

TAMIS : un logiciel en open source pour la gestion des chimiothèques et l'analyse des résultats de criblage de petites molécules

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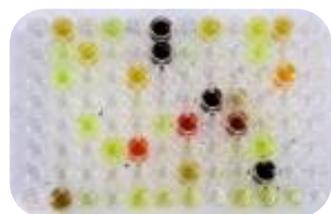




1. Criblage biologique de collections de composés chimiques

L'approche par criblage biologique

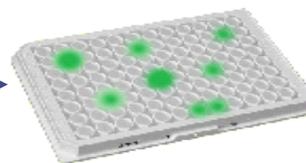
Par la mise en œuvre d'un TEST biologique pour « cribler » des collections de composés chimiques ou CHIMIOTHEQUE



CHIMIOTHEQUE



TEST
(cellules,
protéines,
enzymes...)



SIGNAL



MESURE du SIGNAL

	1	2	3	4	5	6	7	8	9	10	11	12
A	27882	28454	26809	29740	29679	28973	28632	27538	29044	29421	29354	28412
B	31483	28836	28894	29683	29595	27944	26647	25897	27880	28595	28723	29422
C	29821	30172	29235	27785	30731	31450	29416	30494	28686	29064	30576	29790
D	31832	32002	28129	29657	28349	27574	28788	29662	28510	28642	26296	29266
E	29937	29382	30400	29851	28968	28772	29181	29032	28023	28970	30282	29506
F	31006	32947	29436	13980	27800	28975	29533	31601	30026	29862	29825	29066
G	29342	29261	29592	27459	15620	29601	29246	34026	29053	29562	28282	28265
H	32203	31393	29517	35060	30096	29483	31945	30013	5724.3	30393	29638	27485

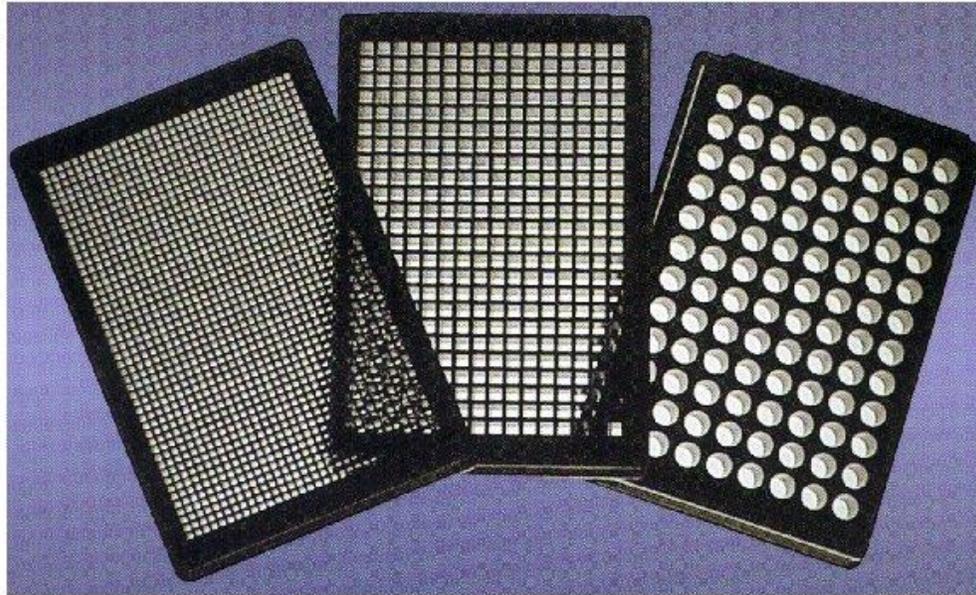
Date of measurement: 2024-08-05/Time of measurement: 11:47:42

FICHER de DONNEES
(valeurs numériques)

...au format microplaque



1536 puits
5 - 10 μ l



96 puits
50 - 250 μ l

384 puits
10 - 100 μ l

Moins de réactifs → moins coûteux

- Réactifs commerciaux
- Protéines, extraits, cellules, ... préparés au laboratoire

Plus rapide → gain de temps

- Accélération du projet
- Rentabilité de la plate-forme
- Réduction des volumes morts totaux

Plus sûr grâce à la robotisation

- Exécution fidèle, reproductible
- Exécution traçable

...en incluant des contrôles

	1	2	3	4	5	6	7	8	9	10	11	12
A	P											N
B	N											P
C	P											N
D	N											P
E	P											N
F	N											P
G	P											N
H	N											P

80 composés

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A	P	P																					N	N
B	N	N																					P	P
C	P	P																					N	N
D	N	N																					P	P
E	P	P																					N	N
F	N	N																					P	P
G	P	P																					N	N
H	N	N																					P	P
I	P	P																					N	N
J	N	N																					P	P
K	P	P																					N	N
L	N	N																					P	P
M	P	P																					N	N
N	N	N																					P	P
O	P	P																					N	N
P	N	N																					P	P

320 composés



Contrôle **POSITIF** = signal **MAXIMAL**



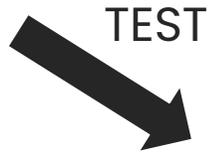
Contrôle **NEGATIF** = signal **MINIMAL**

... dans une plaque contrôles

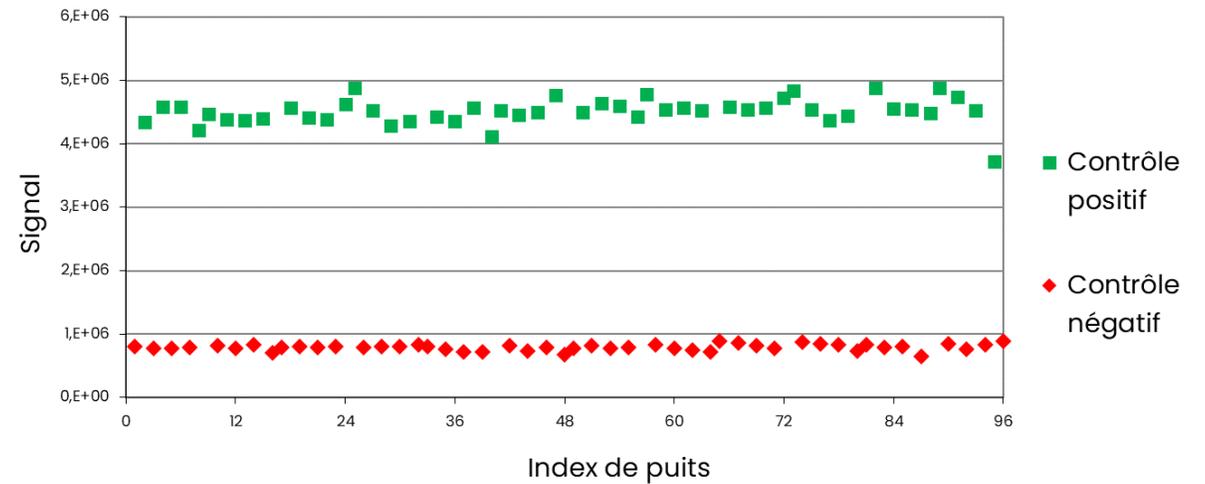


Plan de plaque contrôles

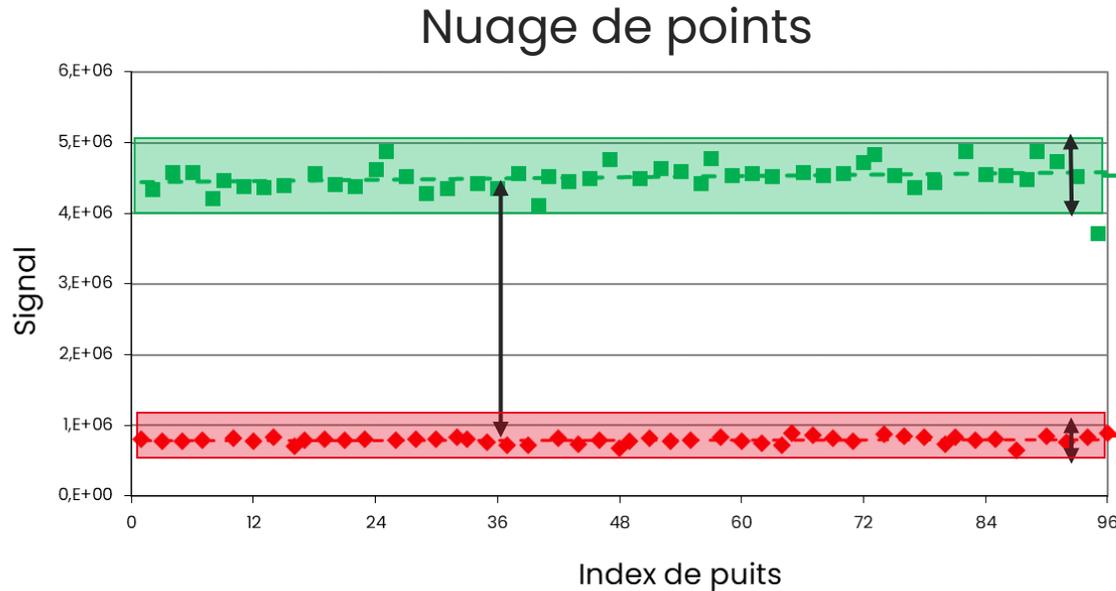
	1	2	3	4	5	6	7	8	9	10	11	12
A	P	N	P	N	P	N	P	N	P	N	P	N
B	N	P	N	P	N	P	N	P	N	P	N	P
C	P	N	P	N	P	N	P	N	P	N	P	N
D	N	P	N	P	N	P	N	P	N	P	N	P
E	P	N	P	N	P	N	P	N	P	N	P	N
F	N	P	N	P	N	P	N	P	N	P	N	P
G	P	N	P	N	P	N	P	N	P	N	P	N
H	N	P	N	P	N	P	N	P	N	P	N	P



Nuage de points



... pour le calcul du « Facteur Z' »



Contrôle POSITIF

Mean: 4.514.347
SD: 203.547

Contrôle NEGATIF

Mean: 793.995
SD: 49.398

$$Z' = 1 - \frac{(3 \times \text{SD de P} + 3 \times \text{SD de N})}{|\text{Mean de P} - \text{Mean de N}|} = 0,80$$

Zhang JH, Chung TD, Oldenburg KR. A simple statistical parameter for use in evaluation and validation of high throughput screening assays. J Biomol Screen 1999;4(2):67-73.

Mais comment ...

- Analyser et Sauvegarder la masse des données ?
 - Assurer la correspondance molécules/résultats ?
 - Fiabilité
 - Traçabilité
 - gain en temps
- Etude initiale des solutions commerciales (Activity Base...)
- surdimensionnées
 - coûteuses à l'achat ou à l'entretien
 - « boîte noire »/ pas « implémentable »

→ Développer en interne une solution adaptée pour la gestion et l'analyse des données de criblage

Modélisation et spécifications des besoins

- Gestion des chimiothèques : données structurales/chimiques/autres
- Gestion et Analyse des données de criblage
 - Identification des touches
 - Normalisations statistiques
 - Analyse comparée des criblages
 - Traçabilité/sauvegarde → démarche qualité

→ **TAMIS**

Tool to Analyse and Manage Information of Screening

en collaboration avec CEA/ DSV/ GIPSE (Dir: C. Charavay)

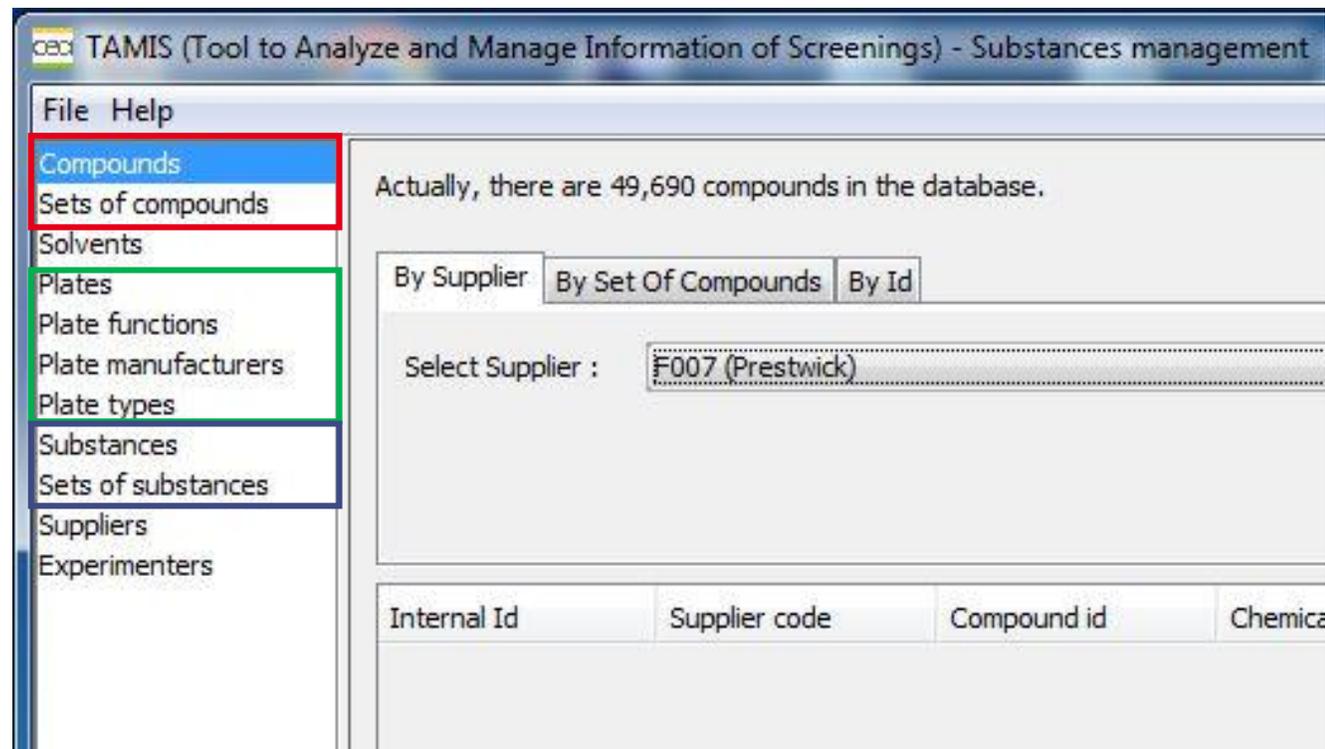


2. **Module** **"Substances"**

Pour la gestion des chimiothèques

Gestion des composés et substances

- Gestion des composés et ensembles de composés
- Gestion des plaques
 - Codes-barres
 - Fonction : mère>stock>fille>test
 - Fabricant
 - Référence/format
- Gestion des substances et ensemble de substances
- Gestion des fournisseurs de composés
- Gestion des expérimentateurs



Gestion des substances

Par import de **fichiers csv** : lien avec les composés, sets, volume résiduel, fonction de plaque...

Création des plaques...

Plate barcode	Manufacturer	Reference number	Temperature
G0002105	Abgene	AB-1000	-20
G0002107	Abgene	AB-1000	-20
G0002109	Abgene	AB-1000	-20
G0002111	Abgene	AB-1000	-20
G0002113	Abgene	AB-1000	-20
G0002115	Abgene	AB-1000	-20
G0002117	Abgene	AB-1000	-20

Correspondance **plaque+puits** et **composé**

Plate barcode	Well position	Available (true, false)	Degradated (yes, no, unknown)	Volume	Color	pH	Precipitate (yes, no, unknown)	Solvent name	Code fournisseur	Compound id	Concentration
G0002105	A02	true	unknown	100	unknown		unknown	DMSO	F007	1	10
G0002105	A03	true	unknown	100	unknown		unknown	DMSO	F007	2	10
G0002105	A04	true	unknown	100	unknown		unknown	DMSO	F007	3	10
G0002105	A05	true	unknown	100	unknown		unknown	DMSO	F007	4	10
G0002105	A06	true	unknown	100	unknown		unknown	DMSO	F007	5	10
G0002105	A07	true	unknown	100	unknown		unknown	DMSO	F007	6	10
G0002105	A08	true	unknown	100	unknown		unknown	DMSO	F007	7	10
G0002105	A09	true	unknown	100	unknown		unknown	DMSO	F007	8	10
G0002105	A10	true	unknown	100	unknown		unknown	DMSO	F007	9	10

... associées à un fournisseur

Plate barcode	Supplier code	JJ/MM/AA	hh:mm:ss
G0002105	F007	22/01/2010	12:00:00
G0002107	F007	22/01/2010	12:00:00
G0002109	F007	22/01/2010	12:00:00
G0002111	F007	22/01/2010	12:00:00
G0002113	F007	22/01/2010	12:00:00
G0002115	F007	22/01/2010	12:00:00
G0002117	F007	22/01/2010	12:00:00

Create Solutions Provided By Supplier

Input CSV file for delivery information* (4 fields)

Input CSV file for solutions information* (9+3*k fields)

Output TXT status file*

Create Cancel

Gestion des substances

Liste des substances par code-barres de plaque

Actually, there are 1,057,323 solutions in the database

By Barcode | By Set Of Substances | By Compound

Plate Barcode :

Set(s) ...	Plate Function(s)	Barcode	Position	Compound(s)	Solvent(s)	Number of pickings	Temperature	Temperature unit	Available	Volume	Volume unit	Color	Precipitate	pH	...	...
[Prest-2]	[mother]	G0002105	A02	[F007:1:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A03	[F007:2:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A04	[F007:3:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A05	[F007:4:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A06	[F007:5:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A07	[F007:6:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A08	[F007:7:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A09	[F007:8:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A10	[F007:9:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	A11	[F007:10:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...
[Prest-2]	[mother]	G0002105	B02	[F007:11:10.000 mmol/L]	[DMSO]	6	-20.0	degree	<input checked="" type="checkbox"/>	35.0	microL	unkno...	unknown	...	...

By importing File:

Add to Sets Remove from Sets

From User Interface:

Table content:

- Plate location
- Plate function(s)
- Substance properties
- Generation properties
- Delivery properties
- Set(s) of substances
- Compound(s)
- Original substance(s)



3 ■ **Module "Analyse"**

Pour analyser les données de criblage et identifier les "hits" potentiels

Module d'analyse

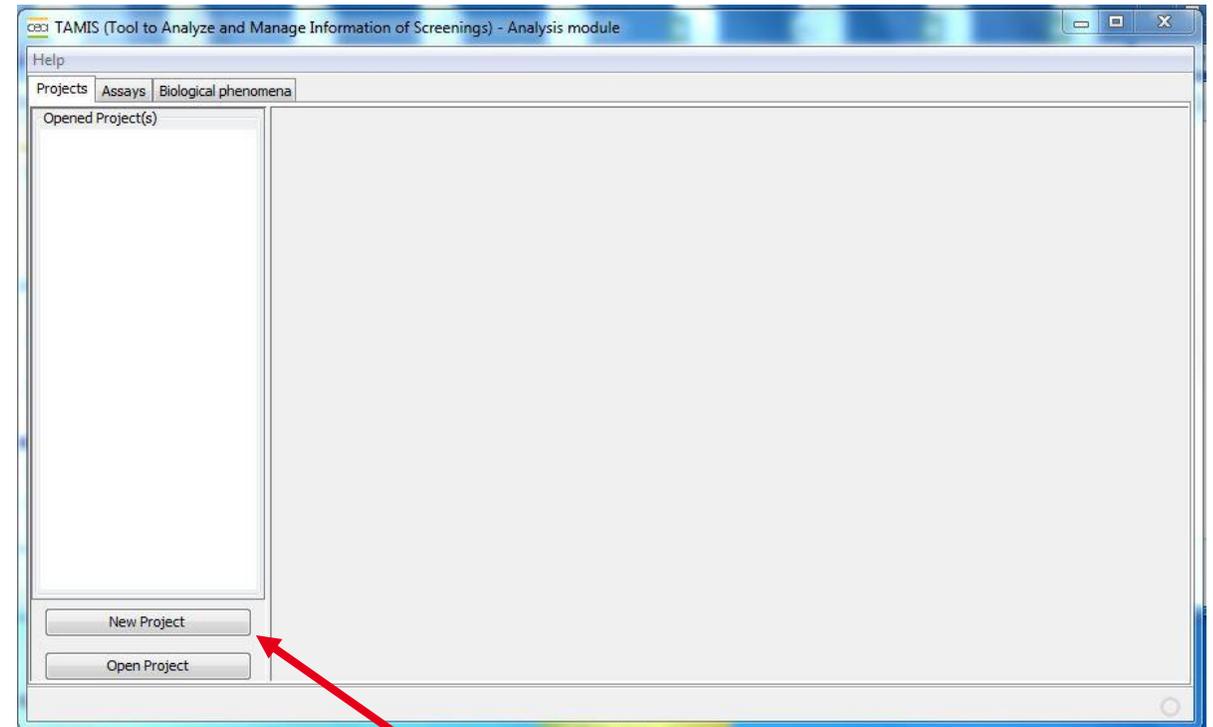
Gestion par
projet → étude → expérience

- Criblage primaire
- Criblage secondaire
- Normalisations statistiques

Interface « Essai biologique »

- Description du/des essai(s) mis en œuvre (fluorophores, longueurs d'onde...)

Interface « Phénomène biologique »



Pour la création d'un
nouveau projet

Nouveau Projet



Interface à renseigner

Nom

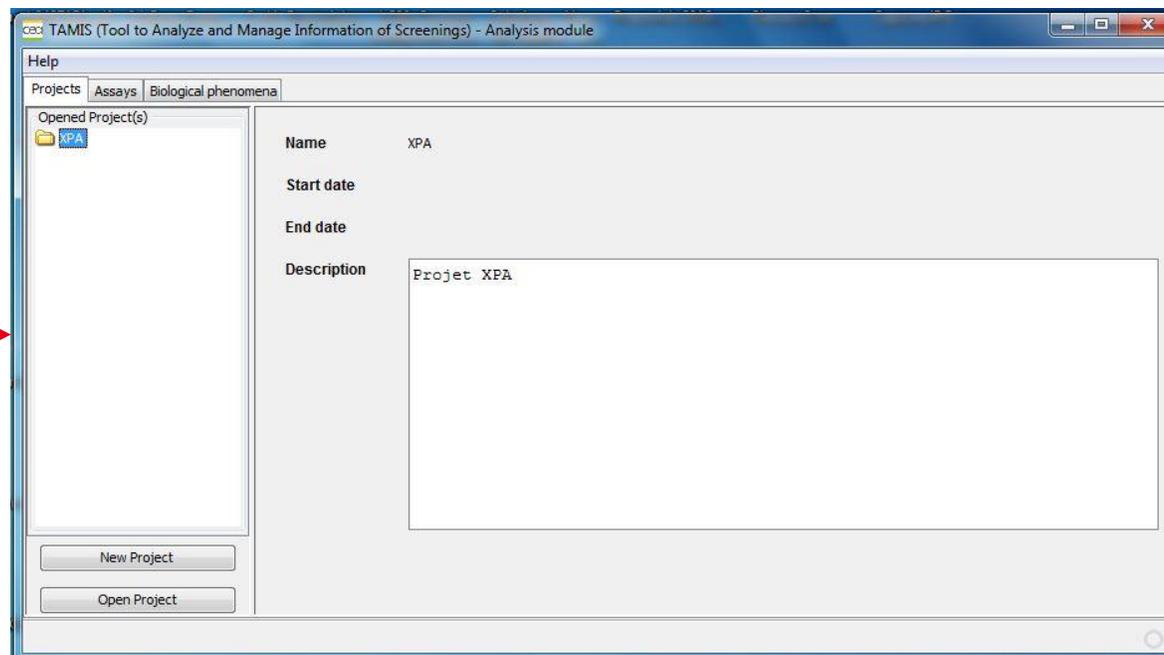
Description

The 'New project' dialog box contains the following fields and values:

- Name *: XPA
- Start date (YYYY-MM-DD): --
- End date (YYYY-MM-DD): --
- Description *: projet XPA

Buttons: Ok, Cancel

Projet créé !



Nouvelle Etude



Interface à renseigner

Nom

Description

New study

Name * Tamis

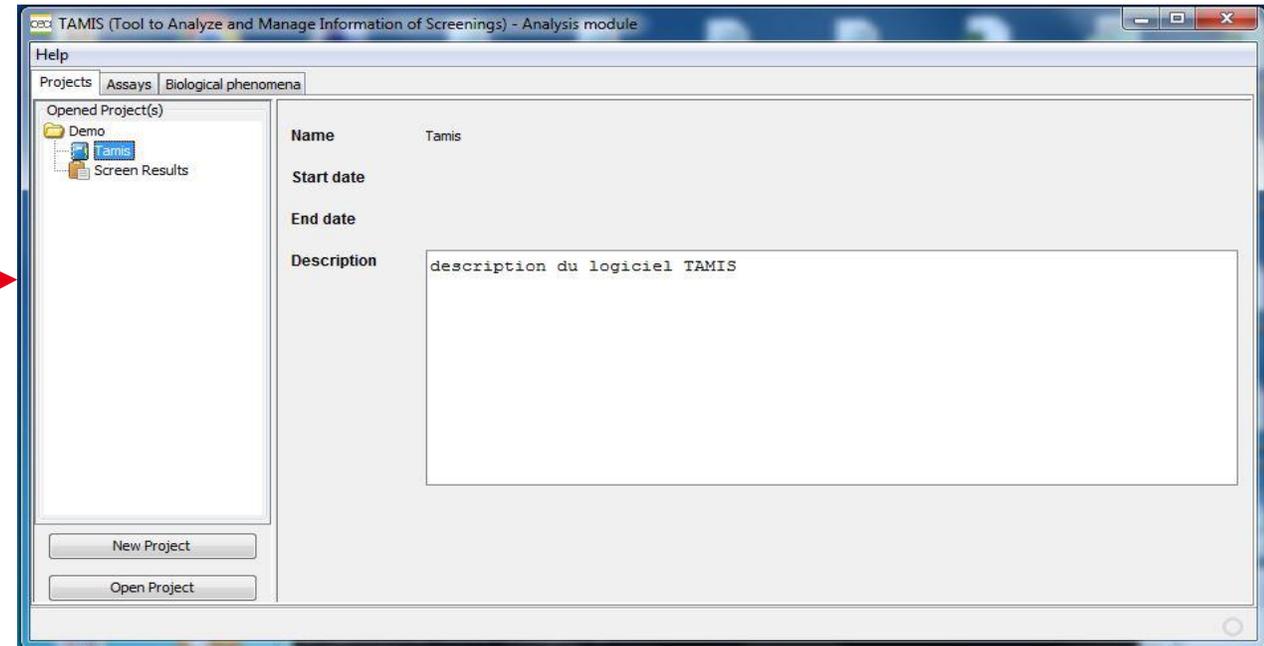
Start date (YYYY-MM-DD) --

End date (YYYY-MM-DD) --

Description * description du logiciel TAMIS

Ok Cancel

Etude créée !



Nouvelle expérience

Nom

Description

Interfaces à renseigner

New experiment - Step 1

Name * Composes marins

Type * primary screen

Start date (YYYY-MM-DD) --

End date (YYYY-MM-DD) --

Description * criblage de composés marins sur les participants de l'école ???

Instrument files directory Browse

Experimental protocol file Browse

Next > Cancel

New experiment - Step 2

Select the assay(s) used during this experiment

Name	Type	Description	Details
ADn nucléaire - Hoechst33258	fluorescence	marquage de l'ADN nucléaire par ...	
APP-Nitrine-ECL	chemiluminescence	révélation par le lit ECL Pierce 3...	
ATADCS	fluorescence	mesure du NADH, produit par ré...	
ATADCS-ABS	absorbance	mesure du NADH en ABSORBAN...	
BetaGlo	chemiluminescence	kit Promega permettant de quant...	
BRCA2-T1-PARP1	fluorescence	mesure de l'interaction BRCA2-T...	
CadA	absorbance	mesure de l'activité enzymatique ...	
Caspase-Glo 3-7 Assay	chemiluminescence	kit Promega de révélation de l'acti...	
CellTiter-Glo	chemiluminescence	mesure de la viabilité cellulaire ba...	
Chlorophylle	fluorescence	mesure de la fluorescence de la ...	
CK2-HTRF	fluorescence	détection en HTRF de l'interactio...	
DO340nm	absorbance	mesure de l'absorbance à 340 nm	
DO600nm	absorbance	mesure de la densité optique à 6...	
DualLuc Promega	chemiluminescence	Révélation séquentielle de l'activi...	
E9L-TMB	absorbance	test de l'activité polymérase d'ES...	
ECL	chemiluminescence	Détection par chemiluminescence.	

New assay

< Back OK Cancel

Expérience créée !

TAMIS (Tool to Analyze and Manage Information of Screenings) - Analysis module

Help

Projects Assays Biological phenomena

Opened Project(s)

- Demo
 - Tamis
 - Primary screens
 - Composes marins
 - Data files
 - Analysis
 - Screen Results

Name Composes marins

Type primary screen

Start date

End date

Description criblage de composés marins sur les participants de l'école ???

Instrument files directory

Experimental protocol file

Relative assays

Name	Type	Description	Details
Caspase-Glo 3-7 Assay	chemiluminescence	kit Promega de révélation de l'acti...	

New Project

Open Project

Nouvelles données de criblage

Au format **96 puits/1 valeur** par puits

```
P0004726_G0007156_20240805_123120.dat - Bloc-notes
Fichier Edition Format Affichage Aide
Date : 20240805
Time : 123110

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39444; 4317.3; 4712; 4564; 4668.8; 4629.8; 4492.5; 4282.3; 4417; 4277.5; 4014; 3783.3
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Ln 1, Col 1    100%    Windows (CRLF)    UTF-8
```

Au format **384 puits/3 valeurs** par puits

```
P0004686_PPI01_18_20240521_163808.dat - Bloc-notes
Fichier Edition Format Affichage Aide
Date : 20240521
Time : 163033

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36525; 38566; 51708; 40961; 42777; 44762; 36671; 38710; 34988; 44260; 44454; 41804; 43956; 38058; 43186; 42912; 43952; 45071; 42197; 49681; 39512; 37068; 4307; 4304
35862; 35537; 36993; 20712; 38827; 43749; 35098; 41643; 33094; 13306; 36777; 36652; 41436; 38898; 7860; 41436; 36858; 44278; 30049; 37222; 35875; 44189; 3190; 2407
4485; 4416; 32451; 37806; 37475; 41819; 39661; 42585; 43397; 41439; 44116; 44262; 41997; 44379; 47092; 46079; 45663; 44785; 46782; 48633; 48786; 45364; 46324; 46886
4469; 4723; 41033; 30901; 43523; 37480; 35351; 43278; 35243; 45467; 41034; 46694; 41460; 38161; 49753; 52828; 38798; 47810; 22264; 40627; 39589; 37529; 1954; 35712
48940; 47283; 50011; 40331; 51312; 39254; 40804; 47668; 52052; 47571; 47808; 43071; 49608; 50572; 50548; 45691; 49781; 49324; 44910; 51383; 46489; 51747; 4857; 5271
37210; 39422; 41290; 37702; 41451; 43139; 42354; 41263; 36195; 40623; 37239; 47485; 37741; 41670; 23552; 50924; 40385; 47324; 40551; 40521; 44382; 41243; 4417; 4020
4961; 4611; 45047; 42189; 47056; 25067; 46334; 42584; 50925; 43341; 46890; 36747; 29498; 46479; 44325; 46047; 48781; 43446; 41772; 24083; 43198; 48523; 43305; 50462
3567; 3476; 35833; 12967; 33712; 32905; 37007; 36498; 35528; 18358; 35882; 35884; 34433; 40638; 37964; 42644; 37796; 43174; 33376; 36362; 36786; 45354; 32072; 36293

0
19183; 17072; 19283; 18546; 21173; 21197; 19980; 21250; 21535; 21691; 19411; 20313; 18409; 18942; 20301; 20289; 18923; 16979; 21503; 17868; 21633; 18129; 1042.6; 1226.1
17392; 17553; 19060; 18015; 18871; 19619; 19897; 20573; 10053; 18135; 19659; 19574; 19169; 19331; 19250; 19731; 14489; 14786; 18470; 16154; 19629; 15709; 737.92; 995.6
1080.9; 1052.8; 16672; 19050; 19583; 20891; 18434; 22029; 20810; 19945; 21369; 21432; 10961; 19444; 22414; 21485; 21129; 21910; 11178; 21610; 20456; 18712; 17416; 20562
1253.1; 1054.1; 14922; 18381; 19793; 19951; 19872; 21546; 19360; 14545; 19487; 18584; 18384; 15362; 19098; 20284; 14977; 21453; 19123; 17695; 16016; 15964; 18329; 20198
21939; 20412; 21395; 17380; 22146; 22141; 22640; 20117; 21362; 20659; 23042; 21373; 23832; 19110; 21669; 18840; 22470; 19490; 23057; 21633; 19242; 19920; 1103.2; 1180.3
10701; 10560; 17855; 10370; 21405; 23317; 20201; 11157; 10231; 17510; 17343; 20824; 18932; 10410; 10275; 10827; 17201; 18840; 18706; 17600; 16800; 14000; 1162.6; 1060.6

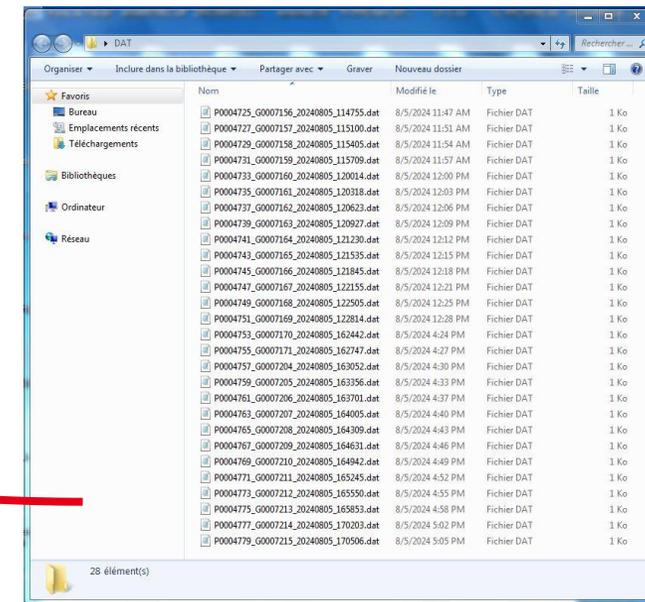
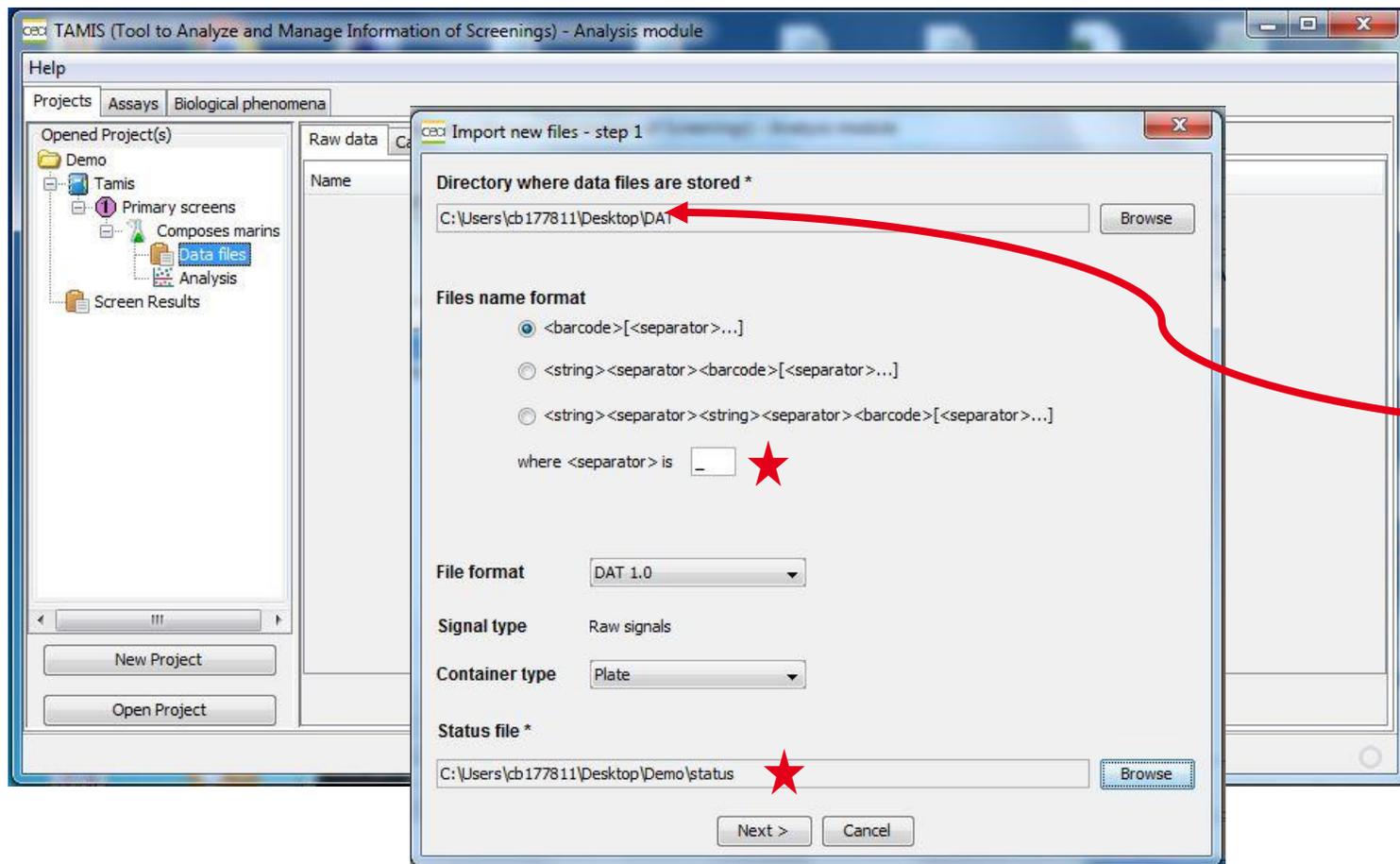
Ln 1, Col 1    100%    Windows (CRLF)    UTF-8
```

