



Proyecto Grupal: Unidad 5
Impedancia eléctrica de tejido mamario

Métodos Estadísticos (XXXVII)

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Maestría en Gerencia de Salud

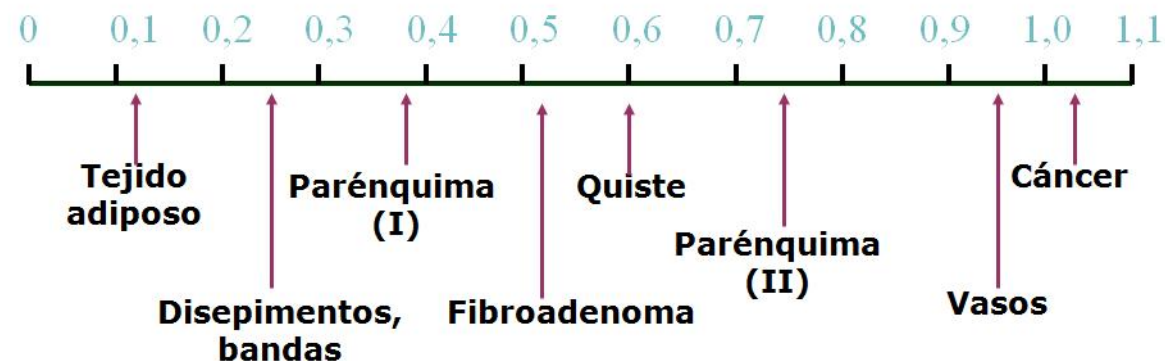
