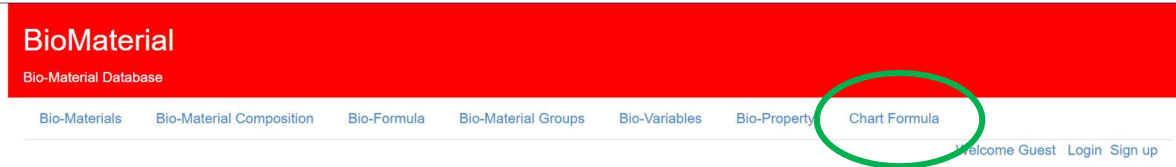


**Step 1:** Go to <http://66.228.60.152:8080/home>.

**Step 2:** Click on "Chart Formula" below.



### About BioMaterials

This site is meant for users to store, retrieve, and visualize physical properties of food materials. To start your adventure, type a food name into the input box and click 'Search'. This will bring you to a page listing the names of foods matching the input. For each food there will be two options, represented by little icons of a magnifying glass and a pencil. The magnifying glass will lead you to a page where you can view formula data corresponding to a chosen input food. The pencil icon will allow the input of new data points representing measurements of properties like temperature, density, thermal conductivity, etc... In the data view page, you can select data for plotting. For a given food, there will be choices for the y-axis variable, and the corresponding x-axis variables (These are provided such that there is a formula that maps from the x-axis to the chosen y-axis variable. Select the desired range for the x-axis variable and select both checkboxes. Given the prior selections, the site will automatically determine the possible formulae. If the formula requires composition information for the chosen food (E.G. is not a function of only the x-variable), input boxes will appear, filled with the food's composition information for the given properties if it exists (i.e. if there are measurements for carbohydrates and fat, those will be filled in), or 'NOT\_FOUND' if the property is not found in the database. The 'Plot' button will chart the given formula and points. The update page will allow you to input data points or new formulas

© 2018 Copyright

### Formulas

A formula relates a variable to another variable. For example, "#D = pow(10,(-4.4977 + (-581.28) / (115.71 - #Tk-)))" relates viscosity to temperature in Kelvin for certain oils. Some formulae require only one variable, such as the previous example, but others require composition information, such as the fat content or carbohydrate content.

**Step 3:** Under "Material 1." start typing the material name.

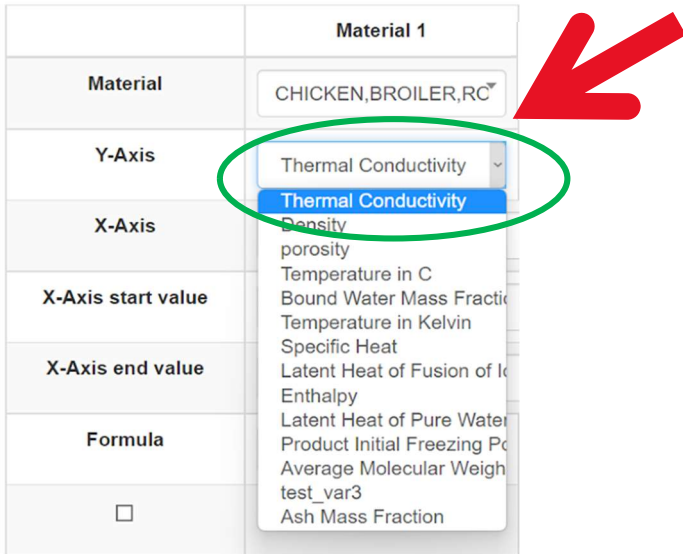
**Step 4:** Select from the suggested list in the dropdown.

The image shows a form with several fields. The 'Material 1' field is a dropdown menu that is open, showing a list of suggestions. A red arrow points to the dropdown menu. The suggestions include 'chic', '4542 FAT,CHICKEN', '5000 CHICKEN,BROIL', '5001 CHICKEN,BROIL FRYERS,MEAT&', '5002 CHICKEN,BROIL FRYER,MEAT&S', and '5003 CHICKEN,BROIL FRYERS,MEAT&'. The '5000 CHICKEN,BROIL' option is highlighted in blue.

Material	chic
Y-Axis	4542 FAT,CHICKEN
X-Axis	5001 CHICKEN,BROIL FRYERS,MEAT&
X-Axis start value	5002 CHICKEN,BROIL FRYER,MEAT&S
X-Axis end value	5003 CHICKEN,BROIL FRYERS,MEAT&
Formula	
<input type="checkbox"/>	Measured Data

