Guide for Getting Started with the CONCEPT5 Formulation System

This guide describes how to use the very minimal basic features of the Concept5 formulation system required for the creation of your first formula. For a more detailed explanation of each function, please refer to the on-screen Help file within Concept5. The Help file can be accessed from the menu bar on the main menu, or by clicking the Help button found on almost every screen.

When you install Concept5, either as a Trial or Licensed version, you have the option to begin with a "blank" database, or with preloaded demonstration data. If you install the system with a blank database, you **MUST** follow the instructions in this guide, in the order that they are presented, before you can create your first formula. If you install the system with demonstration data (or your own data converted by CFC from another formulation system to Concept5), it is still recommended that you follow the instructions in this guide in order to become familiar with the Concept5 data structure and content.

Although the Concept5 system contains several hundred features and functions, this guide will discuss only the following eight minimal functions:

System Options

Nutrient Definitions

Ingredient Names and Nutrient Composition
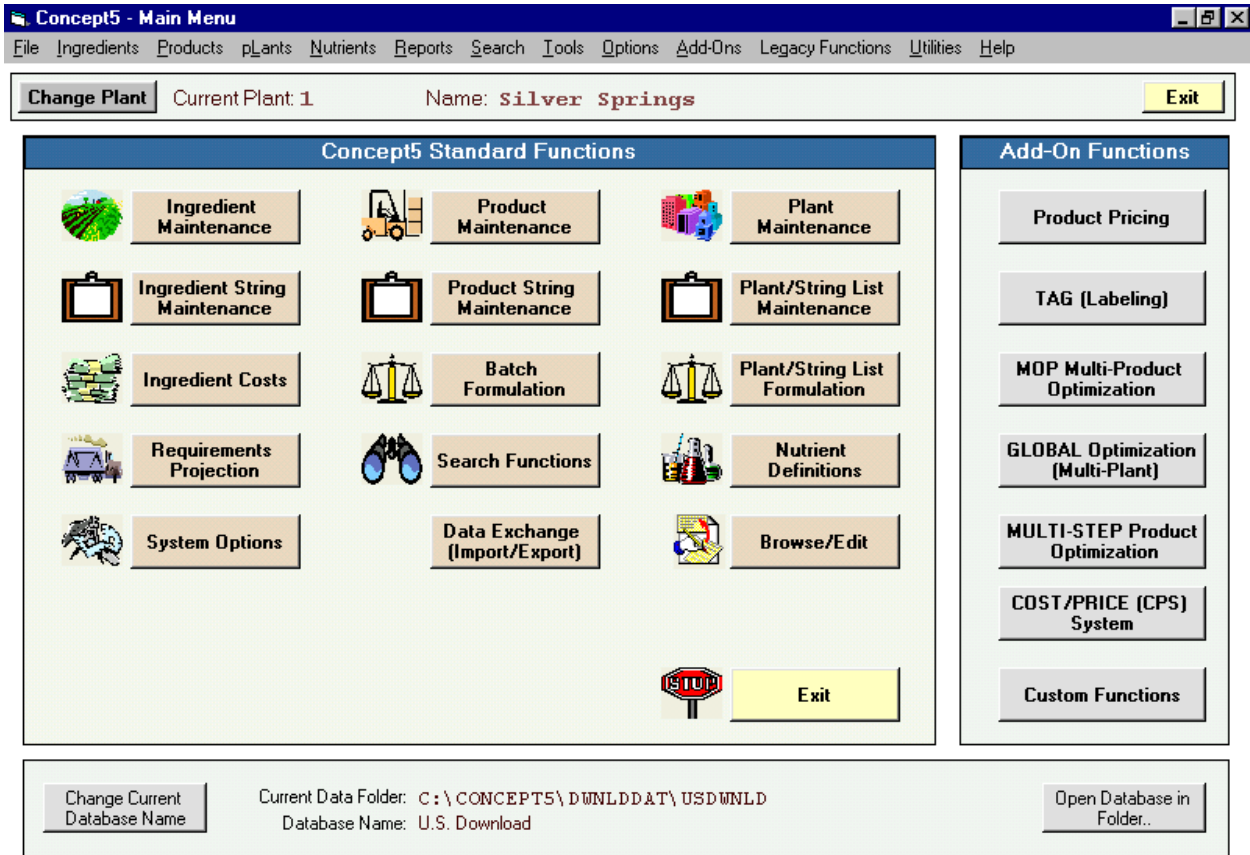
Manufacturing Location Descriptions (Plants)

Ingredient Costs at Manufacturing Locations (Plants)

Manufactured Product Definitions

Trial/Production Formula View/Modify

Least Cost Formulation

Concept5 Main Menu:

Like most, if not all, Windows applications, the Concept5 Main Menu contains a "drop-down" menu line at the top of the screen which may be used to gain access to any and all of the system functions.