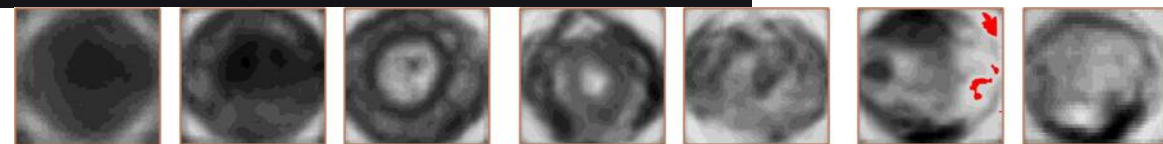
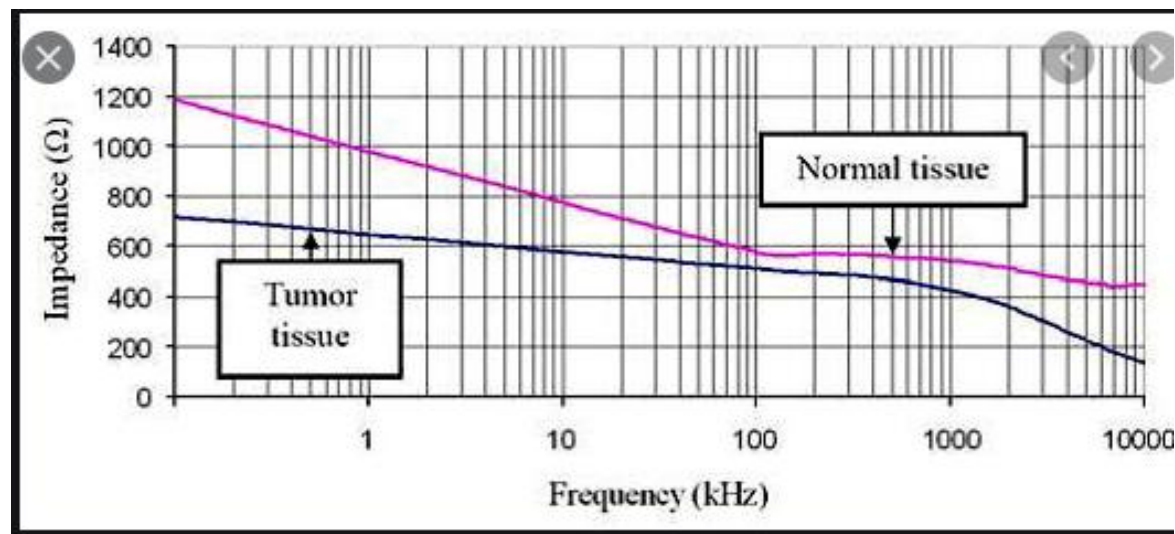
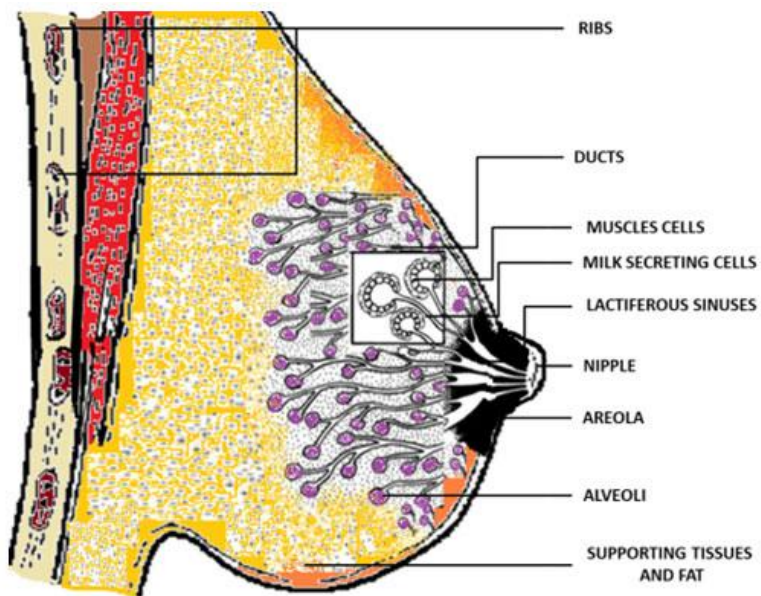
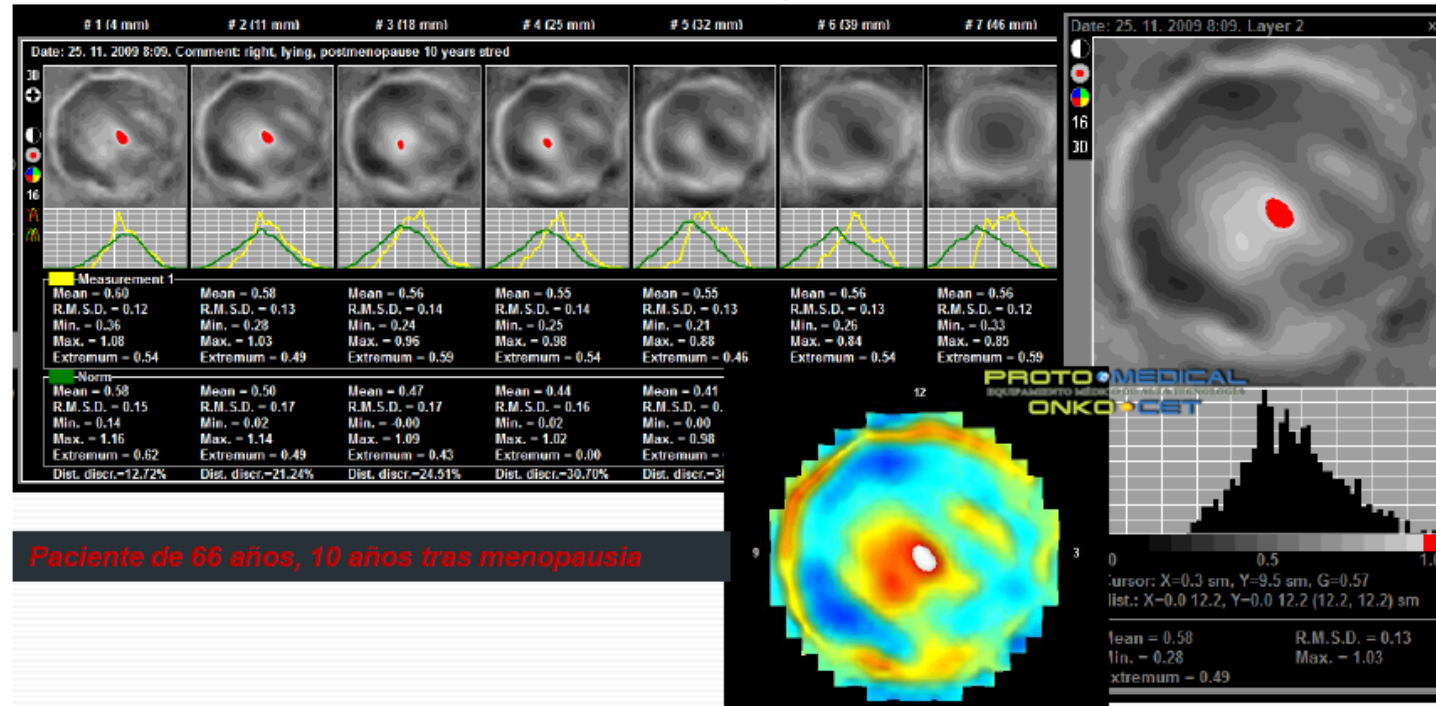
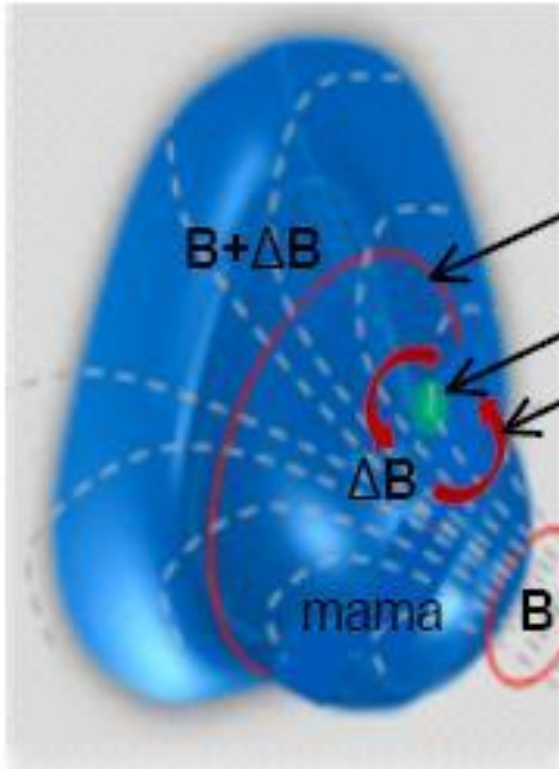
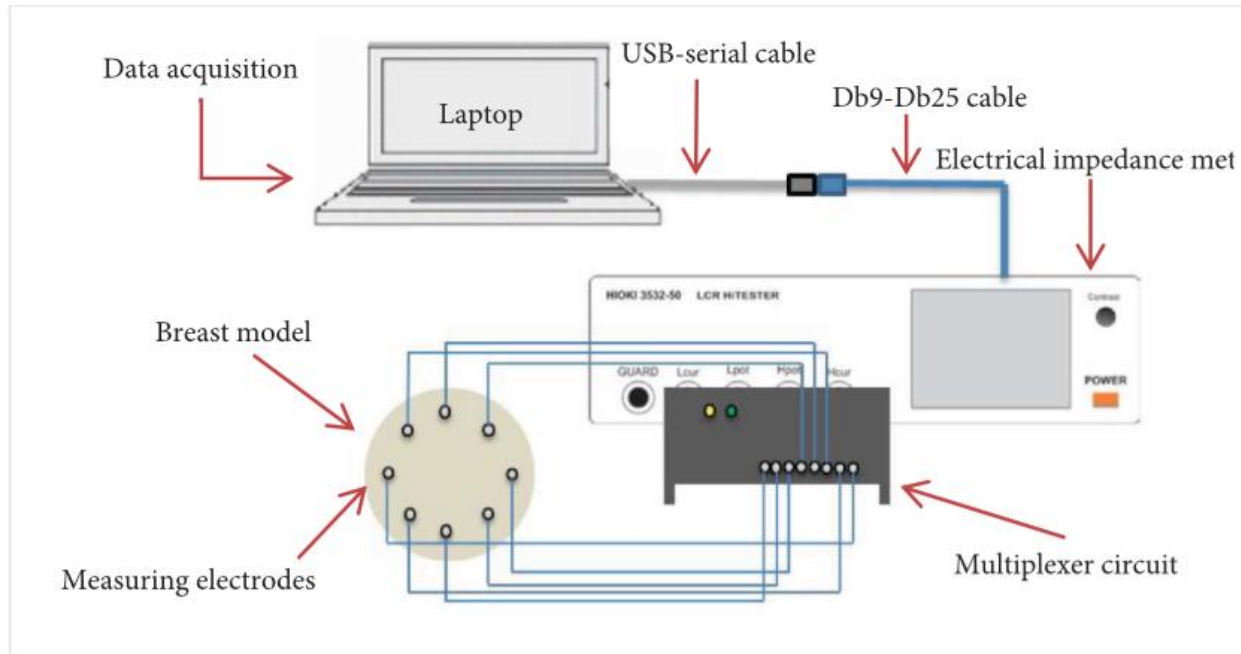


