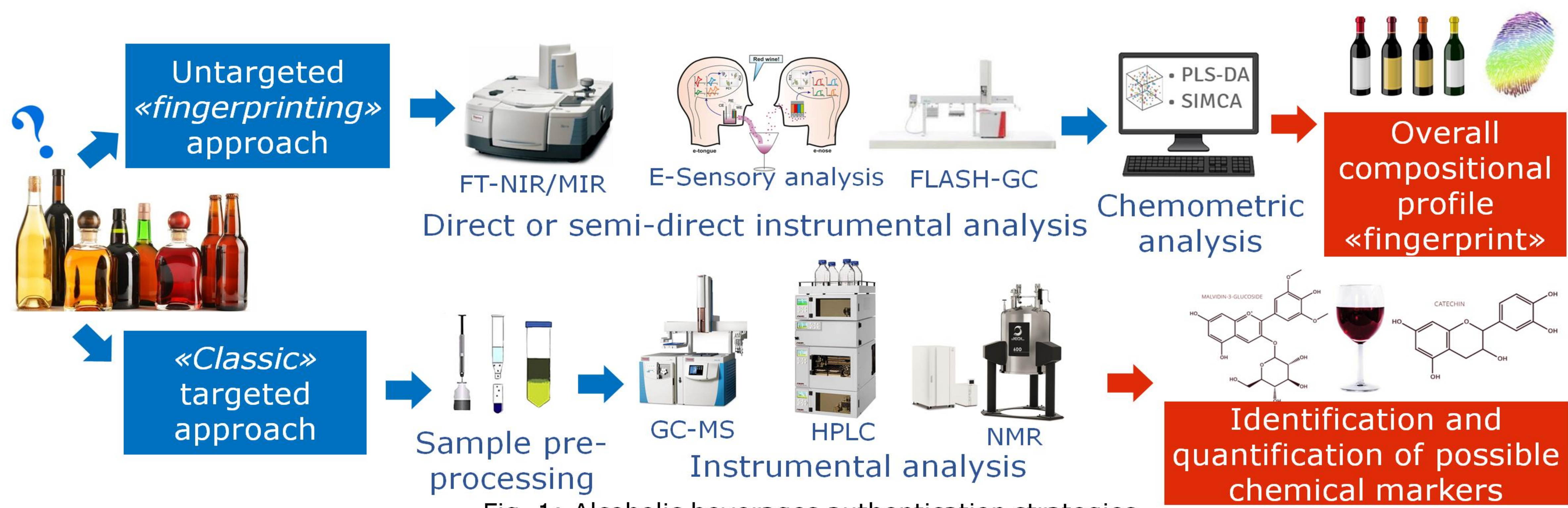


Fig. 1: Alcoholic beverages authentication strategies

Project's aim

The PhD project aims to evaluate different analytical strategies to identify the most effective approaches in terms of sensitivity, selectivity, accuracy, discriminating power, cost-effectiveness, rapidity and simplicity of execution also in relation to the differences resulting from the possible variations in production technology for the authentication of some economically relevant Italian geographical indications. In particular, the study will focus on 'Grappa' and 'Brandy Italiano' as representative of the spirits sector and 'Aceto Balsamico di Modena' and/or a renowned protected geographical indication regional wine as representative of the products of the wine sector. Within the overall objective mentioned, this PhD project can be subdivided into the following activities according to the Gantt diagram (Fig. 2):

Activity	Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A1) Application of "traditional" analytical techniques (SPE/GC/MS, HPLC)																									
1) Optimisation of sample preparation for the different matrices																									
2) Determination of volatile substances and phenolic compounds																									
2) Statistical analysis and identification of potential chemical markers																									
A2) Application of "fingerprint" techniques (NIR, Flash-GC, ED-XRF)																									
1) Optimisation of instrumental analysis for each matrix																									
2) Signal determination for the various matrices																									
3) Chemometric modelling and validation																									
A3) Evaluation of the different analytical strategies																									
Research period in international institution																									
A4) Thesis and Paper Preparation																									

Fig. 2. Gantt diagram



Selected references

- Basalekou M, Kyraleou M, Kallithraka S (2021) Future Foods: Global Trends, Opportunities, and Sustainability Challenges, 1st ed, New York: Elsevier, pp. 669–95.
- Giannetti V, Mariani MB, Marini F, Torrelli P, Biancolillo A (2019) Flavour fingerprint for the differentiation of Grappa from other Italian distillates by GC-MS and chemometrics, Food Control 105: 123–30.