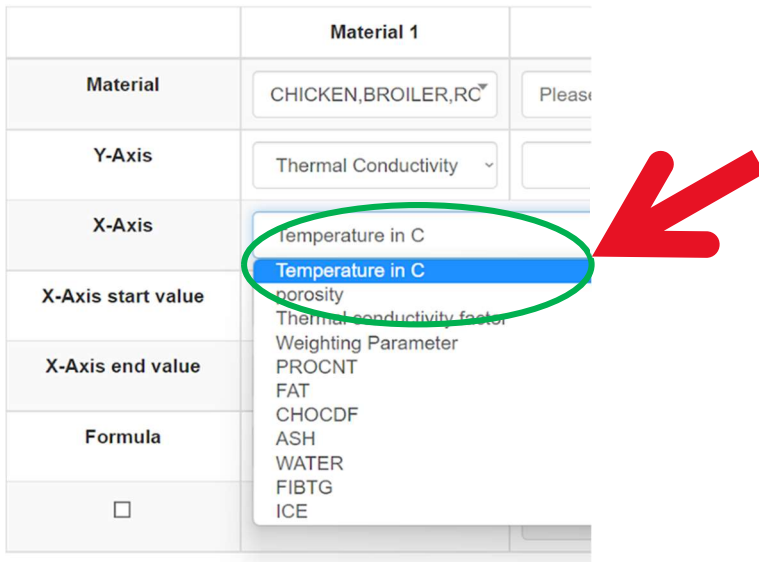
**Step 5:** In the Y-axis row, under your chosen material, click on dropdown menu and select the property of your interest. There may be a delay (15-20 s) before the next step is possible—please wait for it.

Material 1	
Material	CHICKEN,BROILER,RC
Y-Axis	Thermal Conductivity
X-Axis	Density
X-Axis start value	porosity
X-Axis end value	Temperature in C
Formula	Bound Water Mass Fraction
	Temperature in Kelvin
	Specific Heat
	Latent Heat of Fusion of Ice
	Enthalpy
	Latent Heat of Pure Water
	Product Initial Freezing Point
	Average Molecular Weight
	test_var3
	Ash Mass Fraction



**Step 6:** In the X-axis row, under your chosen property, click on the dropdown to select the variable against which you will plot your property.


Material 1	
Material	CHICKEN,BROILER,RC
Y-Axis	Thermal Conductivity
X-Axis	Temperature in C
X-Axis start value	porosity
X-Axis end value	Thermal conductivity factor
Formula	Weighting Parameter
	PROCNT
	FAT
	CHOCDF
	ASH
	WATER
	FIBTG
	ICE



**Step 7:** In the X-Axis start value, under your chosen property, enter the lowest value of the variable you chose in Step 6.


**Step 8:** In the X-Axis end value, under your chosen property, enter the highest value of the variable you chose in Step 6.

Material 1	
Material	CHICKEN,BROILER,RC
Y-Axis	Thermal Conductivity
X-Axis	Temperature in C
X-Axis start value	10
X-Axis end value	20



**Step 9:** In the Formula row, under your chosen property, click on the dropdown to select among the prediction formulas you want to use for your selected property. Again, there may be a delay (15-20 s) for the dropdown list to appear—please wait for it.

Material 1	
Material	CHICKEN,BROILER,RC
Y-Axis	Thermal Conductivity
X-Axis	Temperature in C
X-Axis start value	10
X-Axis end value	20
Formula	K_PARALLEL : K_W



**Step 10:** Check against the “Status” row to make sure the button below “Basic Data Entered” is green

Status	
	1. Basic Data Entered : 
	2. Composition Data Entered: 

**Step 11:** Click on “Material Composition 1” to see a window open up showing all the composition data for the selected material from the database. This window will also show variables from the formula that are not selected in ‘X-axis’ row. You can proceed or change a composition variable by typing your value under the “Change Value” column.

Status	1. Basic Data Entered : ✓	1. Basic Data Entered : ✗	1. Basic Data Entered : ✗	1. Basic Data Entered : ✗
	2. Composition Data Entered: ✓	2. Composition Data Entered: NA	2. Composition Data Entered: NA	2. Composition Data Entered: NA
Material Composition Values	<b>Material Composition 1</b>	Material Composition 2	Material Composition 3	Material Composition 4

Material Composition 1			
Material Composition	Unit	USDA Value	Change Value(Optional)
Water	g	42.41	42.41
AIR	g	0	0
ICE	g	0	0
Protein	g	21.4	21.4
Carbohydrate, by difference	g	2.34	2.34
Total lipid (fat)	g	28.74	28.74
Fiber, total dietary	g	0	0
Ash	g	5.11	5.11

Chart Bio-Material Formula

**Step 12:** Click on “Chart Biomaterial Formula” to plot

Status	1. Basic Data Entered : ✓	1. Basic Data Entered : ✗	1. Basic Data Entered : ✗	1. Basic Data Entered : ✗
	2. Composition Data Entered: ✓	2. Composition Data Entered: NA	2. Composition Data Entered: NA	2. Composition Data Entered: NA
Material Composition Values	<b>Material Composition 1</b>	Material Composition 2	Material Composition 3	Material Composition 4

Material Composition 1			
Material Composition	Unit	USDA Value	Change Value(Optional)
Water	g	42.41	42.41
AIR	g	0	0
ICE	g	0	0
Protein	g	21.4	21.4
Carbohydrate, by difference	g	2.34	2.34
Total lipid (fat)	g	28.74	28.74
Fiber, total dietary	g	0	0
Ash	g	5.11	5.11

Chart Bio-Material Formula

**Step 13:** You should see a plot like the one below:

