

# Прямое определение количественного содержания летучих компонентов в алкогольной продукции с использованием этанола в качестве внутреннего стандарта

Руководство для ChemStation

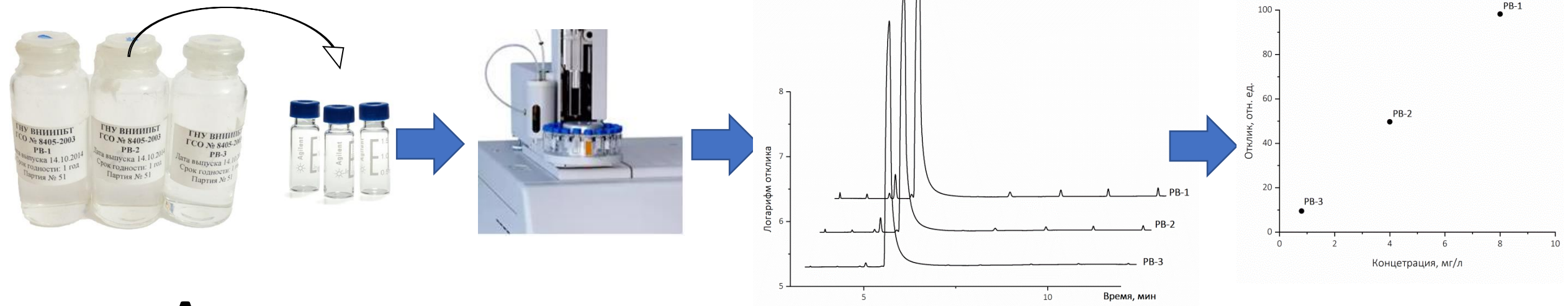


# В постсоветских государствах применяется метод внешнего стандарта

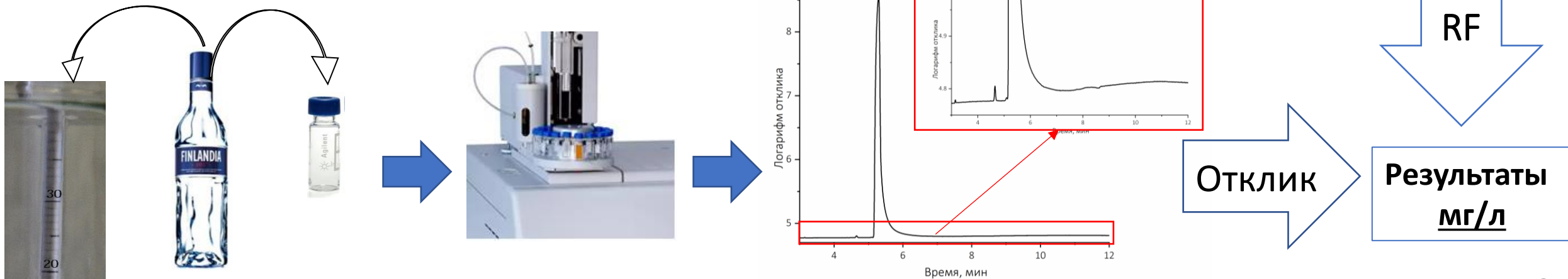
- ГОСТ 30536-2013. Водка и спирт этиловый. Газохроматографический экспресс-метод определения содержания токсичных микропримесей.
- СТБ ГОСТ Р 51698-2001. Водка и спирт этиловый. Газохроматографический экспресс-метод определения содержания токсичных микропримесей.
- ГОСТ 31684-2012. Спирт этиловый-сырец из пищевого сырья. Газохроматографический метод определения содержания летучих органических примесей.
- ГОСТ 33723-2016. Дистиллят зерновой. Технические условия.
- ГОСТ Р 57893-2017. Продукты брожения и сырье для их производства. Газохроматографический метод определения массовой концентрации летучих компонентов.
- ГОСТ Р 55983-2014. Фракция головная этилового спирта. Технические условия.
- ГОСТ 33833-2016. Напитки спиртные. Газохроматографический метод определения объемной доли метилового спирта.
- ГОСТ 33834-2016. Продукция винодельческая и сырье для ее производства. Газохроматографический метод определения массовой концентрации летучих компонентов.
- ГОСТ 33408-2015. Коньяки, дистилляты коньячные, бренди. Определение содержания альдегидов, эфиров и спиртов методом газовой хроматографии.
- СТБ 1385-2013. Спирты коньячные выдержанные. Технические условия.
- СТБ 2139-2011. Дистилляты кальвадосные. Технические условия.
- ДСТУ 4222-2012. Водки, спирт этиловый и водно-спиртовые растворы. Газохроматографический метод определения содержания микрокомпонентов.
- ТУ ВУ 190239501.098-2005 Концентрат головных и промежуточных примесей этилового спирта из пищевого сырья.
- ТУ ВУ 700068910.014-2005 Спирт этиловый ректифицированный технический.
- ТУ РБ 190239501.059-2004 Фракция головная этилового спирта из пищевого сырья.
- ГОСТ Р 52363-2005. Спиртосодержащие отходы спиртового и ликероводочного производства.
- ГОСТ Р 51999-2002. Спирт этиловый технический синтетический ректифицированный и денатурированный. Технические условия.
- Государственная фармакопея Российской Федерации. Т. 3. – Изд. 13-е. – 2015. – С. 169 – 175.
- Государственная фармакопея Республики Беларусь. Т. 2. Общие и частные фармакопейные статьи. Минск, 2007. – С. 295 – 300.

# Метод внешнего стандарта

## Калибровка



## Анализ



**Результаты определения количественного содержания летучих компонентов в алкогольных продуктах должны быть представлены в размерности мг/л безводного этанола**

$$C_i (mg / L AA) = \frac{C_i (mg / L)}{\text{strength}(\% v / v)}$$

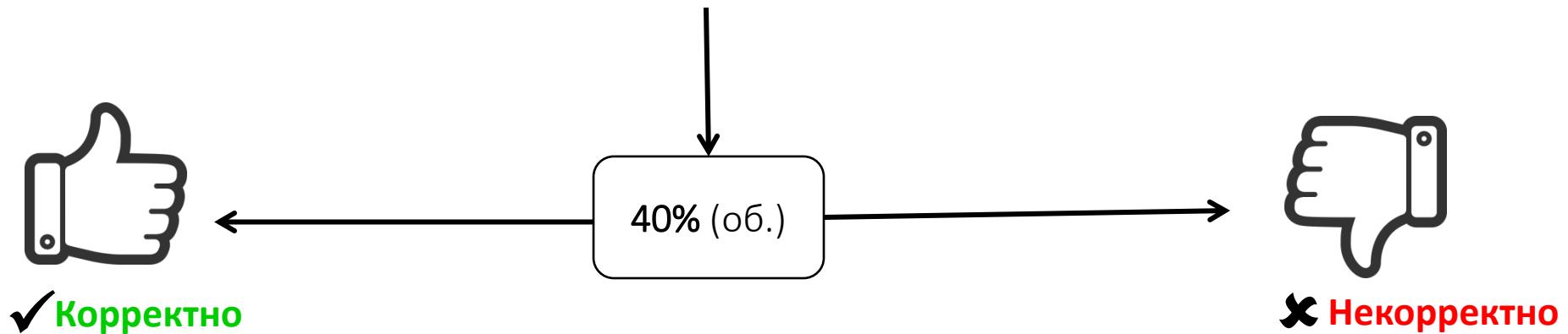
Необходимо определять объемное содержание этанола (крепость) в алкогольном продукте

# Проблема видимой крепости

Как установить значение крепости (объемного содержания этанола) **корректно**?

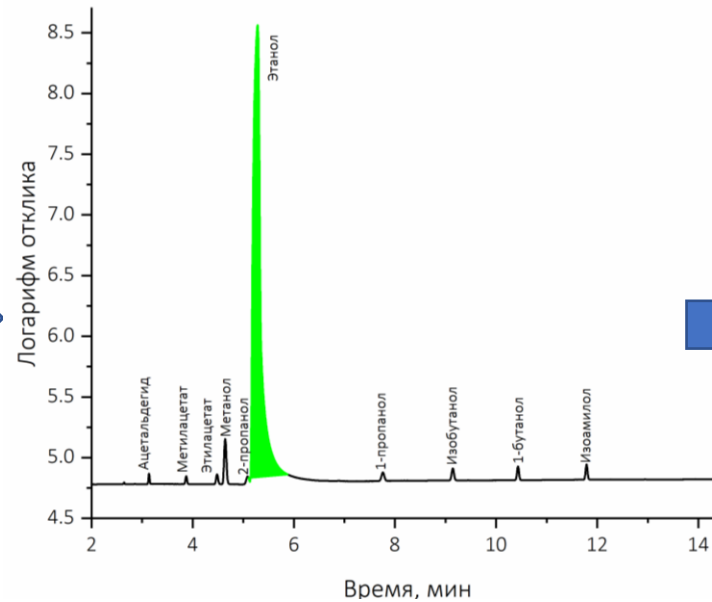
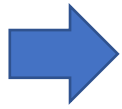


Результат измерения плотности



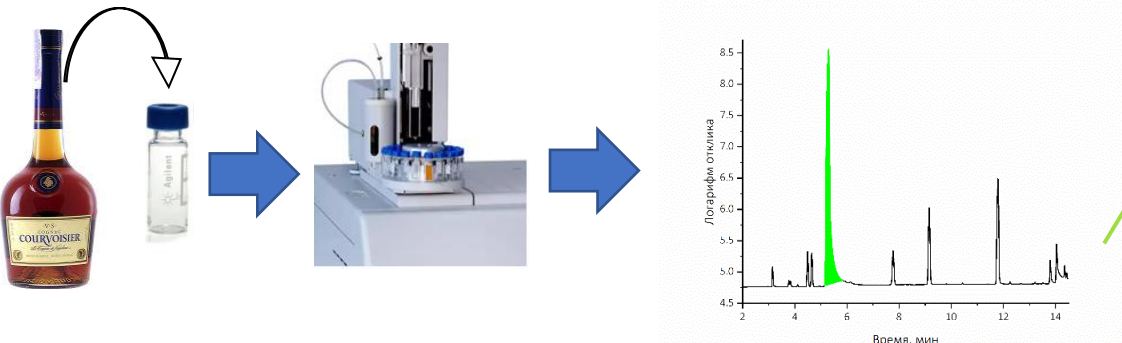
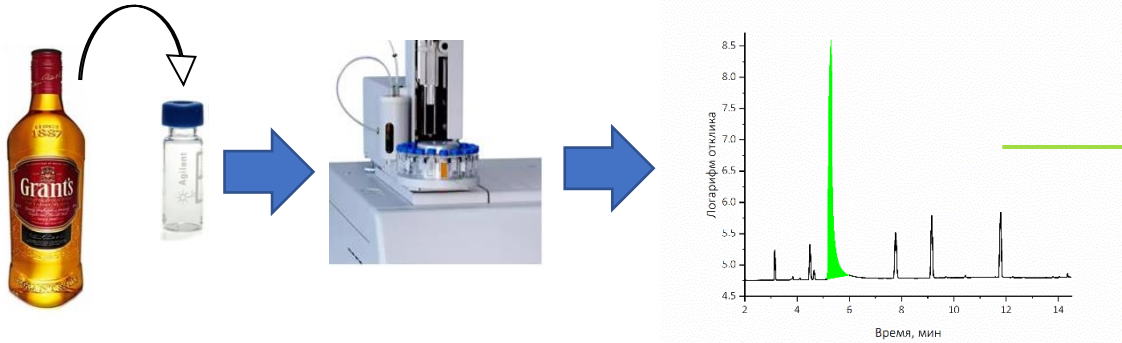
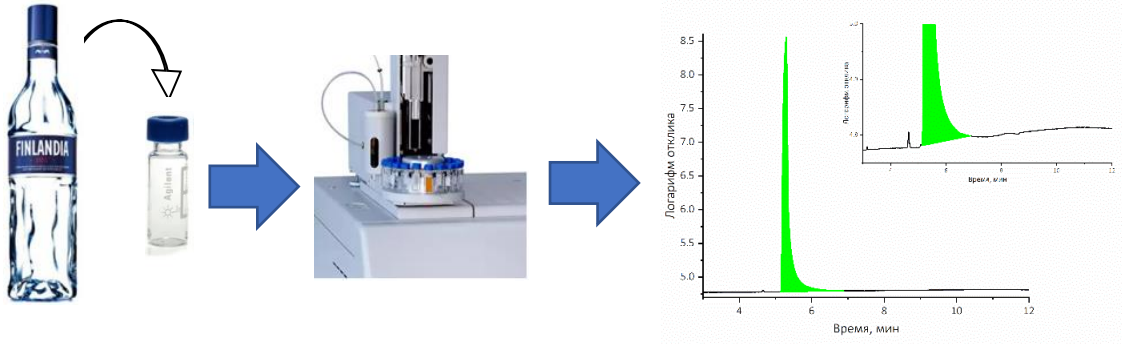
# Метод «Этанол – внутренний стандарт» решает проблему видимой крепости

## Калибровка:



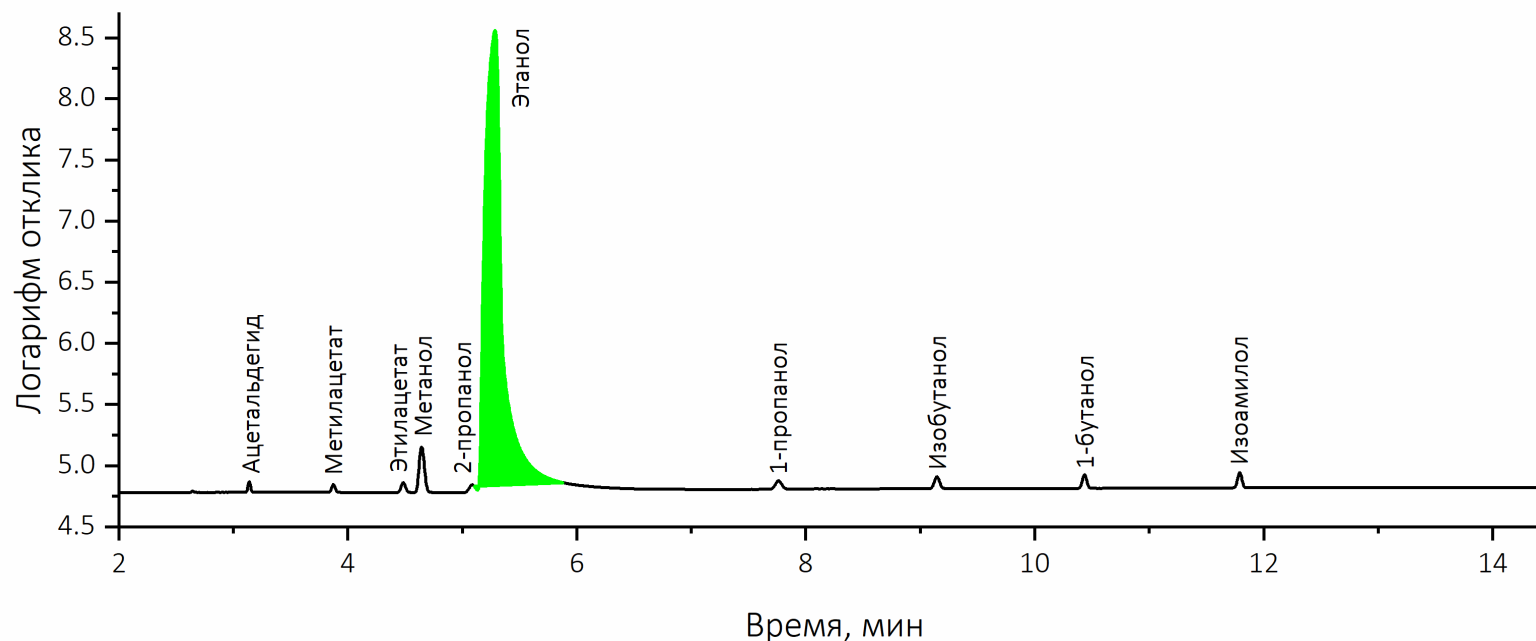
$$RRF_i^{Ethanol} = \frac{C_i^{st} (mg / L AA)}{A_i^{st}} / \frac{\rho_{Ethanol} (mg / L AA)}{A_{Ethanol}^{st}}$$

# Метод «Этанол – внутренний стандарт» для анализа алкогольных напитков



$$C_i \text{ (mg / L AA)} = RRF_i^{\text{Ethanol}} \cdot \frac{A_i}{A_{\text{Ethanol}}} \cdot \rho_{\text{Ethanol}} \text{ (mg / L AA)}$$

# Хроматограмма калибровочного раствора РВ-1 (ГСО 8405)



No	Compound	t, min	Response, pA*min	C, mg/L AA	C, mg/L	RF, mg/(L*min*pA)	RRF <sup>Ethanol</sup>
1	Ацетальдегид	3.146	45,917	24,5	9,8	0,213	2,132
2	Метилацетат	3.839	46,641	23,0	9,2	0,197	1,971
3	Этилацетат	4.493	75,386	22,5	9	0,119	1,193
4	Метанол	4.652	509,391	202,2	80,9	0,159	1,586
5	2-пропанол	5.098	79,891	21,8	8,7	0,109	1,088
6	Этанол	5.302	3154441	789300			1,000
7	1-пропанол	7.771	97,732	20,0	8	0,082	0,818
8	Изобутанол	9.151	116,459	20,0	8	0,069	0,686
9	1-бутанол	10.438	115,092	20,3	8,1	0,070	0,703
10	Изоамилол	11.789	123,517	20,3	8,1	0,066	0,655

$$RRF_i^{Ethanol} = \frac{C_i^{st} (mg / L AA)}{A_i^{st}} / \frac{\rho_{Ethanol} (mg / L AA)}{A_{Ethanol}^{st}}$$

$$RF_i (mg / (L \cdot pA \cdot min)) = \frac{C_i^{st} (mg / L)}{A_i^{st} (pA \cdot min)}$$



**Анализ алкогольных напитков методом  
Абсолютной градуировки  
(Внешнего стандарта)**

# 1. Создайте новый метод

The screenshot shows the 'Save Method as: Instrument 1' dialog box in the 'Data Analysis' software. The dialog has the following elements:

- Name:** A text field containing 'Внешний стандарт' (External standard), highlighted with a red box and the number 3.
- Папки:** A list of folders in the 'c:\chem32\1\methods' directory, including '100fid.m', 'cvt.m', 'def\_go.m', 'estd\_ex.m', 'fid\_tcd.m', 'istd\_ex.m', 'LOADTEST.M', and 'npd\_ecd.m'. The 'methods' folder is selected, highlighted with a red box and the number 4.
- Types:** A dropdown menu set to 'Method (\*.M)'.
- Диски:** A dropdown menu set to 'c:'.
- Buttons:** 'OK' and 'Отмена' (Cancel) buttons, with 'OK' highlighted by a red box.

In the background, the 'File' menu is open, and the 'Save As' option is selected, with the 'Method...' option highlighted by a red box and the number 1. The 'Integration' tab is active in the main window, and the 'Method...' option is highlighted by a red box and the number 2.

## 2. Загрузите все измерения калибровочных растворов

The screenshot displays the 'Load Signal : Instrument 1' dialog box within the 'Data Analysis' software. The 'File name' field contains a list of files: 'RV-1.D', 'RV-1-2.D', 'RV-2.D', 'RV-2-2.D', 'RV-3.D', and 'RV-3-2.D'. The file 'RV-1.D' is selected, indicated by a red box and the number '2'. The 'Folders' list shows 'c:\', 'CHEM32', '1', 'DATA', and 'DEMO'. The 'OK' button is highlighted with a red box and the number '3'. The 'File name' label is highlighted with a red box and the number '1'. The 'Load using Signal Details' checkbox is checked. The background shows the 'Data Analysis' window with a table of data and a menu bar.

Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
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# 2а. При необходимости – импортируйте данные

The screenshot displays the 'Instrument 1 (offline): Data Analysis' software interface. The 'File' menu is open, and the 'Import File' option is selected, leading to a sub-menu where 'Load AIA File...' is highlighted. An 'Import AIA file' dialog box is open, showing a file list with 'RV:1.cdf' selected. The file name field contains '.CDF', and the 'OK' button is highlighted. Red boxes and numbers 1 through 5 indicate the sequence of steps for importing the data file.

1. Import File  
2. Load AIA File...  
3. RV:1.cdf  
4. .CDF  
5. OK

# 3. Настройте калибровку

1 Calibration

2 Calibration Settings...

3 Внутренний стандарт

4 mg/L

5 OK

Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
0	0	1	1	-
0	0	1	1	-
0	0	1	1	-

#	RT	Signal	Compound	Lvl	Amt[mg/L]
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# 4. Создайте калибровочную таблицу

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration **Calibration** Report Batch View Abort Help

1 New Calibration Table...  
Delete Calibration Table...  
Recalibrate...  
2 Add Level...  
Add Peaks...  
Calibration Settings...  
Advanced Calibration >  
Calibration Table Options... >  
Select Peak  
Delete Peaks  
Add Peaks  
Recalibrate Compounds  
Calibration Table...  
Compound Groups...  
Signal Details...  
Control Sample Limits...

3 OK Cancel Help

	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
106	RV-2-2.D	RV-2-2	SPIRT_RV.M	-		0	0	1	1	-
107	RV-3.D	RV-3	SPIRT_RV.M	-		0	0	1	1	-
107	RV-3-2.D	RV-3-2	SPIRT_RV.M	-		0	0	1	1	-

Chromatogram: pA vs min. Peak at 20.796 min.

Calibration Table

#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
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Calibration Curve

0.1  
0.05  
0  
-0.05  
-0.1

-0.1 -0.05 0 0.05

# 4а. Введите паспортные данные для раствора РВ-3

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

Signals Methods Внешний стандарт.M

Data Analysis

Ready/Reprocess Data Mode

...	Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
+ [ ]	13.02.2019 17:28:57	shest	Vial 106	RV-2-2.D	RV-2-2	SPIRT_RV.M	-		0	0	1	1	-
+ [ ]	13.02.2019 16:07:06	shest	Vial 107	RV-3.D	RV-3	SPIRT_RV.M	-		0	0	1	1	-
+ [ ]	13.02.2019 16:34:20	shest	Vial 107	RV-3-2.D	RV-3-2	SPIRT_RV.M	-		0	0	1	1	-

Integration Calibration Signal

Report: Short

FID1 A, (SPIRT...ATIONRV-3-2.D) Overview

Calibration Table

#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	1	1.150	3.5825e-1	3.210	No	No	
2	3.872	FID1 A	Methyl acetate	1	0.920	2.6575e-1	3.462	No	No	
3	4.483	FID1 A	Ethyl acetate	1	0.900	4.7154e-1	1.909	No	No	
4	4.644	FID1 A	Methanol, %	1	1.2000e-3	3.318	3.6166e-4	No	No	
5	5.084	FID1 A	2-propanol	1	1.230	3.9559e-1	3.109	No	No	
6	5.284	FID1 A	Ethanol, %	1	40.000	189880.000	2.1065e-4	No	No	
7	7.761	FID1 A	1-propanol	1	0.800	6.4199e-1	1.246	No	No	
8	9.142	FID1 A	Isobutanol	1	0.800	7.0938e-1	1.128	No	No	
9	10.433	FID1 A	1-butanol	1	0.810	7.3758e-1	1.098	No	No	
10	11.787	FID1 A	Isoamylol	1	0.810	7.4189e-1	1.092	No	No	

1 2

done Instrument 1 Ready

# 5. Добавьте второе измерение раствора RV-3

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

Signals Methods

Data Analysis

C:\CHEM32\1\DATA  
DEMO

Ready/Reprocess Data Mode

	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
106	RV-2-2.D	RV-2-2	SPIRT_RV.M	-		0	0	1	1	-
107	RV-3.D	RV-3	SPIRT_RV.M	-		0	0	1	1	-
107	RV-3-2.D	RV-3-2	SPIRT_RV.M	-		0	0	1	1	-

Integration

FID1 A, (SPIR

Calibration

Enter

#	ng/L	Area	Rsp.Factor	Ref	ISTD	#
1	1.150	3.5825e-1	3.210	No	No	
2	0.920	2.6575e-1	3.462	No	No	
3	0.900	4.7154e-1	1.909	No	No	
4	0.00e-3	3.318	3.6166e-4	No	No	
5	5.084	FID1 A 2-propanol	1 1.230	3.9559e-1	3.109	No No
6	5.284	FID1 A Ethanol, %	1 40.000	189880.000	2.1065e-4	No No
7	7.761	FID1 A 1-propanol	1 0.800	6.4199e-1	1.246	No No
8	9.142	FID1 A Isobutanol	1 0.800	7.0938e-1	1.128	No No
9	10.433	FID1 A 1-butanol	1 0.810	7.3758e-1	1.098	No No
10	11.787	FID1 A Isoamylol	1 0.810	7.4189e-1	1.092	No No

Help

Overview

Calibrate: Instrument 1

Add Level

Level 2

Default Amount: 0.000

OK Cancel Help

Add new level from current chromatogram

Instrument 1 Ready



# 6. Введите паспортные данные для раствора РВ-3

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

Signals Methods Внешний стандарт.M

Data Analysis

Ready/Reprocess Data Mode

...	Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
+	13.02.2019 17:28:57	shest	Vial 106	RV-2-2.D	RV-2-2	SPIRT_RV.M	-		0	0	1	1	-
+	13.02.2019 16:07:06	shest	Vial 107	RV-3.D	RV-3	SPIRT_RV.M	-		0	0	1	1	-
+	13.02.2019 16:34:20	shest	Vial 107	RV-3-2.D	RV-3-2	SPIRT_RV.M	M		0	0	1	1	-

Integration Calibration Signal


Report: Short

FID1 A, (SPIRT...RATION\RV-3.D) Overview

Calibration Table

#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
1	3.139	FID1 A	Acetaldehyde	2	0.000	3.4193e-1	0.000	No	No	
				1	1.150	3.5825e-1	3.210			
2	3.874	FID1 A	Methyl acetate	2	0.000	2.7336e-1	0.000	No	No	
				1	0.920	2.6575e-1	3.462			
3	4.485	FID1 A	Ethyl acetate	2	0.000	4.5623e-1	0.000	No	No	
				1	0.900	4.7154e-1	1.909			
4	4.645	FID1 A	Methanol, %	2	0.000	3.318	0.000	No	No	
				1	1.2000e-3	3.318	3.6166e-4			
5	5.086	FID1 A	2-propanol	2	0.000	4.0221e-1	0.000	No	No	
				1	1.230	3.9559e-1	3.109			
6	5.286	FID1 A	Ethanol, %	2	0.000	191100.000	0.000	No	No	
				1	40.000	189880.000	2.1065e-4			
7	7.763	FID1 A	1-propanol	2	0.000	5.8696e-1	0.000	No	No	
				1	0.800	6.4199e-1	1.246			
8	9.144	FID1 A	Isobutanol	2	0.000	7.1834e-1	0.000	No	No	
				1	0.800	7.0938e-1	1.128			
9	10.432	FID1 A	1-butanol	2	0.000	7.1208e-1	0.000	No	No	
				1	0.810	7.3758e-1	1.098			
10	11.787	FID1 A	Isoamylol	2	0.000	7.3887e-1	0.000	No	No	
				1	0.810	7.4189e-1	1.092			

1



#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
1	3.139	FID1 A	Acetaldehyde	1	1.150	3.5825e-1	3.210	No	No	
				2	1.150	3.4193e-1	3.363			
2	3.874	FID1 A	Methyl acetate	1	0.920	2.6575e-1	3.462	No	No	
				2	0.920	2.7336e-1	3.366			
3	4.485	FID1 A	Ethyl acetate	1	0.900	4.7154e-1	1.909	No	No	
				2	0.900	4.5623e-1	1.973			
4	4.645	FID1 A	Methanol, %	1	1.2000e-3	3.318	3.6166e-4	No	No	
				2	1.2000e-3	3.318	3.6171e-4			
5	5.086	FID1 A	2-propanol	1	1.230	3.9559e-1	3.109	No	No	
				2	1.230	4.0221e-1	3.058			
6	5.286	FID1 A	Ethanol, %	1	40.000	189880.000	2.1065e-4	No	No	
				2	40.000	191100.000	2.0932e-4			
7	7.763	FID1 A	1-propanol	1	0.800	6.4199e-1	1.246	No	No	
				2	0.800	5.8696e-1	1.363			
8	9.144	FID1 A	Isobutanol	1	0.800	7.0938e-1	1.128	No	No	
				2	0.800	7.1834e-1	1.114			
9	10.432	FID1 A	1-butanol	1	0.810	7.3758e-1	1.098	No	No	
				2	0.810	7.1208e-1	1.138			
10	11.787	FID1 A	Isoamylol	1	0.810	7.4189e-1	1.092	No	No	
				2	0.810	7.3887e-1	1.096			

1

done

Instrument 1 Ready

# 7. Добавьте первое измерение раствора РВ-2

The screenshot displays the 'Instrument 1 (offline): Data Analysis' software interface. The 'Calibration' menu is open, and the 'Add Level...' option is highlighted with a red box and the number '1'. Below the main interface, a dialog box titled 'Calibrate: Instrument 1' is shown. In this dialog, the 'Add Level' button is highlighted with a red box and the number '2', and the 'Level' input field contains the value '3', which is also highlighted with a red box and the number '3'. The 'OK' button is highlighted with a red box and the number '3'. The 'Default Amount' is set to '0.000'. The status bar at the bottom indicates 'Instrument 1 Ready'.

#	Area	Rsp.Factor	Ref	ISTD	#
1	1.150	3.5825e-1	3.210	No	No
2	1.150	3.4193e-1	3.363	No	No
3	0.920	2.6575e-1	3.462	No	No
4	0.920	2.7336e-1	3.366	No	No
5	4.485	0.900	4.7154e-1	1.909	No
6	4.645	0.900	4.5623e-1	1.973	No
7	5.086	1.230	3.9559e-1	3.109	No
8	5.286	1.230	4.0221e-1	3.058	No
9	7.763	40.000	189880.000	2.1065e-4	No
10	9.144	40.000	191100.000	2.0932e-4	No
11	10.432	0.800	6.4199e-1	1.246	No
12	11.787	0.800	5.8696e-1	1.363	No
13	10.432	0.800	7.0938e-1	1.128	No
14	11.787	0.800	7.1834e-1	1.114	No
15	10.432	0.810	7.3758e-1	1.098	No
16	11.787	0.810	7.1208e-1	1.138	No
17	10.432	0.810	7.4189e-1	1.092	No
18	11.787	0.810	7.3887e-1	1.096	No

# 8. Введите паспортные данные для раствора РВ-2

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

Signals Methods Внешний стандарт.M

Data Analysis

C:\CHEM32\1\DATA  
DEMO

Ready/Reprocess Data Mode

...	Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man... /	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
+	13.02.2019 17:28:57	shest	Vial 106	RV-2-2.D	RV-2-2	SPIRT_RV.M	-		0	0	1	1	-
+	13.02.2019 16:07:06	shest	Vial 107	RV-3.D	RV-3	SPIRT_RV.M	-		0	0	1	1	-
+	13.02.2019 16:34:20	shest	Vial 107	RV-3-2.D	RV-3-2	SPIRT_RV.M	M		0	0	1	1	-

Integration Calibration Signal

Report: Short


FID1 A, (SPIRT...ATION\RV-2-2.D) Overview

Calibration Table

Enter Delete Insert... Print OK Help

#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
1	3.138	FID1 A	Acetaldehyde	3	0.000	1.440	0.000	No	No	
				1	1.150	3.5825e-1	3.210			
				2	1.150	3.4193e-1	3.363			
2	3.874	FID1 A	Methyl acetate	3	0.000	1.434	0.000	No	No	
				1	0.920	2.6575e-1	3.462			
				2	0.920	2.7336e-1	3.366			
3	4.484	FID1 A	Ethyl acetate	3	0.000	2.305	0.000	No	No	
				1	0.900	4.7154e-1	1.909			
				2	0.900	4.5623e-1	1.973			
4	4.646	FID1 A	Methanol, %	3	0.000	15.673	0.000	No	No	
				1	1.2000e-3	3.318	3.6166e-4			
				2	1.2000e-3	3.318	3.6171e-4			
5	5.088	FID1 A	2-propanol	3	0.000	2.141	0.000	No	No	
				1	1.230	3.9559e-1	3.109			
				2	1.230	4.0221e-1	3.058			
				3	4.600	2.141	2.149			
6	5.287	FID1 A	Ethanol, %	3	0.000	193760.000	0.000	No	No	
				1	40.000	189880.000	2.1065e-4			
				2	40.000	191100.000	2.0932e-4			
7	7.763	FID1 A	1-propanol	3	0.000	3.013	0.000	No	No	
				1	0.800	6.4199e-1	1.246			
				2	0.800	5.8696e-1	1.363			
8	9.145	FID1 A	Isobutanol	3	0.000	3.588	0.000	No	No	
				1	0.800	7.0938e-1	1.128			
				2	0.800	7.1834e-1	1.114			
9	10.432	FID1 A	1-butanol	3	0.000	3.503	0.000	No	No	

1



#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
1	3.138	FID1 A	Acetaldehyde	1	1.150	3.5825e-1	3.210	No	No	
				2	1.150	3.4193e-1	3.363			
				3	5.100	1.440	3.541			
2	3.874	FID1 A	Methyl acetate	1	0.920	2.6575e-1	3.462	No	No	
				2	0.920	2.7336e-1	3.366			
				3	4.600	1.434	3.209			
3	4.484	FID1 A	Ethyl acetate	1	0.900	4.7154e-1	1.909	No	No	
				2	0.900	4.5623e-1	1.973			
				3	4.500	2.305	1.952			
4	4.646	FID1 A	Methanol, %	1	1.2000e-3	3.318	3.6166e-4	No	No	
				2	1.2000e-3	3.318	3.6171e-4			
				3	5.2000e-3	15.673	3.3177e-4			
5	5.088	FID1 A	2-propanol	1	1.230	3.9559e-1	3.109	No	No	
				2	1.230	4.0221e-1	3.058			
				3	4.600	2.141	2.149			
6	5.287	FID1 A	Ethanol, %	1	40.000	189880.000	2.1065e-4	No	No	
				2	40.000	191100.000	2.0932e-4			
				3	40.000	193760.000	2.0644e-4			
7	7.763	FID1 A	1-propanol	1	0.800	6.4199e-1	1.246	No	No	
				2	0.800	5.8696e-1	1.363			
				3	4.000	3.013	1.327			
8	9.145	FID1 A	Isobutanol	1	0.800	7.0938e-1	1.128	No	No	
				2	0.800	7.1834e-1	1.114			
				3	4.000	3.588	1.115			
9	10.432	FID1 A	1-butanol	1	0.810	7.3758e-1	1.098	No	No	

1

done

Instrument 1 Ready

**9. Способом, аналогичным п. 4-8, добавьте в калибровочную таблицу измерения растворов РВ-2 и РВ-1 и укажите их паспортные данные**

# 10. Загрузите файлы измерений водки

Instrument 1 (offline): Data Analysis

1 File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

2 Load Signal... Overlay Signal... Subtract Blank Run... Snapshot Import File Export File Load Save Save As Copy Delete Printer Setup... Print Preview Print

1 SPIRITS\RV\_CALIBRATION\RV-1.D  
2 SPIRITS\RV\_CALIBRATION\RV-1-2.D  
3 SPIRITS\RV\_CALIBRATION\RV-2.D  
4 SPIRITS\RV\_CALIBRATION\RV-2-2.D  
Exit

Внешний стандарт.M

Ready/Reprocess Data Mode

Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
2.2019 17:56:12	shest	Vial 105	RV-1.D	RV-1	SPIRT_RV.M	-		0	0	1	1	-
2.2019 18:23:36	shest	Vial 105	RV-1-2.D	RV-1-2	SPIRT_RV.M	-		0	0	1	1	-
2.2019 17:01:41	shest	Vial 106	RV-2.D	RV-2	SPIRT_RV.M	-		0	0	1	1	-

Load Signal : Instrument 1

File name: 4 SIG11220.D

3 SIG11220.D

5 OK

Cancel Help

Full >>

Drives: c: Сеть...

Signal Details...

RT	Signal	Compound
3.7	FID1 A	Acetaldehyde
4.72	FID1 A	Methyl acetate
3	4.481 FID1 A	Ethyl acetate
4	4.642 FID1 A	Methanol, %
5	5.084 FID1 A	2-propanol

File Information...

Load using Signal Details

5	1.0200e-2	30.429	3.3521e-4			
6	1.0200e-2	30.604	3.3329e-4			
1	1.230	3.9559e-1	3.109	No	No	

Load Signal(s) and Spectra of a Data File

Instrument 1 Ready

# 11. Настройте необходимые параметры отчёта

1

2

3

4

5

Specify Report: Instrument 1

Quantitative Results

Calculate: ESTD Based On: Area Sorted By: Signal

ISTD Cor: ESTD

Use Norm% ISTD ESTD% ISTD%

Style

Report Style: Short

Sample info on each page  Add Fraction Table and Ticks

Add Chromatogram Output  Add Summed Peaks Table

Add Sample Custom fields to Sample info  Add Compound Custom fields

Report Layout For Uncalibrated Peaks

Separately  With Calibrated Peaks  Do Not Report

Destination

Printer  Screen  File

File Settings

File Prefix: Report

.TXT  .CSV  .EMF  .DIF

Unique pdf file name  .PDF  .XLS  .HTM

Calculation Factors

Use Sample Data: From Data File

Amount: 0.0000 # Compound ISTD Amount

Multiplier: 1.0000

Dilution: 1.0000

Enter

Chromatogram Output

Portrait  Landscape  Multi-Page (Landscape)

Size: % of Page

Time: 100

Response: 40

1 Pages

Signal Options...

OK Cancel Help

#	RT	Signal	Area	Height	Width	Area%	Height%	Width%	Area%	Height%	Width%
1	3.137	FID1 A	1.414	3.607							
2	3.872	FID1 A	2.6575e-1	3.462	No	No	No	No	No	No	No
3	4.600		1.434	3.209							
4	4.600		1.412	3.258							

Chromatogram: FID1 A, (SPIRIT...ITS\SIG11)

Acetaldehyde, FID1 A

Area = 0.28064413\*Amt + 0

Correlation: 0.99994

Amount [mg/L]

# 12. Создайте итоговый отчёт

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration **Report** Batch View Abort Help

Print Report  
1 Specify Report...  
System Suitability >

Ready/Reprocess Data Mode

Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
13.02.2019 16:07:06	shest	Vial 107	RV-3.D	RV-3	SPIRT_RV.M	-		0	0	1	1	-
13.02.2019 16:34:20	shest	Vial 107	RV-3-2.D	RV-3-2	SPIRT_RV.M	M		0	0	1	1	-
14.02.2019 10:51:33	shest	Vial 108	SIG11220.D	RVE-F-1	SPIRT_RV.M	M		0	0	0	0	-

FID1 A, (SPIRIT...ITS\SIG11220.D) Overview

Calibration Table

#	RT	Signal	Compound	Lvl	Amt[mg/L]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	1	1.150	3.5825e-1	3.210	No	No	
				2	1.150	3.4193e-1	3.363			
				3	5.100	1.440	3.541			
				4	5.100	1.414	3.607			
				5	9.800	2.736	3.582			
				6	9.800	2.763	3.547			
2	3.872	FID1 A	Methyl acetate	1	0.920	2.6575e-1	3.462	No	No	
				2	0.920	2.7336e-1	3.366			
				3	4.600	1.434	3.209			
				4	4.600	1.412	3.258			

Calibration Curve

Acetaldehyde, FID1 A  
Area = 0.28064413 \* Amt + 0

Rel. Res%(1): 11.002

Correlation: 0.99994

Identify Peaks, calculate Results, print Report

Instrument 1 Ready

Sample Name: RVE-F-1

```

=====
Acq. Operator   : shest
Acq. Instrument : Instrument 1           Location : Vial 108
Injection Date  : 14.02.2019 10:51:33   Inj       : 1
                                           Inj Volume : 1 µl

Acq. Method     : C:\HPCHEM\1\METHODS1\SPIRT_RV.M
Last changed    : 14.02.2019 21:05:08 by shest
Analysis Method : C:\CHEM32\1\METHODS\EXTERNAL_STANDARD_RV.M
Last changed    : 29.04.2019 14:27:14
                 (modified after loading)
Additional Info  : Peak(s) manually integrated
=====
    
```

External Standard Report

```

=====
Sorted By       : Signal
Calib. Data Modified : 29 April 2019 r. 14:25:17
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
    
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [mg/L]	Grp	Name
3.144	BB	1.91441e-1	3.56323	6.82150e-1		Acetaldehyde
3.872		-	-	-		Methyl acetate
4.481		-	-	-		Ethyl acetate
4.651	BB	1.51168	3.34477e-4	5.05623e-4		Methanol, %
5.093	BV	1.59827e-1	2.05442	3.28351e-1		2-propanol
5.294	VB S	1.91914e5	2.09598e-4	40.22488		Ethanol, %
7.759		-	-	-		1-propanol
9.143		-	-	-		Isobutanol
10.432		-	-	-		1-butanol
11.787		-	-	-		Isoamylol

Totals : 41.23589

2 Warnings or Errors :

Warning : Calibration warnings (see calibration table listing)  
 Warning : Calibrated compound(s) not found

\*\*\* End of Report \*\*\*

External Standard Report

```

Sorted By       : Signal
Calib. Data Modified : 29 April 2019 r. 14:25:17
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
    
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [mg/L]	Grp	Name
3.144	BB	1.91441e-1	3.56323	6.82150e-1		Acetaldehyde
3.872		-	-	-		Methyl acetate
4.481		-	-	-		Ethyl acetate
4.651	BB	1.51168	3.34477e-4	5.05623e-4		Methanol, %
5.093	BV	1.59827e-1	2.05442	3.28351e-1		2-propanol
5.294	VB S	1.91914e5	2.09598e-4	40.22488		Ethanol, %
7.759		-	-	-		1-propanol
9.143		-	-	-		Isobutanol
10.432		-	-	-		1-butanol
11.787		-	-	-		Isoamylol

Totals : 41.23589



**Анализ алкогольных напитков методом  
«Этанол – внутренний стандарт»**

# 1. Создайте новый метод

The screenshot shows the 'Instrument 1 (offline): Data Analysis' software interface. The 'File' menu is open, and the 'Save As' option is selected. The 'Method...' option is highlighted. The 'Save Method as: Instrument 1' dialog box is open, showing the 'Name' field with the text 'Этанол - внутренний стандарт.M'. The file list on the left includes 100FID.M, CBT.M, DEF\_GC.M, ESTD\_EX.M, FID\_TCD.M, ISTD\_EX.M, LOADTEST.M, and NPD\_ECD.M. The folder list on the right includes c:\, chem32, 1, methods, 100fid.m, cbt.m, def\_go.m, estd\_ex.m, fid\_tcd.m, istd\_ex.m, LOADTEST.M, and npd\_ecd.m. The 'Types' dropdown is set to 'Method(\*.M)' and the 'Диски' (Drives) dropdown is set to 'c:'. The 'OK' button is highlighted.

## 2. Загрузите все измерения раствора RV-1

The screenshot displays the 'Instrument 1 (offline): Data Analysis' software interface. A 'Load Signal : Instrument 1' dialog box is open, showing a list of files in the 'File name:' field. The file 'RV-1.D' is selected and highlighted with a red box, with a red '1' next to it. The 'Folders:' field shows the directory structure: 'c:\', 'c:\CHEM32', 'c:\CHEM32\1', 'c:\CHEM32\1\DATA', 'c:\CHEM32\1\SPIRITS', and 'c:\CHEM32\1\SPIRITS\RV\_CALIBRATION'. The 'OK' button is highlighted with a red box and a red '2' next to it. The background shows the main software interface with a menu bar (File, Method, Sequence, Graphics, Integration, Calibration, Report, Batch, View, Abort, Help), a toolbar, and a data table with columns: Date Time, Operator, Vial, Data File, Sample Name, Method Name, Man..., Sample Info, Sample Am..., ISTD Amount, Multiplier, Dilution, ECM. The status bar at the bottom indicates 'Instrument 1 Busy'.

# 3. Настройте калибровку

1 Calibration

2 Calibration Settings...

3 Etанол - внутренний стандарт

4 mg/L AA

5 OK

Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
0	0	1	1	-
0	0	1	1	-
0	0	1	1	-

20.736 min

Calibration Curve

0.1  
0.05  
0  
-0.05  
-0.1

-0.1 -0.05 0 0.05

Instrument 1 Ready

# 4. Создайте калибровочную таблицу

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration **Calibration** Report Batch View Abort Help

1 New Calibration Table...  
Delete Calibration Table...  
Recalibrate...  
2 Add Level...  
Add Peaks...  
Calibration Settings...  
Advanced Calibration >  
Calibration Table Options... >  
Select Peak  
Delete Peaks  
Add Peaks  
Recalibrate Compounds  
Calibration Table...  
Compound Groups...  
Signal Details...  
Control Sample Limits...

3 OK Cancel Help

	Data File	Sample Name	Method Name	Man... /	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
105	RV-1.D	RV-1	SPIRT_RV.M	-		0	0	1	1	-
105	RV-1-2.D	RV-1-2	SPIRT_RV.M	-		0	0	1	1	-

Chromatogram peaks (min): 3.137, 4.643, 9.143, 10.432, 11.787, 20.872

#	RT	Signal	Compound	Lvl	Amt[mg/L AA]	Area	Rsp.Factor	Ref	ISTD	#
---	----	--------	----------	-----	--------------	------	------------	-----	------	---

# 5. Введите паспортные данные для раствора РВ-1

The screenshot displays the 'Data Analysis' software interface. The main window shows a list of data points with columns: Date Time, Operator, Vial, Data File, Sample Name, Method Name, Man..., Sample Info, Sample Am..., ISTD Amount, Multiplier, Dilution, and ECM. Below this, the 'Calibration Table' is visible, containing a list of compounds with their respective retention times, signals, levels, and amounts. The 'Compound' and 'Amt[mg/L AA]' columns are highlighted with red boxes. Red numbers '1' and '2' are placed below the 'Compound' and 'Amt[mg/L AA]' columns respectively, indicating where to enter passport data for the solution RV-1.

#	RT	Signal	Compound	Lvl	Amt[mg/L AA]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	1	24.500	2.739	8.945	No	No	
2	3.872	FID1 A	Methyl acetate	1	23.000	2.792	8.239	No	No	
3	4.482	FID1 A	Ethyl acetate	1	22.500	4.502	4.997	No	No	
4	4.643	FID1 A	Methanol	1	202.160	30.469	6.635	No	No	
5	5.085	FID1 A	2-propanol	1	21.750	4.381	4.965	No	No	
6	5.284	FID1 A	Ethanol	1	789300.000	189210.000	4.171	No	No	
7	7.761	FID1 A	1-propanol	1	20.000	5.841	3.424	No	No	
8	9.143	FID1 A	Isobutanol	1	20.000	6.951	2.877	No	No	
9	10.432	FID1 A	1-butanol	1	20.250	6.854	2.954	No	No	
10	11.787	FID1 A	Isoamylol	1	20.250	7.386	2.742	No	No	

# 6. Добавьте второе измерение раствора РВ-1

1 New Calibration Table...  
Delete Calibration Table...  
2 Recalibrate...  
Add Level...  
Add Peaks...  
Calibration Settings...  
Advanced Calibration >  
Calibration Table Options... >  
Select Peak  
Delete Peaks  
Add Peaks  
Recalibrate Compounds  
Calibration Table...  
Compound Groups...  
Signal Details...  
Control Sample Limits...

Calibrate: Instrument 1

Add Level

Level 2 3

Default Amount: 0.000

4 OK Cancel Help

#	Retention Time	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
105		RV-1-D	RV-1			0	0	1	1	-
105		RV-1-2-D	RV-1-2			0	0	1	1	-

#	Area	Rsp.Factor	Ref	ISTD	#
1	24.500	2.739	8.945	No	No
2	23.000	2.792	8.239	No	No
3	22.500	4.502	4.997	No	No
4	202.160	30.469	6.635	No	No
5	21.750	4.381	4.965	No	No
6	789300.000	189210.000	4.171	No	No
7	20.000	5.841	3.424	No	No
8	20.000	6.951	2.877	No	No
9	20.250	6.854	2.954	No	No
10	20.250	7.386	2.742	No	No

Add new level from current chromatogram

Instrument 1 Ready

# 7. Введите паспортные данные для раствора РВ-1

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

Signals Methods Этанол - внутренний стандарт.M

Data Analysis

Ready/Reprocess Data Mode

Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
13.02.2019 17:56:12	shest	Vial 105	RV-1.D	RV-1	SPIRT_RV.M	M		0	0	1	1	-
13.02.2019 18:23:36	shest	Vial 105	RV-1-2.D	RV-1-2	SPIRT_RV.M	M		0	0	1	1	-

Integration Calibration Signal


Report: Short

FID1 A, (SPIRT...RATION\RV-1.D) Overview

Calibration Table

#	RT	Signal	Compound	Lvl	Amt[mg/L AA]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	2	0.000	2.769	8.945	No	No	
				1	24.500	2.739	8.945	No	No	
2	3.872	FID1 A	Methyl acetate	2	0.000	2.840	0.000	No	No	
				1	23.000	2.792	8.239	No	No	
3	4.481	FID1 A	Ethyl acetate	2	0.000	4.560	0.000	No	No	
				1	22.500	4.502	4.997	No	No	
4	4.642	FID1 A	Methanol	2	0.000	30.613	0.000	No	No	
				1	202.160	30.469	6.635	No	No	
5	5.084	FID1 A	2-propanol	2	0.000	4.381	0.000	No	No	
				1	21.750	4.381	4.965	No	No	
6	5.283	FID1 A	Ethanol	2	0.000	190240.000	0.000	No	No	
				1	789300.000	189210.000	4.171	No	No	
7	7.759	FID1 A	1-propanol	2	0.000	5.834	0.000	No	No	
				1	20.000	5.841	3.424	No	No	
8	9.143	FID1 A	Isobutanol	2	0.000	7.022	0.000	No	No	
				1	20.000	6.951	2.877	No	No	
9	10.432	FID1 A	1-butanol	2	0.000	6.898	0.000	No	No	
				1	20.250	6.854	2.954	No	No	
10	11.787	FID1 A	Isoamylol	2	0.000	7.476	0.000	No	No	
				1	20.250	7.386	2.742	No	No	

1



#	RT	Signal	Compound	Lvl	Amt[mg/L AA]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	1	24.500	2.739	8.945	No	No	
				2	24.500	2.769	8.847	No	No	
2	3.872	FID1 A	Methyl acetate	1	23.000	2.792	8.239	No	No	
				2	23.000	2.840	8.098	No	No	
3	4.481	FID1 A	Ethyl acetate	1	22.500	4.502	4.997	No	No	
				2	22.500	4.560	4.934	No	No	
4	4.642	FID1 A	Methanol	1	202.160	30.469	6.635	No	No	
				2	202.160	30.613	6.604	No	No	
5	5.084	FID1 A	2-propanol	1	21.750	4.381	4.965	No	No	
				2	21.750	4.381	4.965	No	No	
6	5.283	FID1 A	Ethanol	1	789300.000	189210.000	4.171	No	No	
				2	789300.000	190240.000	4.149	No	No	
7	7.759	FID1 A	1-propanol	1	20.000	5.841	3.424	No	No	
				2	20.000	5.834	3.428	No	No	
8	9.143	FID1 A	Isobutanol	1	20.000	6.951	2.877	No	No	
				2	20.000	7.022	2.848	No	No	
9	10.432	FID1 A	1-butanol	1	20.250	6.854	2.954	No	No	
				2	20.250	6.898	2.936	No	No	
10	11.787	FID1 A	Isoamylol	1	20.250	7.386	2.742	No	No	
				2	20.250	7.476	2.709	No	No	

1

done

Instrument 1 Ready



# 8. Выберите Этанол внутренним стандартом (ISTD)

The screenshot displays the 'Instrument 1 (offline): Data Analysis' software interface. The main window shows a list of samples and a 'Calibration Table' with columns for #, RT, Signal, Compound, Lvl, Amt[mg/L AA], Area, Rsp.Factor, Ref, ISTD, and #. A dialog box titled 'Calibration Table: Instrument 1' is open, allowing the user to select an ISTD. The dialog includes fields for 'ISTD #:' (set to 1), 'Sample Default' (set to 'No'), and 'ISTD Amount:' (set to 789300.000). The 'OK' button is highlighted with a red box.

Calibration Table: Instrument 1

#	RT	Signal	Compound	Lvl	Amt[mg/L AA]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	1	24.500	2.739	8.945	No	No	
				2	24.500	2.769	8.847			
2	3.872	FID1 A	Methyl acetate	1	23.000	2.792	8.239	No	No	
				2	23.000	2.840	8.098			
3	4.481	FID1 A	Ethyl acetate	1	22.500	4.502	4.997	No	No	
				2	22.500	4.560	4.934			
4	4.642	FID1 A	Methanol	1	202.160	30.469	6.635	No	No	
				2	202.160	30.613	6.604			
5	5.084	FID1 A	2-propanol	1	21.750	4.381	4.965	No	No	
				2	21.750	4.381	4.965			
6	5.283	FID1 A	Ethanol	1	789300.000	189210.000	4.171	No	No	1
				2	789300.000	190240.000	4.149	No	No	
7	7.759	FID1 A	1-propanol	1	20.000	5.841	3.424	No	Yes	2
				2	20.000	5.834	3.428			
8	9.143	FID1 A	Isobutanol	1	20.000	6.951	2.877	No	No	
				2	20.000	7.022	2.848			
9	10.432	FID1 A	1-butanol	1	20.250	6.854	2.954	No	No	
				2	20.250	6.898	2.936			
10	11.787	FID1 A	Isoamylol	1	20.250	7.386	2.742	No	No	
				2	20.250	7.476	2.709			

Calibration Table: Instrument 1

ISTD #: 1

Sample Default: No

ISTD Amount: 789300.000

OK Cancel Help

# 9. Добавьте файлы измерений водки

1 Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration Report Batch View Abort Help

2 Load Signal... Overlay Signal... Subtract Blank Run... Snapshot Import File Export File Load Save Save As Copy Delete Printer Setup... Print Preview Print

3 4 5 OK

File name: SIG11220.D

File list:

- RVE1-3.D
- RVEB-1.D
- RVEB-2.D
- RVEB-3.D
- RVEC-1.D
- RVEC-2.D
- RVEC-3.D
- RVED-1.D
- RVED-2.D
- RVED-3.D
- RVEH-1.D
- RVEH-2.D
- RVEH-3.D
- RVEK-1.D
- RVEK-2.D
- RVEK-3.D
- SIG11219.D
- 4 SIG11220.D
- SIG11221.D
- SIG11222.D
- SIG11223.D
- SIG11224.D
- SIG11225.D
- SIG11226.D
- SIG11227.D
- SIG11228.D

File Information...

Load using Signal Details

Retention Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
2.2019 17:56:12	shest	Vial 105	RV-1.D	RV-1	SPIRT_RV.M			0	0	1	1	-
2.2019 18:23:36	shest											
6	5.283	FID1 A	Ethanol									
7	7.759	FID1 A	1-propanol									
8	9.143	FID1 A	Isobutanol									
9	10.432	FID1 A	1-butanol									
10	11.787	FID1 A	Isoamylol									

Load Signal(s) and Spectra of a Data File

Instrument 1 Busy

# 10. Настройте необходимые параметры отчёта

1

2

3

4

Specify Report: Instrument 1

Quantitative Results

Calculate: **ISTD** Based On: Area Sorted By: Signal

ISTD Correction

Use Multiplier & Dilution Factor with ISTDs

Style

Report Style: Short

Sample info on each page  Add Fraction Table and Ticks

Add Chromatogram Output  Add Summed Peaks Table

Add Sample Custom fields to Sample info  Add Compound Custom fields

Report Layout For Uncalibrated Peaks

Separately  With Calibrated Peaks  Do Not Report

Destination

Printer  Screen  File

File Settings

File Prefix: Report

.TXT  .CSV  .EMF  .DIF

Unique pdf file name  .PDF  .XLS  .HTM

Calculation Factors

Use Sample Data: From Data File

Amount: 0.0000 # Compound: 1 Ethanol ISTD Amount: 7.89300e5

Multiplier: 1.0000

Dilution: 1.0000

Chromatogram Output

Portrait  Landscape  Multi-Page (Landscape)

Size

% of Page

Time: 100

Response: 40

1 Pages

Signal Options...

OK Cancel Help

Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
14.02.2019 10:51:33	shest	Vial 108	SIG11220.D	RVE-F-1	SPIRT_RV.M	-		0	0	1	1	-
13.02.2019 17:56:										1	1	-
13.02.2019 18:23:										1	1	-

#	RT	Signal
1	3.137	FID1 A
2	3.872	FID1 A
3	4.481	FID1 A
4	4.642	FID1 A
5	5.084	FID1 A
6	5.283	FID1 A
7	7.759	FID1 A
8	9.143	FID1 A
9	10.432	FID1 A
10	11.787	FID1 A

	Isoamyloi	1	20.250	7.386	2.742	No	No	1				
		2	20.250	7.476	2.709							

Specify Report Calculation and Print Style

Instrument 1 Ready

# 11. Создайте отчёт

Instrument 1 (offline): Data Analysis

File Method Sequence Graphics Integration Calibration **Report** Batch View Abort Help

Signals Methods **Print Report** Этанол - внутр

Data Analysis 1 Specify Report... System Suitability > Seq

Ready/Reprocess Data Mode

...	Date Time	Operator	Vial	Data File	Sample Name	Method Name	Man...	Sample Info	Sample Am...	ISTD Amount	Multiplier	Dilution	ECM
+	14.02.2019 10:51:33	shest	Vial 108	SIG11220.D	RVE-F-1	SPIRT_RV.M	-		0	0	1	1	-
+	13.02.2019 17:56:12	shest	Vial 105	RV-1.D	RV-1	SPIRT_RV.M	M		0	0	1	1	-
+	13.02.2019 18:23:36	shest	Vial 105	RV-1-2.D	RV-1-2	SPIRT_RV.M	M		0	0	1	1	-

Integration Calibration Signal

Report: Short

FID1 A, (SPIRIT...ITS\SIG11220.D) Overview

FID1 A, (SPIRITS\SPIRITS\SIG11220.D)

Calibration Table

#	RT	Signal	Compound	Lvl	Amt[mg/LAA]	Area	Rsp.Factor	Ref	ISTD	#
1	3.137	FID1 A	Acetaldehyde	1	24.500	2.739	8.945	No	No	1
				2	24.500	2.769	8.847			
2	3.872	FID1 A	Methyl acetate	1	23.000	2.792	8.239	No	No	1
				2	23.000	2.840	8.098			
3	4.481	FID1 A	Ethyl acetate	1	22.500	4.502	4.997	No	No	1
				2	22.500	4.560	4.934			
4	4.642	FID1 A	Methanol	1	202.160	30.469	6.635	No	No	1
				2	202.160	30.613	6.604			
5	5.084	FID1 A	2-propanol	1	21.750	4.381	4.965	No	No	1
				2	21.750	4.381	4.965			

Calibration Curve

Acetaldehyde, FID1 A  
Area Ratio = 0.46764546\*Amount Ratio + 0

Area Ratio

Rel. Res%(1): -2.8001e-1

Correlation: 1.00000

Amount Ratio

Identify Peaks, calculate Results, print Report

Instrument 1 Ready

Sample Name: RVE-F-1

```

=====
Acq. Operator   : shest
Acq. Instrument : Instrument 1      Location : Vial 108
Injection Date  : 14.02.2019 10:51:33  Inj : 1
                                           Inj Volume : 1 µl

Acq. Method     : C:\HPCHEM\1\METHODS1\SPIRT_RV.M
Last changed    : 14.02.2019 21:05:08 by shest
Analysis Method : C:\CHEM32\1\METHODS\ETHANOL_AS_INTERNAL_STANDARD.M
Last changed    : 29.04.2019 12:04:57
                 (modified after loading)
Additional Info : Peak(s) manually integrated
=====
    
```

Internal Standard Report

```

=====
Sorted By      : Signal
Calib. Data Modified : 29.04.2019 11:59:26
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs
Sample ISTD Information:
ISTD  ISTD Amount  Name
# [mg/L AA]
-----|-----|-----
1  7.89300e5  Ethanol
    
```

Signal 1: FID1 A,

RetTime [min]	Type	ISTD used	Area [pA*s]	Amt/Area ratio	Amount [mg/L AA]	Grp	Name
3.144	BB	1	1.92595e-1	2.13837	1.69381		Acetaldehyde
3.872		1	-	-	-		Methyl acetate
4.481		1	-	-	-		Ethyl acetate
4.651	BB	1	1.51070	1.59112	9.88586		Methanol
5.061	MM R	1	2.00066e-1	1.19343	9.81986e-1		2-propanol
5.294	VB S I	1	1.91914e5	1.00000	7.89300e5		Ethanol
7.759		1	-	-	-		1-propanol
9.143		1	-	-	-		Isobutanol
10.432		1	-	-	-		1-butanol
11.787		1	-	-	-		Isoamylol

Totals without ISTD(s) : 12.56165

2 Warnings or Errors :

Warning : Calibration warnings (see calibration table listing)  
 Warning : Calibrated compound(s) not found

\*\*\* End of Report \*\*\*

Internal Standard Report

```

Sorted By      : Signal
Calib. Data Modified : 29.04.2019 11:59:26
Multiplier     : 1.0000
Dilution       : 1.0000
    
```

Use Multiplier & Dilution Factor with ISTDs

Sample ISTD Information:

```

ISTD  ISTD Amount  Name
# [mg/L AA]
-----|-----|-----
1  7.89300e5  Ethanol
    
```

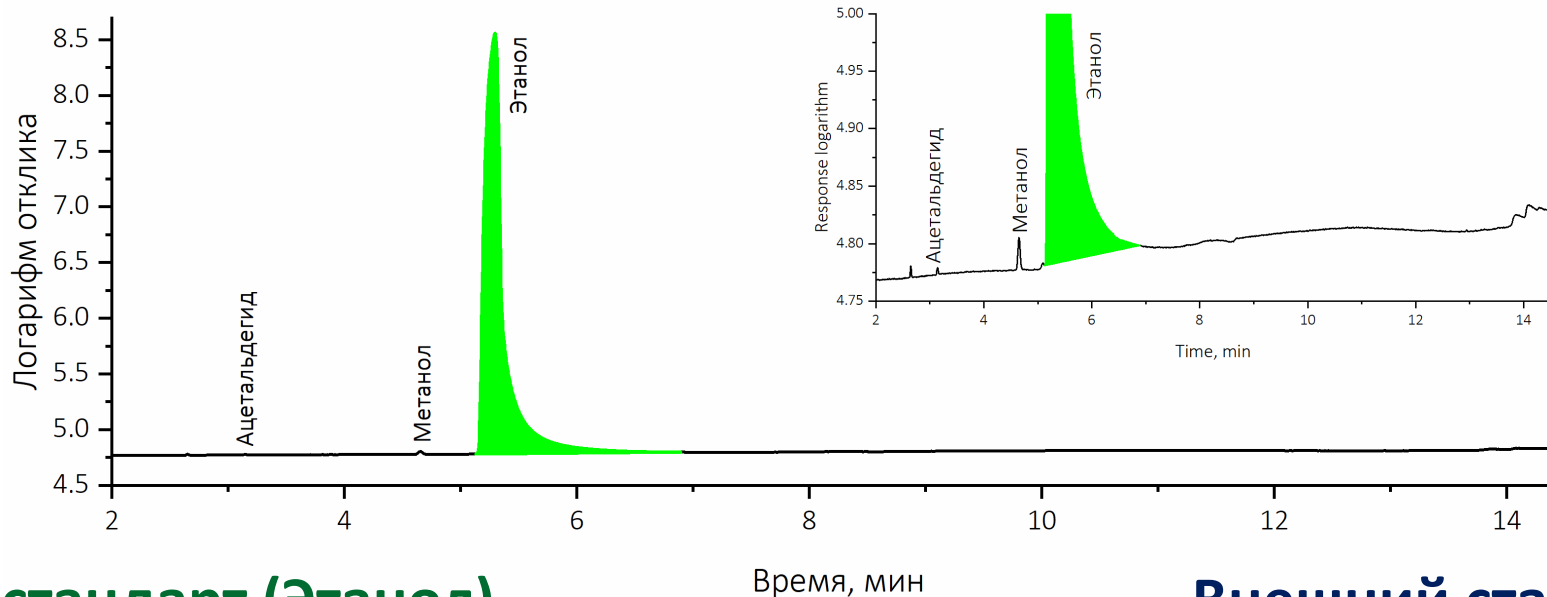
Signal 1: FID1 A,

RetTime [min]	Type	ISTD used	Area [pA*s]	Amt/Area ratio	Amount [mg/L AA]	Grp	Name
3.144	BB	1	1.92595e-1	2.13837	1.69381		Acetaldehyde
3.872		1	-	-	-		Methyl acetate
4.481		1	-	-	-		Ethyl acetate
4.651	BB	1	1.51070	1.59112	9.88586		Methanol
5.061	MM R	1	2.00066e-1	1.19343	9.81986e-1		2-propanol
5.294	VB S I	1	1.91914e5	1.00000	7.89300e5		Ethanol
7.759		1	-	-	-		1-propanol
9.143		1	-	-	-		Isobutanol
10.432		1	-	-	-		1-butanol
11.787		1	-	-	-		Isoamylol

Totals without ISTD(s) : 12.56165

**12. Способом, аналогичным п. 8-10, добавьте измерения виски и коньяка и создайте отчеты**

# Хроматограмма образца водки "Finsky"



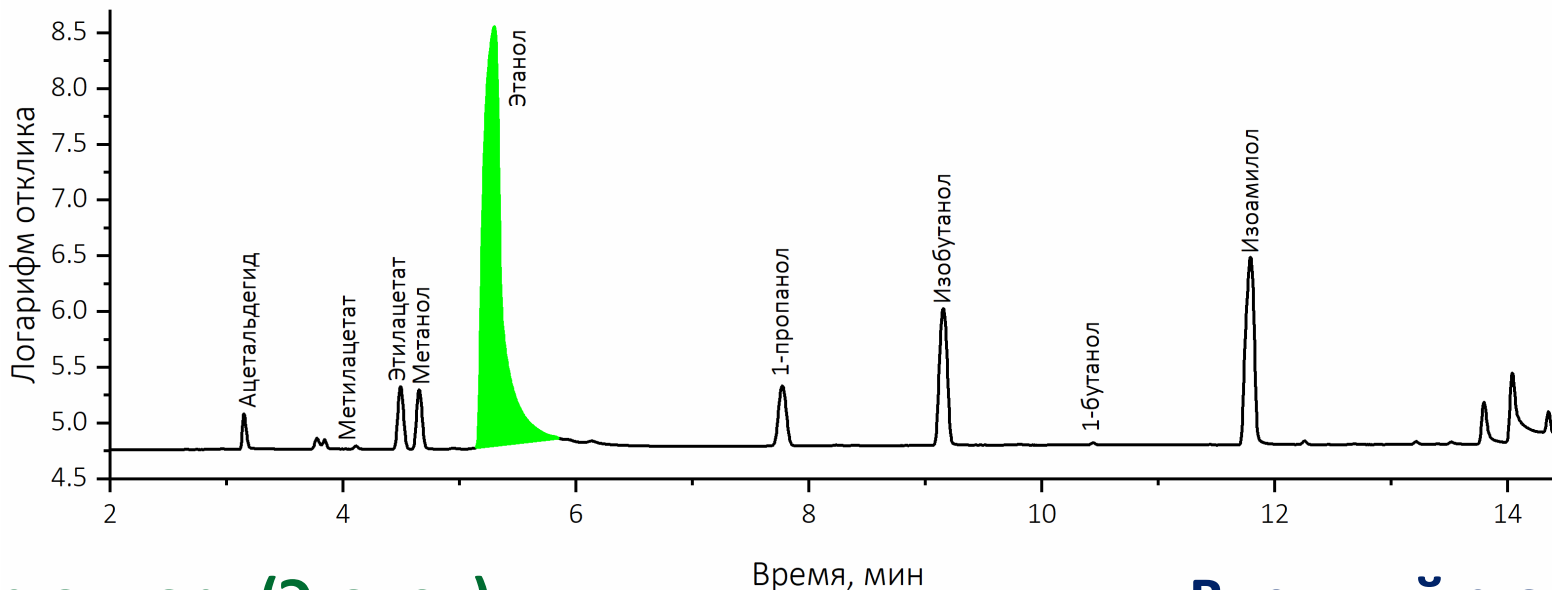
## Внутренний стандарт (Этанол)

RetTime [min]	Type	ISTD used	Area [pA*s]	Amt/Area ratio	Amount [mg/L AA]	Grp	Name
3.144	BB	1	1.92595e-1	2.13837	1.69381		Acetaldehyde
3.872		1	-	-	-		Methyl acetate
4.481		1	-	-	-		Ethyl acetate
4.651	BB	1	1.51070	1.59112	9.88586		Methanol
5.061	MM R	1	2.00066e-1	1.19343	9.81986e-1		2-propanol
5.294	VB S I	1	1.91914e5	1.00000	7.89300e5		Ethanol
7.759		1	-	-	-		1-propanol
9.143		1	-	-	-		Isobutanol
10.432		1	-	-	-		1-butanol
11.787		1	-	-	-		Isoamylol
Totals without ISTD(s) :			12.56165				

## Внешний стандарт

RetTime [min]	Type	Area [pA*s]	Amt/Area ratio	Amount [mg/L]	Grp	Name
3.144	BB	1.91441e-1	3.56323	6.82150e-1		Acetaldehyde
3.872		-	-	-		Methyl acetate
4.481		-	-	-		Ethyl acetate
4.651	BB	1.51168	3.34477e-4	5.05623e-4		Methanol, %
5.093	BV	1.59827e-1	2.05442	3.28351e-1		2-propanol
5.294	VB S	1.91914e5	2.09598e-4	40.22488		Ethanol, %
7.759		-	-	-		1-propanol
9.143		-	-	-		Isobutanol
10.432		-	-	-		1-butanol
11.787		-	-	-		Isoamylol
Totals :			41.23589			

# Хроматограмма образца коньяка "Courvoisier"



## Внутренний стандарт (Этанол)

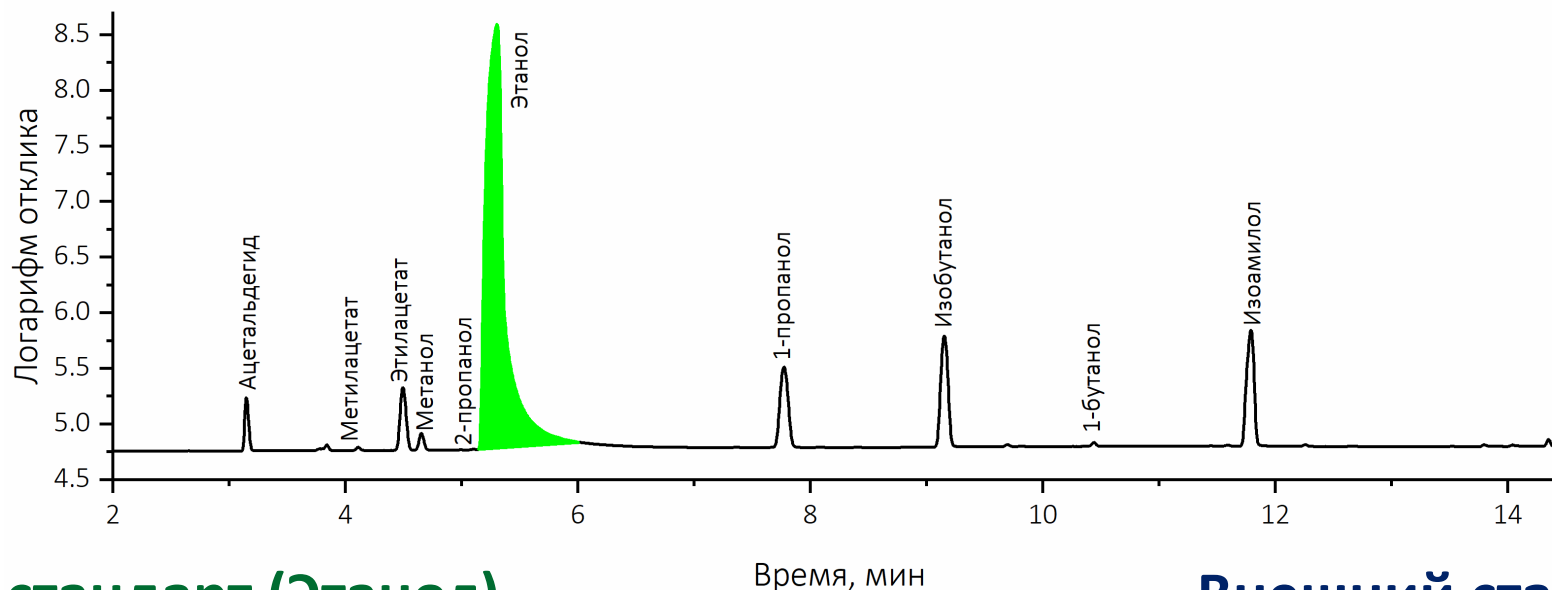
## Внешний стандарт

RetTime [min]	Type	ISTD used	Area [pA*s]	Amt/Area ratio	Amount [mg/L AA]	Grp	Name
3.148	BB	1	17.73493	2.13837	158.37769		Acetaldehyde
3.841	VB	1	3.78571	1.96342	31.04139		Methyl acetate
4.493	BV	1	56.87724	1.19359	283.51427		Ethyl acetate
4.652	VB	1	51.86232	1.59112	344.61609		Methanol
5.084		1	-	-	-		2-propanol
5.297	VB S I	1	1.89000e5	1.00000	7.89300e5		Ethanol
7.771	BB	1	78.85472	8.23617e-1	271.22801		1-propanol
9.153	BB	1	421.85425	6.88149e-1	1212.34556		Isobutanol
10.439	BB	1	1.07133	7.07897e-1	3.16720		1-butanol
11.791	BB	1	1211.15601	6.55055e-1	3313.28708		Isoamylol
Totals without ISTD(s) :			5617.57729				

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [mg/L]	Grp	Name
3.148	BB	17.70635	3.56323	63.09183		Acetaldehyde
3.841	VB	3.74441	3.26572	12.22820		Methyl acetate
4.493	BV	56.87840	1.98489	112.89747		Ethyl acetate
4.652	VB	51.86296	3.34477e-4	1.73470e-2		Methanol, %
5.084		-	-	-		2-propanol
5.297	VB S	1.88999e5	2.09598e-4	39.61389		Ethanol, %
7.771	BB	78.85083	1.36310	107.48153		1-propanol
9.153	BB	421.74683	1.14250	481.84638		Isobutanol
10.439	BB	1.07213	1.17048	1.25491		1-butanol
11.791	BB	1211.08069	1.08505	1314.08262		Isoamylol
Totals :			2132.51416			



# Хроматограмма образца виски "Grant's"



## Внутренний стандарт (Этанол)

RetTime [min]	Type	ISTD used	Area [pA*s]	Amt/Area ratio	Amount [mg/L AA]	Grp	Name
3.145	BB	1	28.38794	2.13837	237.17331		Acetaldehyde
3.838	VB	1	2.41633	1.96342	18.53606		Methyl acetate
4.492	BV	1	57.39063	1.19359	267.63611		Ethyl acetate
4.650	VB	1	8.40122	1.59112	52.22678		Methanol
5.099	VV	1	2.69554e-1	1.19343	1.25688		2-propanol
5.298	VB S I	1	2.02020e5	1.00000	7.89300e5		Ethanol
7.770	BB	1	127.91264	8.23617e-1	411.61158		1-propanol
9.148	BB	1	220.70325	6.88149e-1	593.38973		Isobutanol
10.438	BB	1	1.88682	7.07897e-1	5.21855		1-butanol
11.790	BB	1	253.89352	6.55055e-1	649.79731		Isoamylol
Totals without ISTD(s) :				2236.84630			

## Внешний стандарт

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [mg/L]	Grp	Name
3.146	BB	30.36502	3.56323	108.19758		Acetaldehyde
3.839	BB	3.21587	3.26572	10.50212		Methyl acetate
4.493	BV	60.57589	1.98489	120.23659		Ethyl acetate
4.652	VB	8.93475	3.34477e-4	2.98847e-3		Methanol, %
5.098	BV	2.01038e-1	2.05442	4.13015e-1		2-propanol
5.302	VB S	2.14053e5	2.09598e-4	44.86516		Ethanol, %
7.771	BB	135.63293	1.36310	184.88118		1-propanol
9.151	BB	234.27811	1.14250	267.66309		Isobutanol
10.438	BB	2.01285	1.17048	2.35599		1-butanol
11.789	BB	269.12677	1.08505	292.01589		Isoamylol
Totals :				1031.13360		

 [elab@inp.bsu.by](mailto:elab@inp.bsu.by)