Extension .dat

Nommage : « CB plaque Test »_ « CB plaque Composés »_ « AAAAMMJJ »_ « HHMMSS »

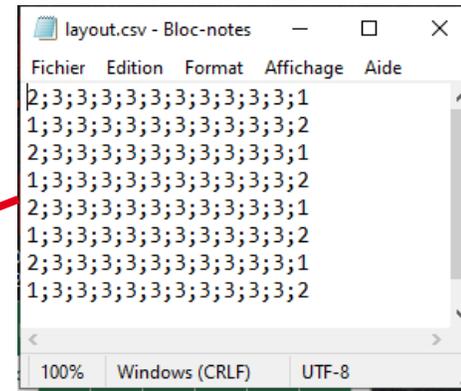
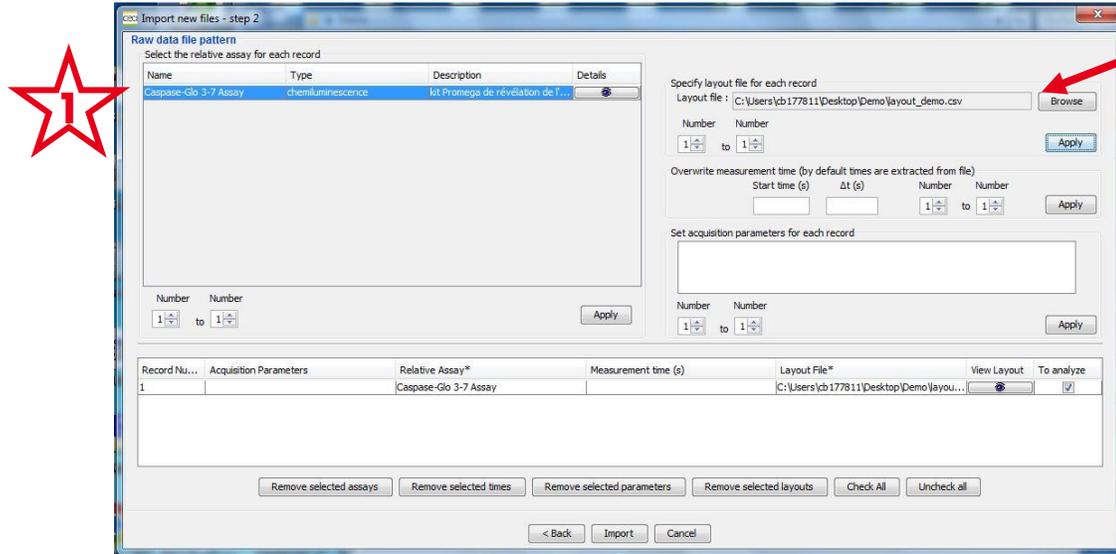
Nouvelles données

1^e interface « Import » renseignée

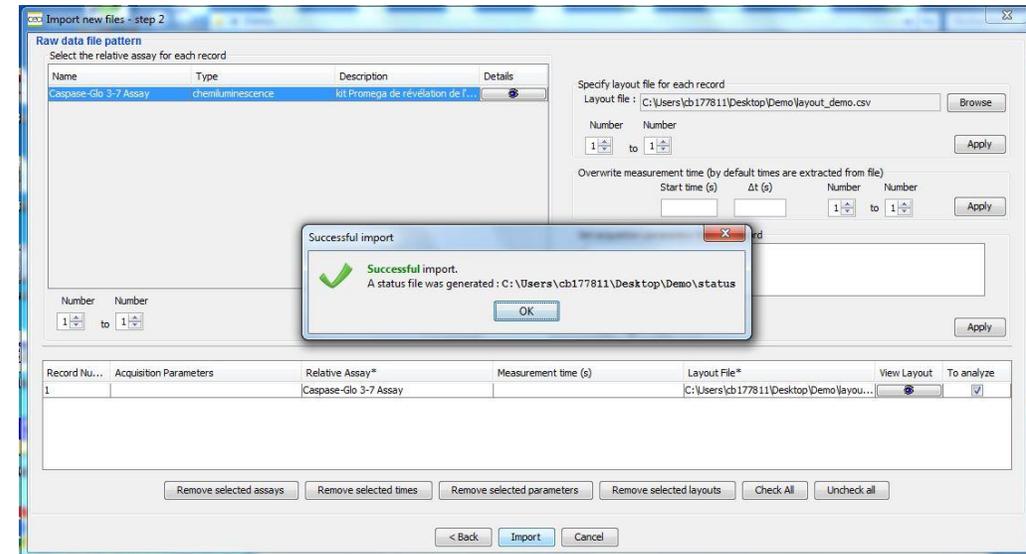


Nouvelles données

2^{de} interface « Import » renseignée



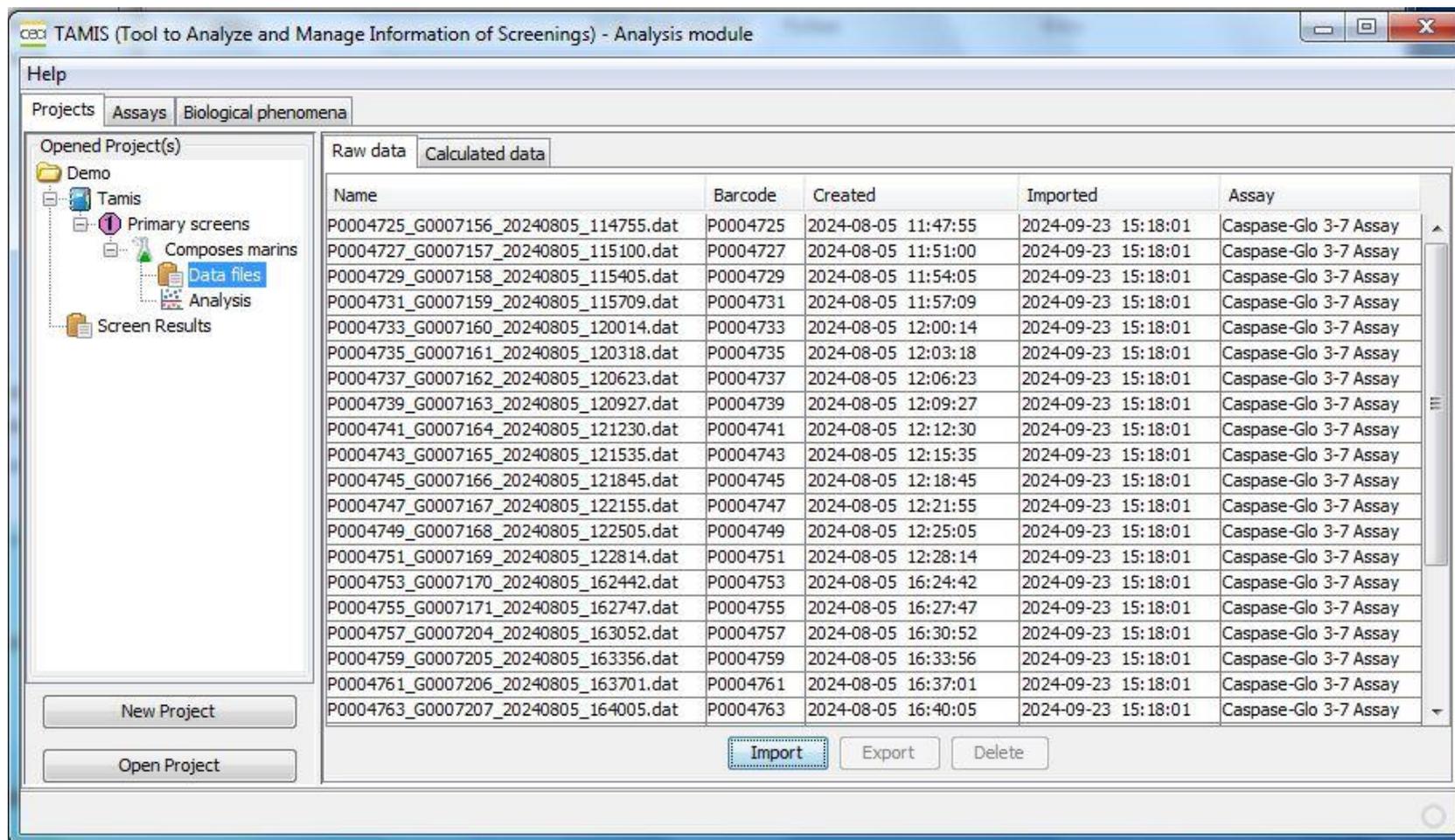
Layout
(position des
contrôles et
composés)
Contrôles : 1 vs 2
Composés : 3



Import des données réussi !

Nouvelles données importées

Liste des fichiers importés (1 ligne par plaque)



The screenshot shows the TAMIS software interface. The window title is "TAMIS (Tool to Analyze and Manage Information of Screenings) - Analysis module". The interface includes a "Help" menu, tabs for "Projects", "Assays", and "Biological phenomena", and a sidebar for "Opened Project(s)" with a tree view showing "Demo", "Tamis", "Primary screens", "Composes marins", "Data files", "Analysis", and "Screen Results". The main area displays a table of imported data files under the "Raw data" tab. The table has columns for Name, Barcode, Created, Imported, and Assay. Below the table are buttons for "New Project", "Open Project", "Import", "Export", and "Delete".

Name	Barcode	Created	Imported	Assay
P0004725_G0007156_20240805_114755.dat	P0004725	2024-08-05 11:47:55	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004727_G0007157_20240805_115100.dat	P0004727	2024-08-05 11:51:00	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004729_G0007158_20240805_115405.dat	P0004729	2024-08-05 11:54:05	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004731_G0007159_20240805_115709.dat	P0004731	2024-08-05 11:57:09	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004733_G0007160_20240805_120014.dat	P0004733	2024-08-05 12:00:14	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004735_G0007161_20240805_120318.dat	P0004735	2024-08-05 12:03:18	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004737_G0007162_20240805_120623.dat	P0004737	2024-08-05 12:06:23	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004739_G0007163_20240805_120927.dat	P0004739	2024-08-05 12:09:27	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004741_G0007164_20240805_121230.dat	P0004741	2024-08-05 12:12:30	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004743_G0007165_20240805_121535.dat	P0004743	2024-08-05 12:15:35	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004745_G0007166_20240805_121845.dat	P0004745	2024-08-05 12:18:45	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004747_G0007167_20240805_122155.dat	P0004747	2024-08-05 12:21:55	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004749_G0007168_20240805_122505.dat	P0004749	2024-08-05 12:25:05	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004751_G0007169_20240805_122814.dat	P0004751	2024-08-05 12:28:14	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004753_G0007170_20240805_162442.dat	P0004753	2024-08-05 16:24:42	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004755_G0007171_20240805_162747.dat	P0004755	2024-08-05 16:27:47	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004757_G0007204_20240805_163052.dat	P0004757	2024-08-05 16:30:52	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004759_G0007205_20240805_163356.dat	P0004759	2024-08-05 16:33:56	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004761_G0007206_20240805_163701.dat	P0004761	2024-08-05 16:37:01	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay
P0004763_G0007207_20240805_164005.dat	P0004763	2024-08-05 16:40:05	2024-09-23 15:18:01	Caspase-Glo 3-7 Assay

Analyse de données : données brutes

Choix

- des données à analyser
- de la normalisation à appliquer



Choix du test associé aux données

Select the numerical data to analyze

Barcode	Record number	Measurement t...	Acquisition par...	File name	File import date	File creation date
P0004726	1	0.000		P0004726_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004728	1	0.000		P0004728_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004730	1	0.000		P0004730_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004732	1	0.000		P0004732_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004734	1	0.000		P0004734_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004736	1	0.000		P0004736_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004738	1	0.000		P0004738_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004740	1	0.000		P0004740_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004742	1	0.000		P0004742_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004744	1	0.000		P0004744_G000...	2024-09-09 13:...	2024-08-05 12:...
P0004746	1	0.000		P0004746_G000...	2024-09-09 13:...	2024-08-05 13:...
P0004748	1	0.000		P0004748_G000...	2024-09-09 13:...	2024-08-05 13:...
P0004750	1	0.000		P0004750_G000...	2024-09-09 13:...	2024-08-05 13:...

Bioactivity type: increasing decreasing

Normalization method: control percentage activity percentage robust Z-score

< Back Analyze Cancel

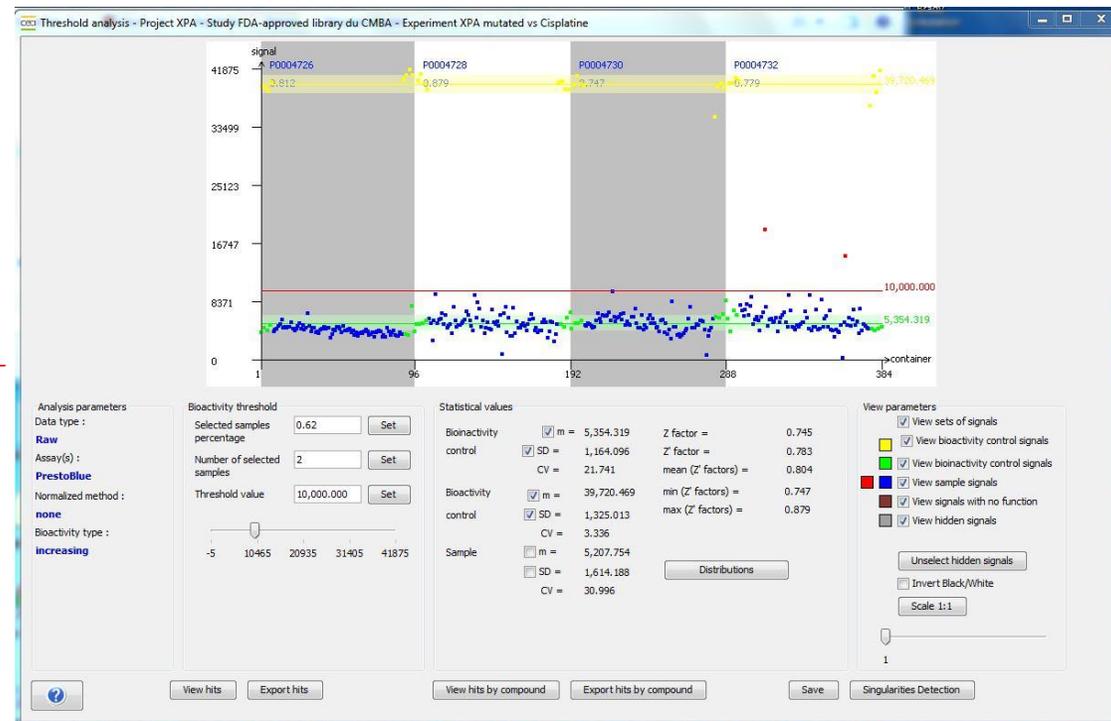
Type of data: Raw

Select assay to analyze (only for raw data)

Name	Type	Description
Caspase-Glo 3-7 Assay	chemiluminescence	kit Promega de révélation d...

Next> Cancel

Nuage de points en valeurs brutes de signal



Analyse de données : pourcentage d'activité

Contrôles positifs
→ 100%

Seuillage (bioactivité)

D'un seul clic droit sur le point

Sort by...

Signal value: 87.018
Barcode: P0004748
Position: D02

Signal value: 86.771
Barcode: P0004754
Position: A07

Formula: C15H23NO9
Molecular weight: 361.352
Concentration (mmol/L): 0.010
Supplier: Prestwick
Id Compound: 911
Biological phenomena: 0

Formula: C39H60O24
Molecular weight: 683.620
Concentration (mmol/L): 0.010
Supplier: Tebu-bio
Id Compound: 70193
Biological phenomena: 0



P0004732 C08

Signal value: 9.891
Barcode: P0004732
Position: C08
Function: sample

Compounds

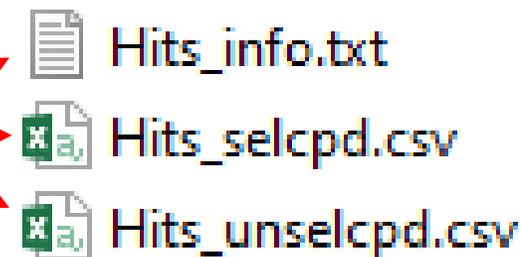
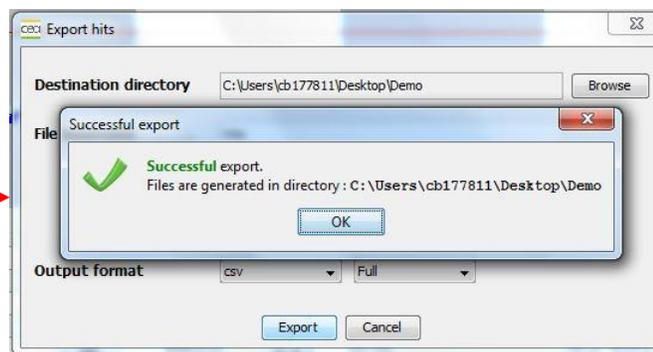
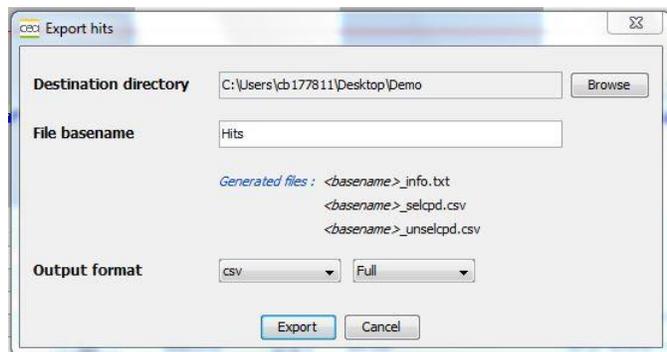
Molecular formula: C22H17GN2
Molecular weight: 344.847
Concentration (mmol/L): 0.010
Supplier: Prestwick
Id Compound: 257
Biological phenomena: 0

Details

Contrôles négatifs
→ 0%

Paramètres Statistiques

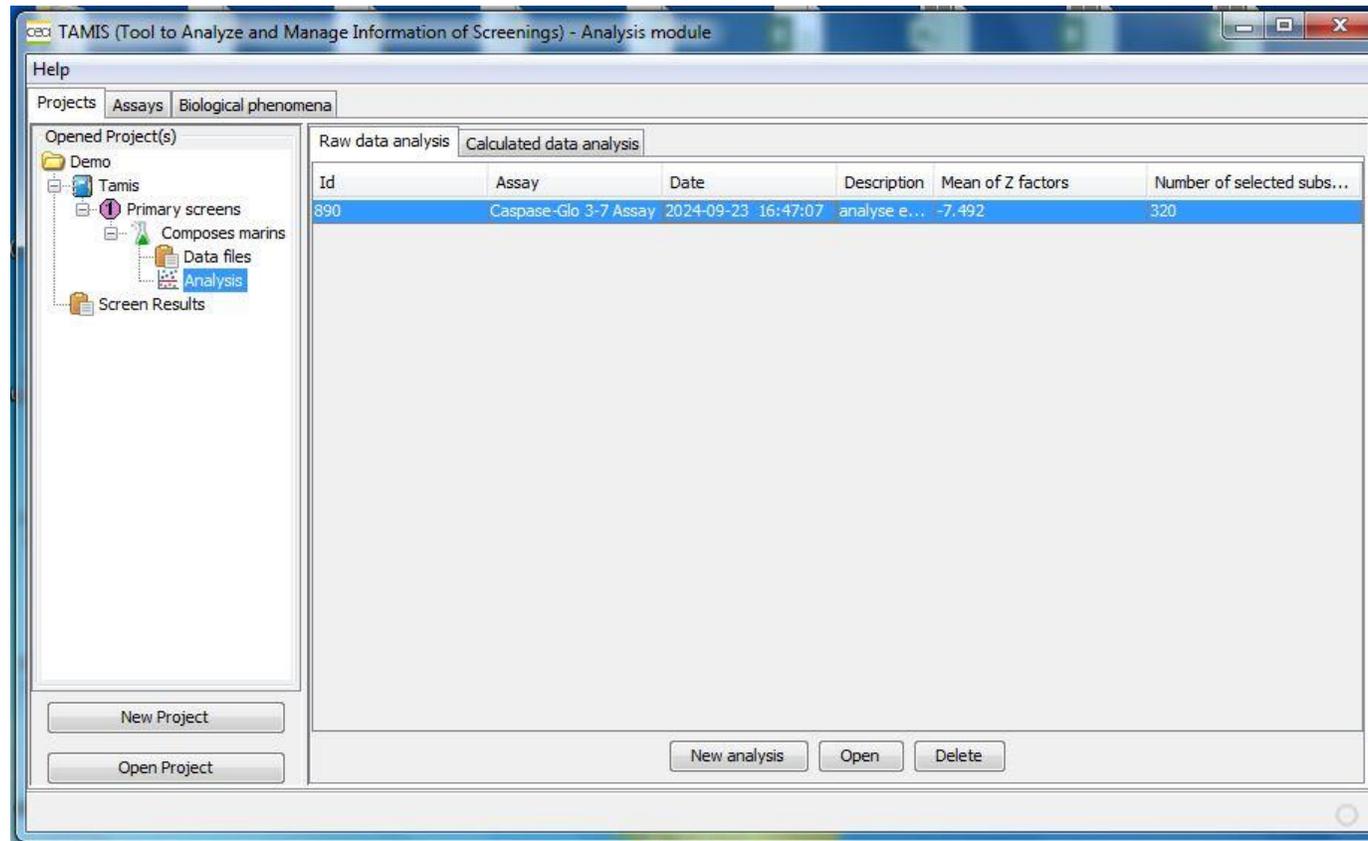
Export des touches sélectionnées



Internal compound id	Molecular weight	Formula	Compound id	Supplier code	Supplier name	Concentration	Concentration unit	Sets of compounds	Sets of substances	Well name	Plate barcode	Signal value	Z' Factor
31098	477.429	C26H28Cl	312	F007	Prestwick	0.010	mmol/L	Prest-1 / Prest-2	not defined	H03	P0004732	39.316	0.779
31415	303.144	C13H12Cl	259	F007	Prestwick	0.010	mmol/L	Prest-1 / Prest-2	not defined	B10	P0004732	28.155	0.779

Gestion des analyses

Sauvegarde des analyses réalisées (résultats + normalisation + seuillage → hits)



Autres fonctionnalités

- Détection des singularités
- Courbes de distribution des molécules et des contrôles
- Exportation des données importées
- Suppression/modification composé, substance, plaques, résultats analyse...

Bons points !

- Open source
- Simple et traçable (fichiers d'import, fichiers status, warnings limpides !)
- Implémentable

Evolutions possibles

- Nouvelles normalisations statistiques
- Dose-réponse
- Cinétique
- Gestion des données images
- Diffusion et formation des utilisateurs

Merci à ...

Grenoble (CMBA, SDBE, GIPSE)

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Yves Vandenbrouck

Saclay (DBJC)

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Orsay (LRI)

Antoine Cornuéjols
Michèle Sebag

Strasbourg (Pharmacochimie)

Bruno Didier
Didier Rognan
Marcel Hibert

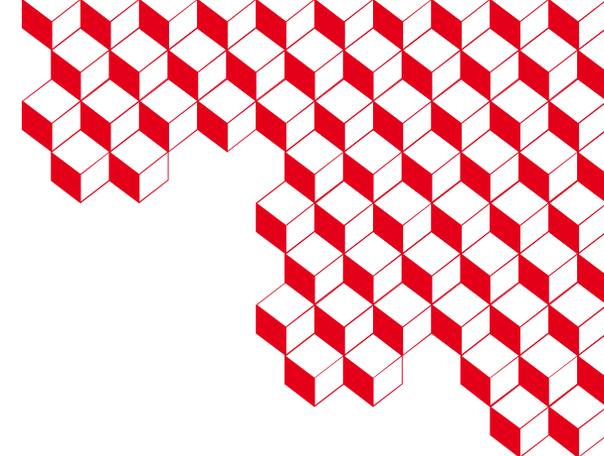


La science pour la santé
From science to health



Grenoble Alliance for Integrated
Structural & Cell Biology





**Merci à vous
pour
votre attention**

→ caroline.barette@cea.fr



CMBA

plateforme de Criblage pour des Molécules BioActives



Différentes normalisations

Control percentage normalization

If increasing bioactivity :

$$\text{Normalized signal} = \frac{\text{signal}}{\text{Bioactivity control mean}} \times 100$$

If decreasing bioactivity :

$$\text{Normalized signal} = \frac{\text{signal}}{\text{Bioactivity control mean}} \times 100$$

For more details, please consult the following review :

*Malo N., Hanley J. A., Cerquozzi S., Pelletier J., Nadon R.
Statistical practice in high-throughput screening data analysis
Nature biotechnology, 24(2):167-75, 2006*

Activity percentage normalization

$$\text{Normalized signal} = \frac{\text{Bioactivity control mean} - \text{signal}}{\text{Bioactivity control mean} - \text{Bioactivity control mean}} \times 100$$

For more details, please consult the following review :

*Malo N., Hanley J. A., Cerquozzi S., Pelletier J., Nadon R.
Statistical practice in high-throughput screening data analysis
Nature biotechnology, 24(2):167-75, 2006*

Robust Z score normalization

$$\text{Normalized signal} = \frac{\text{signal} - \text{median}(\text{samples})}{\text{MAD}(\text{samples})}$$

For more details, please consult the following review :

*Malo N., Hanley J. A., Cerquozzi S., Pelletier J., Nadon R.
Statistical practice in high-throughput screening data analysis
Nature biotechnology, 24(2):167-75, 2006*

Gestion descriptive des essais

Via un assistant de création : type de détection, description textuelle des tests, fluorochromes, longueurs d'onde...

The screenshot shows the 'Available assays' window in the TAMIS software. The window has tabs for 'Projects', 'Assays', and 'Biological phenomena'. Under 'Assays', there are sub-tabs for 'Absorbance', 'Chemiluminescence', 'Fluorescence', and 'Radioactivity'. The 'Available assays' table lists various assays with their names, descriptions, and wavelengths.

Name	Description	Wavelength (nm)
AtADCS-ABS	mesure du NADH en ABSORBANCE, produit par réaction ...	355.000
CadA	mesure de l'activité enzymatique de CadA, révélée par l...	620.000
DO340nm	mesure de l'absorbance à 340 nm	340.000
DO600nm	mesure de la densité optique à 600nm	600.000
E9L-TMB	test de l'activité polymérase d'E9L par quantification du ...	355.000
GDH-ABS	mesure du NADH en ABSORBANCE, produit par réaction ...	355.000
MTT	cytotoxicité	650.000
NadA	test de criblage différentiel hétérogène (==> 2 micropla...	600.000
PNAPEP0238	réaction du substrat PNAPEP transformé en un produit a...	405.000
PNAPEP1025	éaction du substrat PNAPEP transformé en un produit ab...	405.000
Tyrosinase	réaction de la tyrosinase transformant le substrat L-LOP...	477.000

The screenshot shows the 'Available assays' window in the TAMIS software, with the 'Fluorescence' sub-tab selected. The 'Available assays' table now includes columns for 'Fluorophores', 'Donor fluorophore', and 'Acceptor fluorophore'. Below the table are buttons for 'New assay', 'Modify', and 'Delete'. There is also a section for 'Available fluorophores' with its own table and buttons.

Name	Description	Fluorophores	Donor fluorophore	Acceptor fluorophore
ADn nucleaire -Hoechst33258	marquage de l'ADN nucléaire pa...	Hoechst33258		
AtADCS	mesure du NADH, produit par ré...	NADH		
BRCA2-T1-PARP1	mesure de l'interaction BRCA2-T...	HTRF-Cisbio-340-665		
CK2-HTRF	détection en HTRF de l'interacti...	GFP / HTRF-Cisbio-340-665	HTRF-Cisbio-340-665	HTRF-Cisbio-340-665
Chlorophylle	mesure de la fluorescence de la ...	Chlorophylle		

Name	Excitation (nm)	Emission (nm)
AMC	380.000	460.000
Alexa Fluor 488	494.000	519.000
Chlorophylle	440.000	680.000
Cyanine3	554.000	568.000
GFP	485.000	527.000

Fichier status

Date: 09/09/2024 Time: 10:24:29

Input CSV File : S:\342-Projets_BGE\342.3-GenChem\342.3.4-ProjetsHTS\TAMIS\Criblages\XPA\Plates - New_PTest.csv

Errors : 0/56

Date: 09/09/2024 Time: 10:24:56

Input CSV File : S:\342-Projets_BGE\342.3-GenChem\342.3.4-ProjetsHTS\TAMIS\Criblages\XPA\Plates - Add to plate functions_PTest.csv

Errors : 0/56

Date: 09/09/2024 Time: 11:30:32

Input CSV File : S:\342-Projets_BGE\342.3-GenChem\342.3.4-ProjetsHTS\TAMIS\Criblages\XPA\Solutions - dePMolàPTest.csv

Errors : 0/56

Warnings : 0/56

Date: 21/06/2024 Time: 13:49:54

Selected Directory: S:\342-Projets_BGE\342.3-GenChem\342.3.4-ProjetsHTS\TAMIS\Criblages\PHYLDROG\DAT

Number of files in the directory: 33

Number of files with error(s) : 33

DAT version: DAT 1.0

Signal Type: Raw signals

Container Type: Plate

Number of acquisitions: 0

Errors:

P0004720_PPI29_18_20240603_164618.dat

Inconsistent number of acquisition lines. Expected : 16 but found : 64 in acquisition : 2

P0004702_PPI09_18_20240523_172254.dat

Inconsistent number of acquisition lines. Expected : 16 but found : 64 in acquisition : 2

P0004711_PPI19_18_20240524_164120.dat

Expected numerical value but found : Overflow line : 14

P0004703_PPI10_18_20240523_174054.dat

Inconsistent number of acquisition lines. Expected : 16 but found : 64 in acquisition : 2

P0004700_PPI07_18_20240523_164654.dat

Fichier info.txt

```
Export time : 2024-09-09 13:32:51

Analysis parameters :
  Bioactivity type : increasing
  Normalization method : activity percentage

General statistics :
  Number of signal sets : 28
  Number of sample signals : 2240
  Number of hidden signals : 0
  Percent of hidden signals : 0.00
  Z factor : 0.656
  Z' factor : 0.798
  Mean(Z' factor) : 0.816
  Min(Z' factor) : 0.667
  Max(Z' factor) : 0.904

Bioactivity control statistics :
  Mean : 100.000
  Standard Deviation : 3.660
  CV : 3.660

Bioinactivity control statistics :
  Mean : -0.000
  Standard Deviation : 3.072
  CV : -582,592,392,605,968,000.000

Sample control statistics :
  Mean = -2.429
  Standard Deviation = 8.090
  CV : -333.091

Selection :
  Threshold value : 8.191
  Number of selected sample signals : 80
  Percent of selected sample signals : 3.57
  Number of unselected samples : 2160
```

```
Number of selected sample signals by set of containers :
P0004728 : 2
P0004748 : 2
P0004746 : 2
P0004768 : 4
P0004766 : 5
P0004744 : 3
P0004742 : 1
P0004764 : 6
P0004772 : 5
P0004770 : 3
P0004738 : 1
P0004736 : 2
P0004758 : 3
P0004778 : 8
P0004756 : 1
P0004734 : 2
P0004732 : 6
P0004776 : 3
P0004754 : 2
P0004730 : 1
P0004774 : 3
P0004752 : 2
P0004762 : 2
P0004760 : 7
P0004780 : 4

Number of selected compounds by supplier :
  Tebu-bio :
    Number of selected compounds : 53
    Percent of selected compounds : 66.25
  Prestwick :
    Number of selected compounds : 27
    Percent of selected compounds : 33.75
```