Figure 1: Anatomy of Human breast as illustrated in [12, Fig. 2]

Introducción

Jossinet, J. Variability of impedivity in normal and pathological breast tissue. *Med. Biol. Eng. Comput.* **34**, 346–350 (1996).

<https://doi.org/10.1007/BF02520002>



Paciente de 66 años, 10 años tras menopausia

Método

- 64 mujeres (18-73 años) sometidas a Qx mama
 - 106 muestras
 - Tejido sustraído – impedancia a 12 frecuencias distintas
 - Se construye un espectro de impedancia al cual se determinan características
- Clases
 - Tejido glandular
 - Tejido conectivo
 - Tj adiposo
 - Mastopatía
 - Fibro-adenoma
 - Carcinoma

Jossinet, J. Variability of impedivity in normal and pathological breast tissue. *Med. Biol. Eng. Comput.***34**, 346–350 (1996).

<https://doi.org/10.1007/BF02520002>

Variables

Independiente

		# of cases
Car	Carcinoma	21
Fad	Fibro-adenoma	15
Mas	Mastopathy	18
Gla	Glandular	16
Con	Connective	14
Adi	Adipose	22
		106

Discreta nominal

Impedancias

Dependientes

I0	Impedivity (ohm) at zero frequency						
PA500	phase angle at 500 KHz						
HFS	high-frequency slope of phase angle						
DA	impedance distance between spectral ends						
AREA	area under spectrum						
A/DA	area normalized by DA						
MAX IP	maximum of the spectrum						
DR	distance between I0 and real part of the maximum frequency point						
P	length of the spectral curve						

Cuantitativa continua

Statistics

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum	Range
IO	106	0	784.3	73.2	754.0	103.0	250.0	384.9	1497.6	2800.0	2697.0

Variable	Mode	N for Mode
IO	250, 1800	3

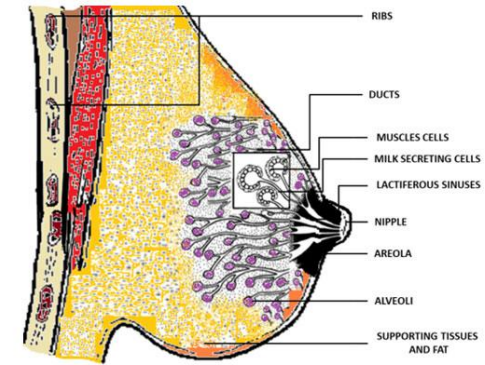


Figure 1: Anatomy of Human breast as illustrated in [12, Fig. 2]

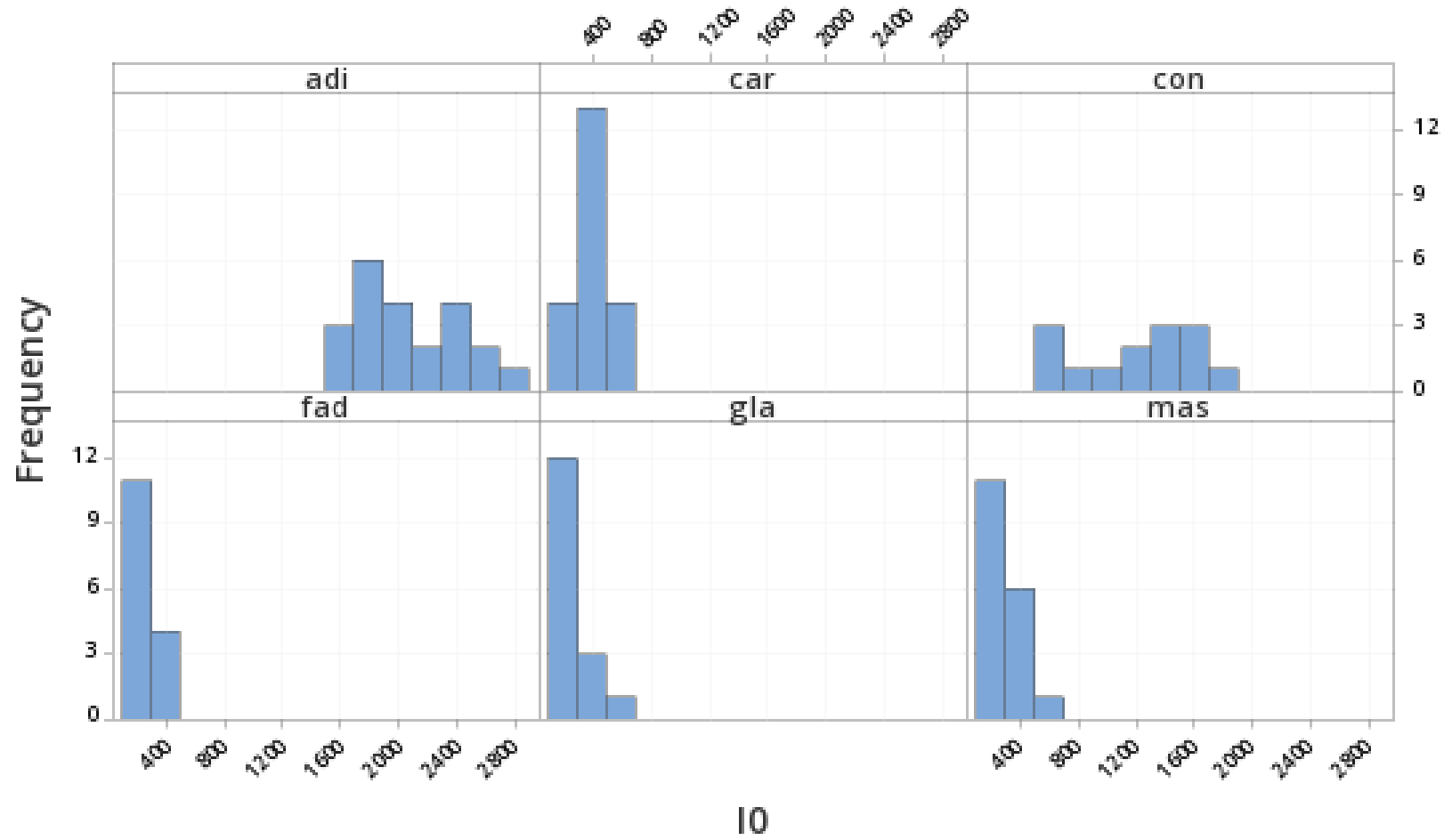
Statistics

Variable	Class	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
IO	adi	22	0	2052.1	73.0	342.5	1600.0	1800.0	1974.6	2334.9	2800.0
	car	21	0	394.2	19.0	87.0	269.5	312.5	389.9	477.8	551.9
	con	14	0	1213	103	386	649	750	1328	1509	1724
	fad	15	0	245.9	18.0	69.8	144.0	196.9	245.0	301.3	355.0
	gla	16	0	238.3	29.8	119.2	103.0	158.0	197.0	289.8	502.0
	mas	18	0	290.3	26.4	112.0	121.0	196.0	267.6	347.2	544.7

Variable	Class	Range	Mode	N for Mode
IO	adi	1200.0	1800	3
	car	282.4	500	2
	con	1075	*	0
	fad	211.0	*	0
	gla	399.0	197	2
	mas	423.7	*	0

Impedancias

Histogram of I0

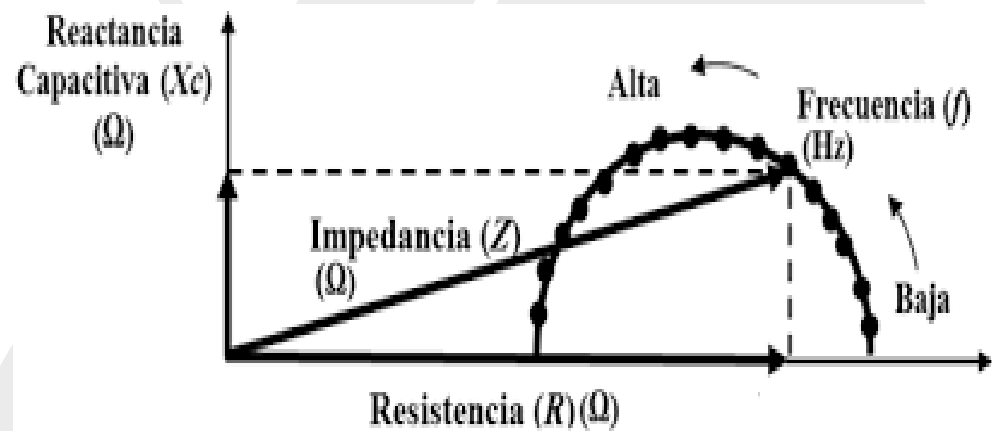


Panel variable: Class

Tj Adiposo	
Media	2052.1
Mediana	1974.6
Moda	1800

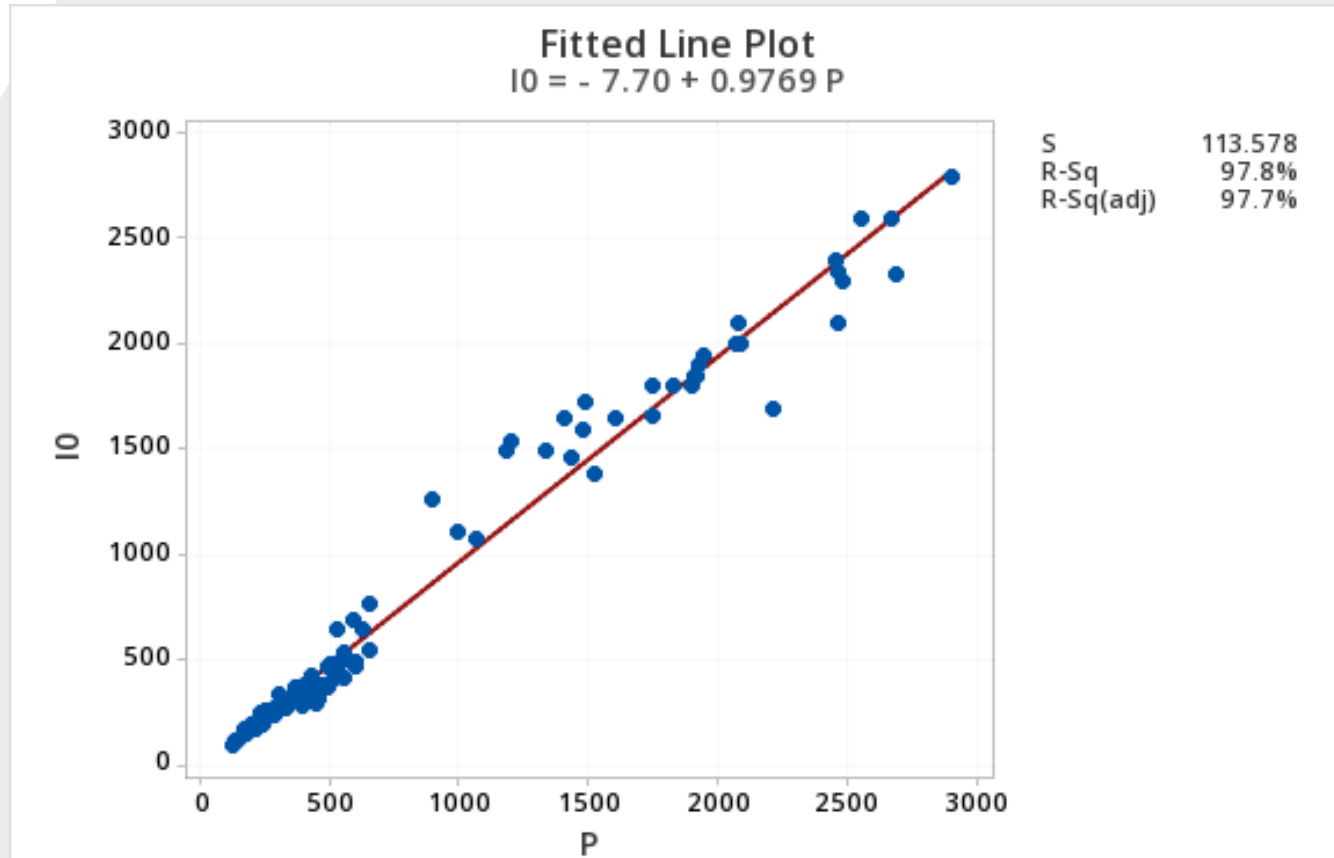
Tj conectivo	
Media	1213
Mediana	1328
Moda	(*)

P = Curva espectral

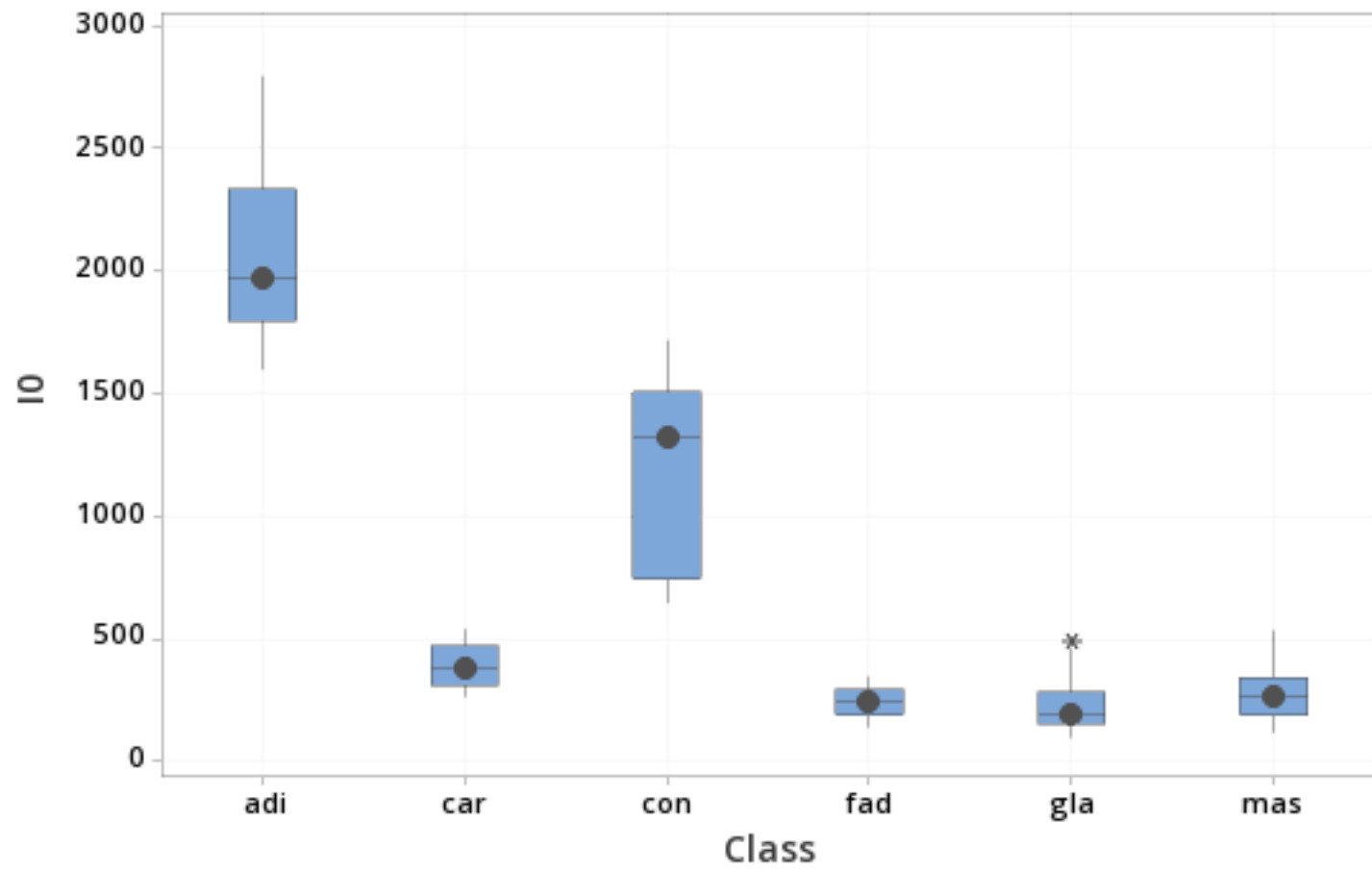


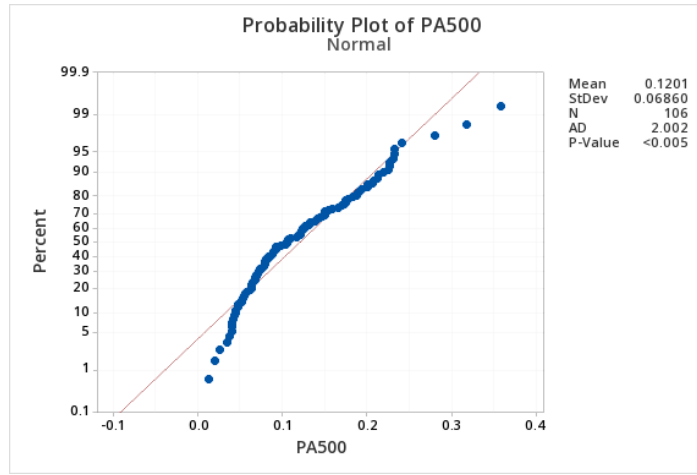
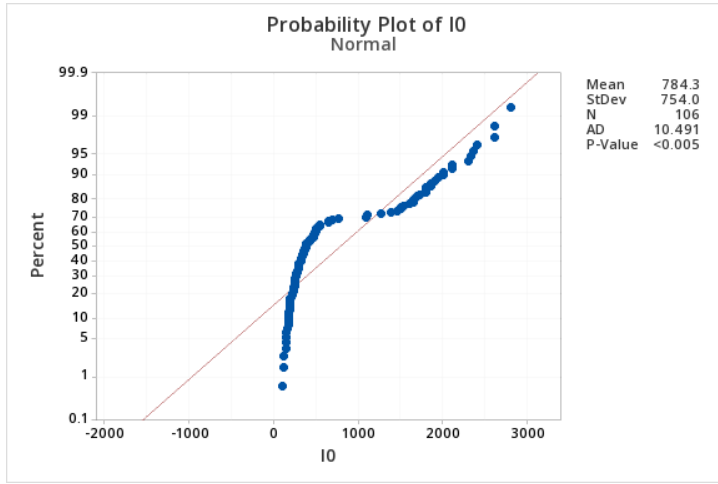
Correlations

