

Statistical approach	Statistical method	Short Description	Product	Ref.
Unsupervised	PCA (Principal Component Analysis)	Method for reducing the dimensionality of datasets minimizing information loss.	Apple	[60]
			Cherry	[32]
			Cabbage	[34]
			Coffee	[53]
			Hazelnut	[7, 24]
			Lentil	[57]
			Melons	[28]
			Milk	[69]
			Pistachios	[59]
			Salvia	[26]
			Tea	[50, 81]
			Honey	[12, 54, 58, 66]
			Oil	[2, 27, 29, 30, 31, 36, 38, 44, 46, 63, 65, 77, 80]
			Rice	[3, 82]
			Sweet Cherry	[5, 29]
			Tomato	[13, 40, 62, 88]
			Wine	[33, 35, 37, 42, 48, 55, 72, 73, 85]
			Whiskey	[64]
	CA (Cluster Analysis)	Statistical method to organize items into groups (cluster), providing information on associations and patterns on the data.	Alcoholic beverage	[47]
			Oil	[77]
			Tea	[81]
	HCA ( Hierarchical Clustering Analysis)	The method create clusters that have a predetermined ordering from top to bottom It could be Agglomerative or Divisive.	Cabbage	[34]
			Honey	[54]
			Oils	[38]
			Tomato	[88]
	CCA ( Canonical Analysis)	Multivariate statistical technique to determining of relationship among variables in a data set.	Wine	[37]
			Milk	[69]
	kMC ( k-Means Clustering)	The algorithm try to split a data set into a defined (k) number of clusters	Oils	[43]
	MDS ( Multidimensional Scaling)	The aim of the algorithm is visualize the level of similarity	Oils	[36]

		on the items of a data set.		
	LSD ( Least Significant Difference)	It is a value associated to a particular level of statistical probability which provides information on the possible difference between groups	Wine	[42]
	UPGMA ( Unweighted Pair Group Method with Arithmetic mean)	Simple clustering method with the contribution of all distances among the point are the same.	Oils	[38]
Supervised	RDA (Regularized Discriminant Analysis)	Generalization of LDA; it is used to highlight the variables discriminate between two or more groups.	Alcoholic beverage	[47]
	LDA (Linear Discriminant Analysis)	It is a very common classification method based on a linear combination of the original variables.	Rice	[3]
			Oils	[2, 36,, 38, 41, 43, 44]
			Cherries	[5]
			Honey	[12]
			Lentils	[57]
			Wine	[33, 35]
			Wheat	[67]
	CART ( Classification and Regression Tree)	Predictive algorithm where a target variable's values can be predicted based on other values	Alcoholic beverage	[ 47]
	PLS ( Partial Least Square)	Statistical method for classification particularly used if the number of variables is larger than the number of observations.	Tomato	[88]
			Oils	[80]
			Milk	[69]
	PLSR ( Partial Least Square Regression)	Classification method based on the linear regression model.	Oils	[30]
	PLS-DA( Partial Least Square – Discriminant Analysis)	It is an algorithm used for predictive and descriptive modelling, and for the selection of discriminative variable.	Apples	[60]
			Beer	[12]
			Chicory	[49]

			Coffee	[53]
			Cherry	[5, 29]
			Honey	[54; 58]
			Melons	[28]
			Oils	[27, 29, 30, 31]
			Pistachio	[59]
			Spices	[12]
			Wine	[24, 37, 42, 48, 55]
			Lentils	[57]
	SIMCA ( Soft Independent Modelling of Class Analogy)	It is an efficient statistical method for one-class classification mainly based on PCA>	Beer	[12]
			Cherry	[5]
			Lentils	[57]]
			Wine	[33]
			Honey	[54]
			Pistachio	[59]
	OPLS-DA ( Orthogonal Projections to Latent Structures Discriminant Analysis)	It is a preprocessing method for multivariate statistics that analyze the variance explained in each of component PLS.	Cherry	[29]
			Coffee	[39]
			Honey	[66]
			Oils	[27, 29, 30, 31, 63, 65]
			Salvia	[26]
			Tea	[50]
			Whiskey	[64]
	CL ( Classification Learner)	Classification method of objects using various classifiers (decision trees, support vector machine, etc.)	Hazelnut	[7]
	DT ( Decision Trees)	The decision tree allows building classifications in the form of tree structure.	Hazelnut	[7]
	SVM ( Support Vector Machines)	It is a machine learning model that uses algorithms based on kernel trick function for group classification problems.	Hazelnut	[7]
	k-NN ( Nearest Neighbor Classification)	The method uses classifiers to find patterns available on a training set to classify a test pattern.	Lentils	[57]]
			Milk	[69]
			Hazelnut	[7]
			Honey	[54]
	CT ( Classification trees)	The method assigns objects to classes, and provide a measure of confidence related to	Hazelnut	[24]

		the correctness of classification.		
	CDA ( Canonical Discriminant Analysis)	The approach find the best way to separate two or more groups of objects, based on quantitative measures of a variables set.	Oils	[44]
	ANN ( Artificial neural networks)	The ANNs are represented by a set of mathematical function that learn complex data structure with the purpose to solve data classification's problems.	Oils	[46]
	LASSO ( Least Absolute Shrinkage and Selection Operator)	The algorithm is very useful to identify the most informative variables in the original variables set and produce a classification with lower predictive errors.	Oils	[46]
	CBT ( Classification Binary Trees)	The method set simple classification rules on the origin of existing samples, then apply these rules on samples with unknown origin.	Oils	[23]
	TCA ( Tree Clustering Analysis)	The purpose of the algorithm is clustering the objects into meaningful groups, without any a priori hypothesis on the data classification.	Oils	[43]
	RF( Random Forest)	The method creates a combination of decision trees, then applying them on a training and test subset of samples. The algorithm can be trained in several sequential steps.	Wine	[37]

*Table S1: Overview of the statistical approach used for food classification problems. In the table the statistical method applied (with a short definition), the type of food product involved and the reference papers are reported.*