$\frac{IO}{P}$
0.989

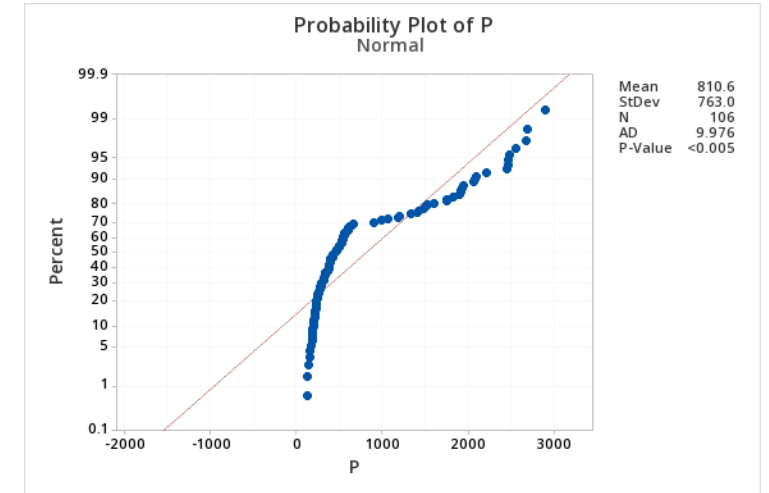
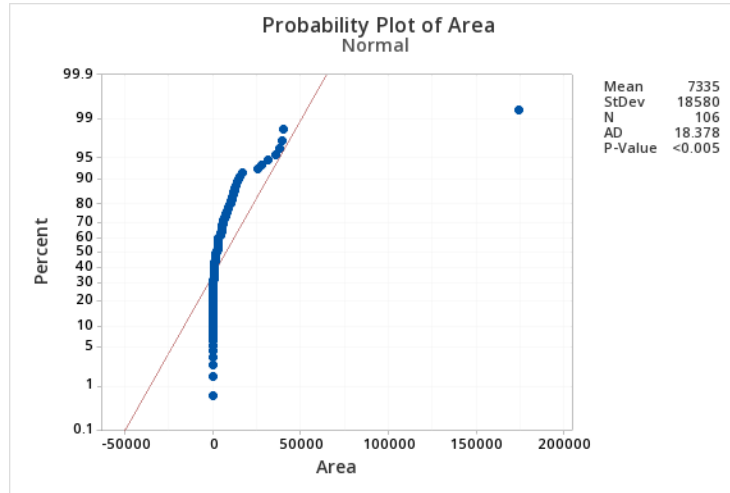
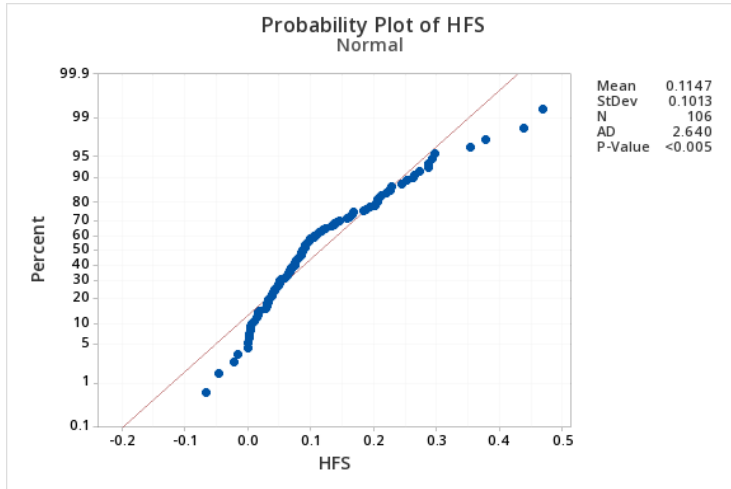


Boxplot of I0





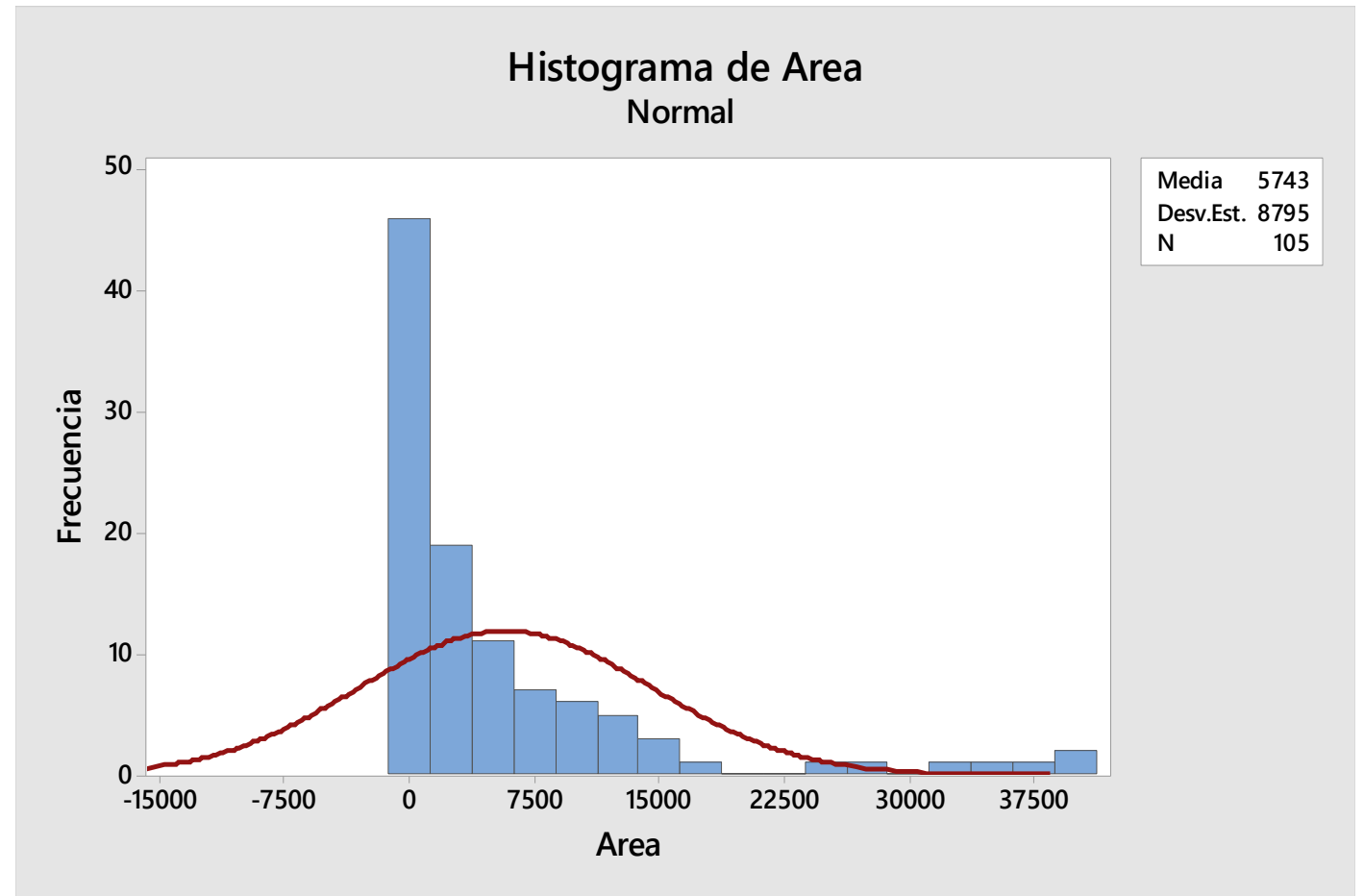
P-value
< 0.005
N= 106



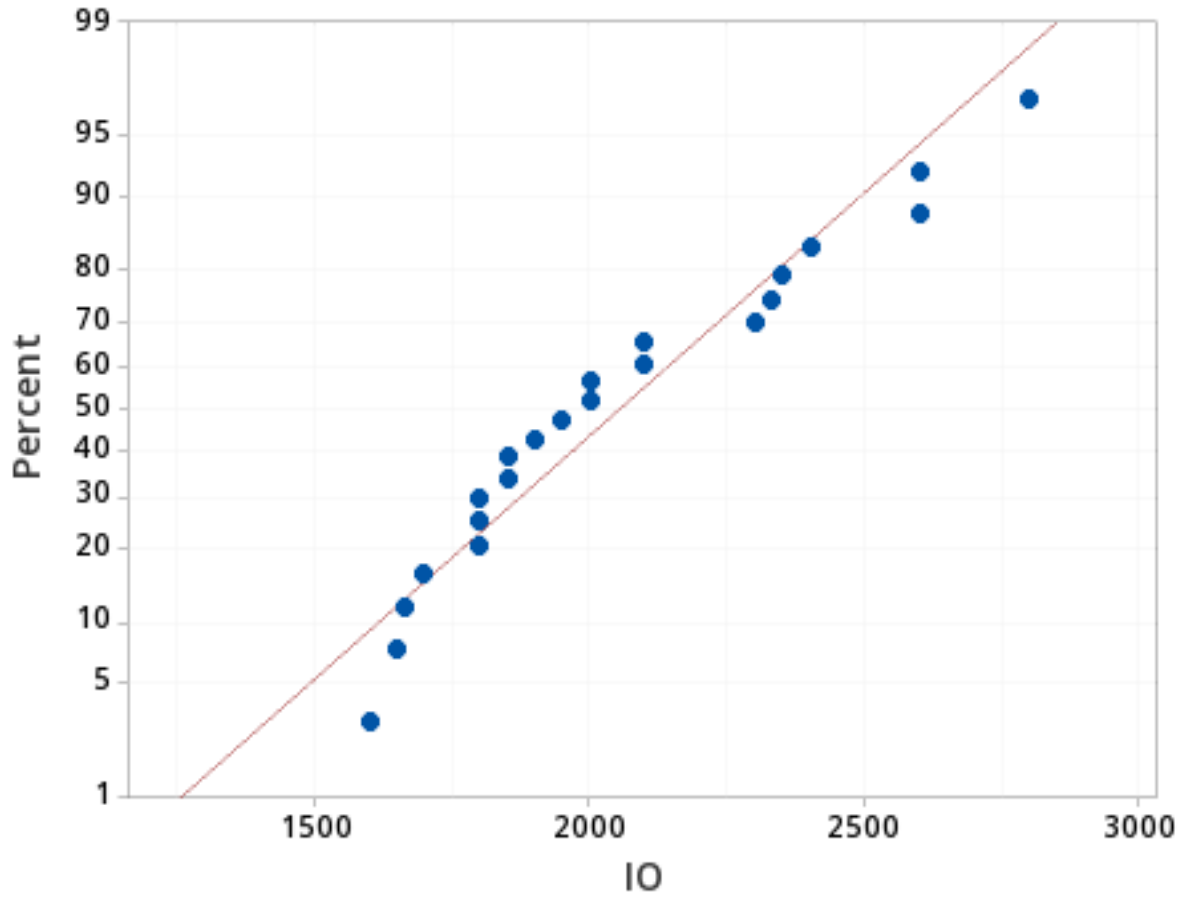
HISTOGRAMA

El histograma nos indica que es asimétrico hacia la derecha, nos refleja que la mayoría de las lesiones presentan un tamaño inferior a los 3750 micras, sin embargo, hay un ajuste deficiente a la curva normal.

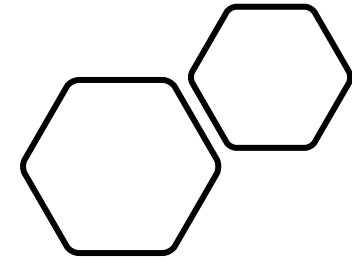
N= 106



Probability Plot of IO
Normal



Mean 2052
StDev 342.5
N 22
AD 0.584
P-Value 0.115



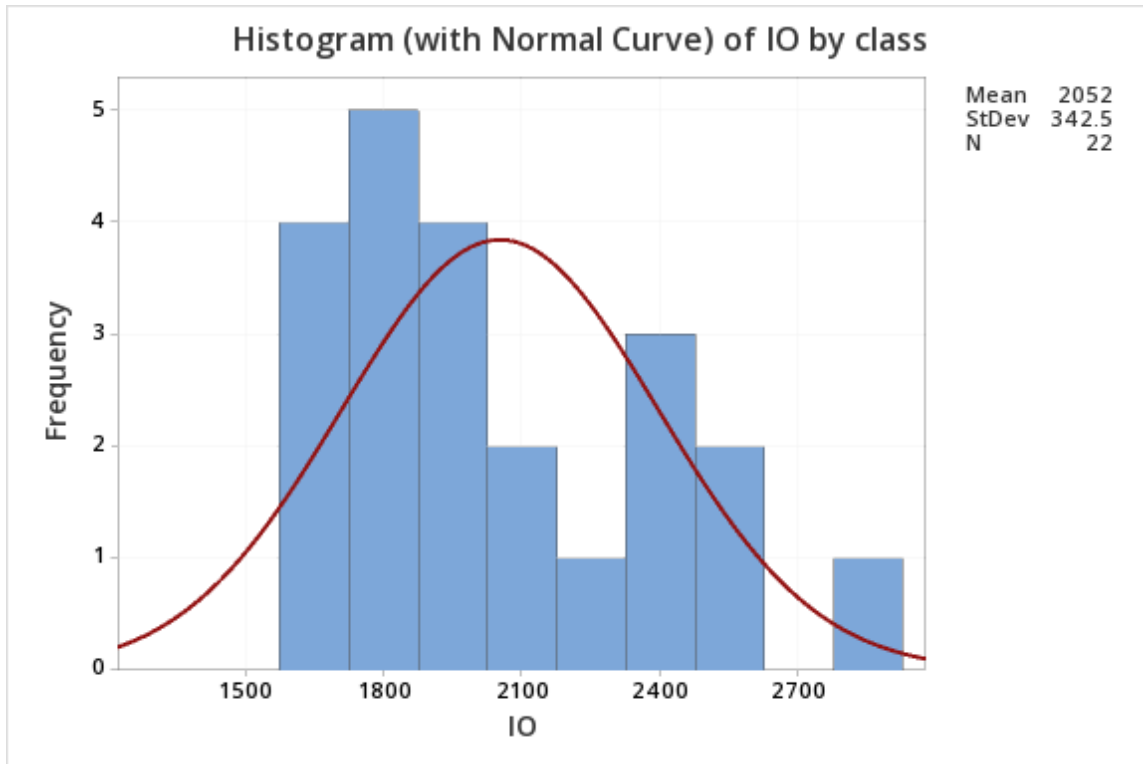
P-value
> 0.05 n= 22

IO n=22

Media = 2052

Desv est = 342.5

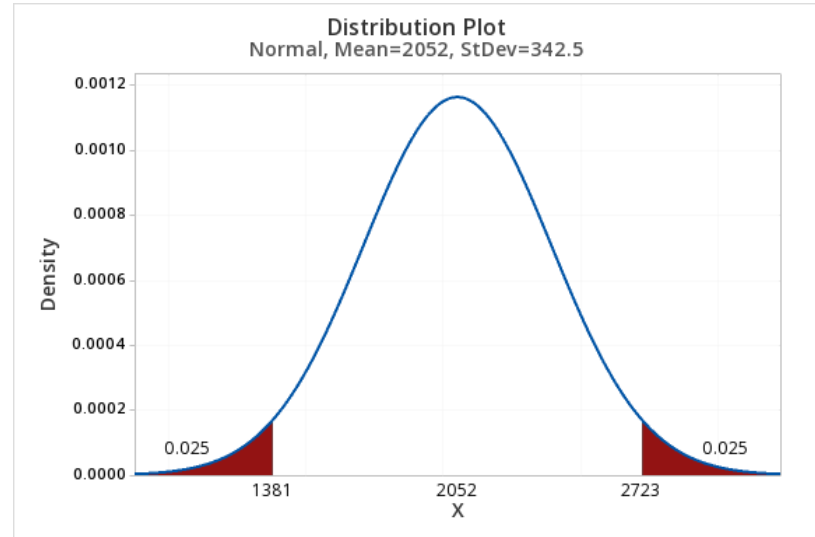
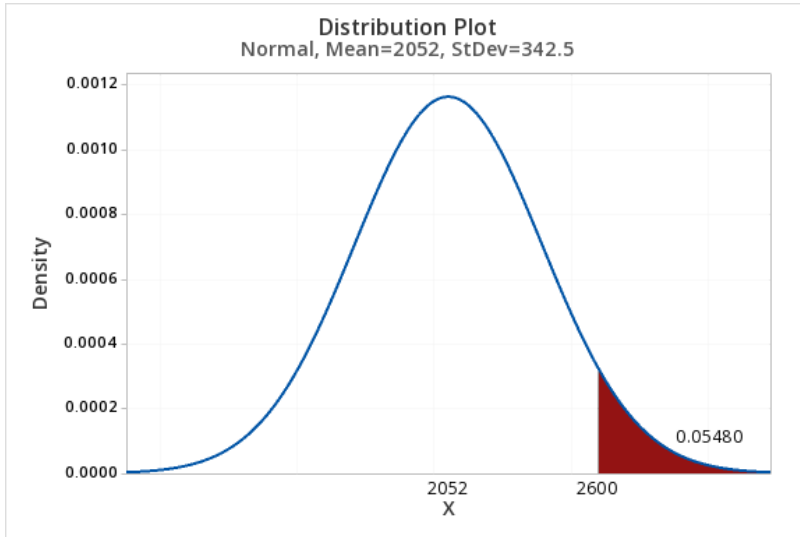
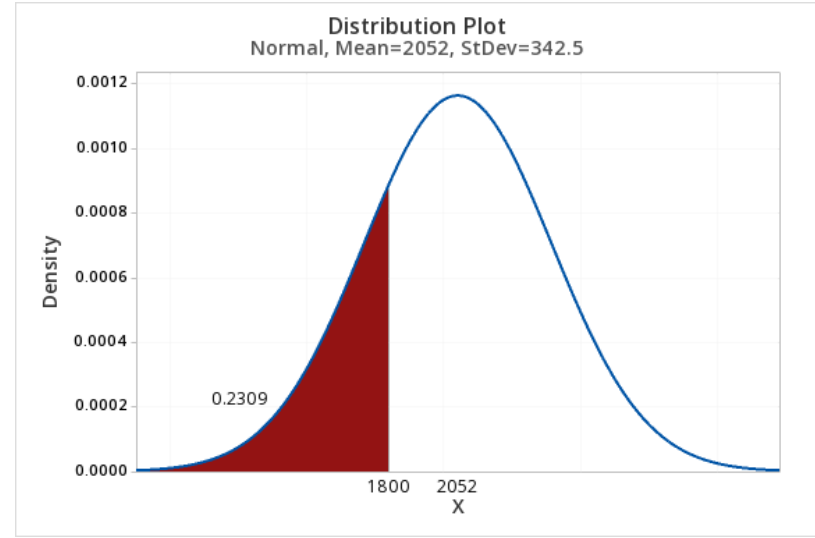
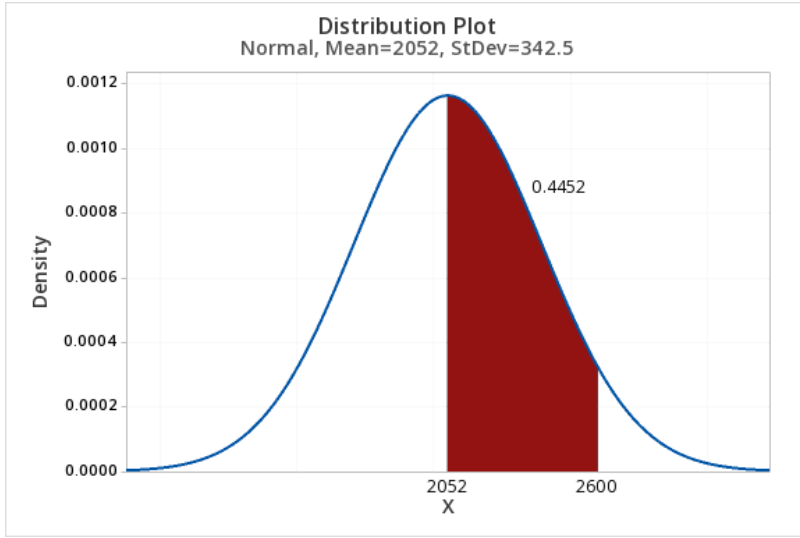
Clase Tejido Adiposo - IO



Statistics

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Variable	class	Range	Mode	N for Mode
IO	adi	1200.0	1800	3



- **Impedancias** de tejido adiposo y conectivo en la mama son **mayores** con respecto a tejido patológico

Conclusiones

- Existe **correlación positiva** ($R = 0.989 // R\text{-sq} = 97,8\%$) entre la impedancia del tejido mamario y el perímetro de la curva espectral
- Las **impedancias para tejido adiposo y conectivo** en la mama además de ser mas altas **tienen mayor dispersión** en comparación con tejido patológico
- Las **impedancias del tejido adiposo** presentan un P-value 0.115 en la prueba de normalidad por tanto **presentan una distribución normal**.
- La probabilidad de que el tejido adiposo de la mama presente
 - Una impedancia menor de 1800 Ohms es de 23%
 - Una impedancia mayor de 2600 Ohms es de 5,48%
 - Una impedancia entre 2052 y 2600 Ohms es de 44,5%
 - Una impedancia entre 1381 y 2723 Ohms es de 95%



GRACIAS

MINITAB ES SUPER