In addition to the Menu line, the most commonly used functions may be accessed by clicking the mouse on the large command buttons appearing in the Standard System Functions frame. If you prefer to access all system functions from the menu line, or if you find the large command buttons and icons distracting, a System Option allows you to disable and hide all of the command button shortcuts.

System Options (Setting your personal preferences):

Although many things are constant for any installation of Concept5, such as the actual mathematical algorithm required for least cost formulation, some things are either optional, or require clarification due to your particular database content or your personal preference. All of the optional or modifiable system controls are set and maintained by clicking on the "System Options" command button located on the Main Menu.

Selection of this function will result in the multi-tabbed form shown below.

Although there are many different "tabs" containing options which you may modify, only the "U.S. or Metric", "Ingredient Cost Units", and "Ingredient Min/Max" frames on the General/Default Units tab shown above, and the selection of the "Default Cost Set" on the Formulation Controls tab are important to this getting started tutorial. More detailed information on all system options may be obtained from the on-line Help system.

U.S. or Metric Option:

This option informs Concept5 whether to use U.S. or Metric terminology and data units. It is recommended that this option be set only one time, that being prior to loading any data into the Concept5 database. Toggling this option from one setting to another will **NOT** perform any conversion of the data in the database. It will merely change the terminology used in communicating on the screens and printed reports.

Ingredient Cost Units Option:

If the system measurement option is U.S., these three options will read $/Pound, $/100 Lb, and $/Ton. If Metric measurement is in effect, they will read $/Kilogram, $/100 Kg, and $/Tonne. The option selected will not change the method of calculations in the system. It is merely for your preference in entering and reviewing current ingredient costs.

Ingredient Min/Max Option:

The Candidate Ingredients section of the Least Cost Specifications contains a list of all ingredients which "may" be used in the formula, and an optional minimum and/or maximum amount required or allowed. The setting of this system option tells the Concept5 system whether these minimum and maximum ingredient amounts are expressed as a percent of formula total, or as Pounds (or Kilograms if Metric) per Batch.

System Options – Formulation Controls Tab:

Default Cost Set:

For each Ingredient, at each manufacturing location (Plant), Concept5 allows you to enter two costs. For identification purposes, these two costs are referred to throughout the system as the "Owning" cost and the "Market" cost. You may choose to use both or only one of these cost sets, and you indicate which of these is the "default" by your selection in the "Default Cost Set" frame of the "Formulation Controls" tab.

Nutrient Definitions:

The Concept5 Formulation System allows the definition of up to 1000 Nutrients. The Nutrients are numbered from 1 to 1000, and there are no pre-defined requirements for nutrient numbering.

If you are beginning with a blank database, it is important to give careful consideration to how you will number your nutrients. Use the numbers to group "like" nutrients, such as amino acids, minerals, etc., and leave gaps between numbers so that additional nutrients may be inserted into like groups as needed.

Once all nutrients have been defined, and ingredients and products added to the system, there is no easy way "change your mind" on the nutrient numbering scheme.

Nutrient Definitions are set and maintained by clicking on the "Nutrient Definitions" command button located on the Main Menu. Selection of this function will result in the form shown below.

Nutrient Maintenance

Help   Print   Exit

Nutr No.	Nutrient Name	Units	Shadow Incr	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Computed	DO NOT Adjust On Moisture Chg
2	ME; POULTRY	Kcal/Lb	10.00	✔	✔													✔		
3	ME; SWINE	Kcal/Lb	10.00		✔				✔											
4	DE DAIRY	Mcal/Kg	0.10		✔														Computed	
5	ME; RUMIN	Kcal/Lb	10.00		✔															
6	ME DAIRY	Mcal/Kg	0.10		✔														Computed	
7	NEL DAIRY	Mcal/Kg	0.10		✔								✔						Computed	
8	NEM DAIRY	Mcal/Kg	0.10		✔														Computed	
9	NEG DAIRY	Mcal/Kg	0.10		✔														Computed	
10	TDN; SWINE	PCT	1.00		✔															
11	TDN	PCT	1.00		✔															
12	Protein, Crude	PCT	1.00	✔	✔				✔				✔				✔	✔		
13	PROTEIN; DIGEST	PCT	0.10		✔															
14	NPN; PROT EQ.	PCT	0.10		✔															
15	FAT; CRUDE	PCT	0.10	✔	✔				✔				✔							
16	FAT; ADDED	PCT	0.10		✔															
17	FIBER; CRUDE	PCT	0.10	✔	✔								✔							
18	ASH	PCT	0.10	✔	✔								✔							
19	MOISTURE	PCT	0.50		✔															
20	CALCIUM	PCT	0.01	✔	✔				✔				✔							
21	PHOSPHORUS; TOT	PCT	0.01	✔	✔				✔				✔							
22	PHOSPHORUS; AV	PCT	0.01		✔															
23	SALT	PCT	0.01		✔								✔							
24	SODIUM	PCT	0.01	✔	✔															

There are 1000 nutrient "rows" available for use, representing nutrients numbered from 1 through 1000. Nutrients are added and/or edited by clicking in the appropriate box and typing in the desired text or numbers. Each Nutrient Name may contain up to 20 characters, and each Unit of Measure may contain up to 8 characters. Each of these entries is descriptive only, and may contain any characters of your choice.

The Shadow Incr. and Class Assignment columns are beyond the scope or intent of this guide. See the on-line Help system for further information.

If the column labeled Computed contains the word, Computed, the value of that nutrient in all ingredients is created by the calculation of a global nutrient equation.

The column titled DO NOT Adjust on Moisture Chg allows you to designate which nutrient values will not be adjusted when the moisture/dry matter values of the base ingredients are changed.

Nutrient definitions cannot be deleted once created. They can, however, be renamed. A word of caution - if a nutrient is renamed (or if the name is removed) the original nutrient values and product restrictions for this nutrient number will remain on each ingredient and product to which it was previously applied. If the name is removed, the notation [**No Name**] will appear in all ingredients and products that contain a non-zero value for that nutrient number. It is strongly suggested that before a nutrient number is re-used, that the time be taken to review each ingredient and product, and change or remove the original values on this row.

Ingredient Names and Nutrient Composition:

In the Concept5 Formulation System, "Ingredients" are the physical "raw materials" which are combined in the manufacturing of feed or food "Products". The system allows the definition of an unlimited number of Ingredients.

Ingredients are added and maintained by clicking on the "Ingredient Maintenance" command button located on the Main Menu. Selection of this function will result in the form shown below.

Base Ingredient Maintenance

Ingredient: 1 Name: **Corn, Ground**   Help

Get Code: [   ] ok   Get Ingr...   First Prev Next Last   Add New Ingr   Delete Ingr   SaveAs   Overlays   Print   Notes   **Edit**   eXit

| General | Tag (Labeling) Controls |

Description

Full Name: Corn, Ground

Short Name (16 Char Max): [   ]

Moisture: 13.0000 Pct

Alternate Code: ING284

Round Amount: 1.00 Pounds

Production Minimum: [   ] Pounds

(Legacy) PI-Code: [   ]

Mix Report Parameters:

Bin: 1   Sequence: 10

Scale: 1   Other: [   ]

Equivalent Formula

Is Ingredient Also a Formula ?   ○ Yes   ● No

| Nutrients | Types | Costs | Stock Status |

Nutr	Nutrient Name	Units	Value	
2	ME; POULTRY	Kcal/Lb	1,561.0000	
3	ME; SWINE	Kcal/Lb	1,402.1000	
4	DE DAIRY	Mcal/Kg	3.4203	Cg
5	ME; RUMIN	Kcal/Lb		
6	ME DAIRY	Mcal/Kg	3.0045	Cg
7	NEL DAIRY	Mcal/Kg	1.7801	Cg
8	NEM DAIRY	Mcal/Kg	2.0352	Cg
9	NEG DAIRY	Mcal/Kg	1.3765	Cg
10	TDN; SWINE	PCT	79.5455	
11	TDN	PCT	77.5568	
12	Protein, Crude	PCT	8.0000	
13	PROTEIN; DIGEST	PCT	6.7116	
14	NPN; PROT EQ.	PCT		
15	FAT; CRUDE	PCT	3.8778	
16	FAT; ADDED	PCT		
17	FIBER; CRUDE	PCT	2.7841	
18	ASH	PCT	1.2926	
19	MOISTURE	PCT	13.0000	
20	CALCIUM	PCT	0.0199	
21	PHOSPHORUS; TOT	PCT	0.2884	

Last Change: **08/14/07 09:35:20**   By: **ADMIN**

Use this form to add or change ingredient names, nutrient values, types, costs, out-of-stock indicator, alternate code, round amount, production minimum, Legacy code, mix report parameters. (For more detailed information, see the Help file Contents tab - Ingredients, Editing Ingredients.)

The "Save-As" function may be used to add a new ingredient which closely resembles an existing ingredient, and a copy and editing process will save time and reduce errors. [See the Help file Contents tab - Ingredients, Adding Ingredients (Copy an Existing Ingredient).]

The "Add New Ingr" function is used to add a new ingredient which bears no similarity to an existing ingredient, or when the user desires a blank ingredient template. [See the Help file Contents tab - Ingredients, Adding Ingredients (Blank Form).]

The "Delete Ingr" function is used to delete an existing ingredient from the system. Deleting ingredients must be done carefully and with some forethought to avoid the challenges that can develop from deleting ingredients from active or stored formulas. **Caution is advised throughout this procedure. The system cannot undo an ingredient deletion**. It is recommended that an ingredient search be completed before any ingredient is deleted. (See the Help file Contents tab - Ingredients, Deleting Ingredients.)

Manufacturing Location Descriptions (Plants)

Before adding any ingredient costs, Products, or Formulas to the Concept5 system, at least one Manufacturing Location (Plant) must be defined. This is done by clicking on the "Plant Maintenance" command button located on the Main Menu. Selection of this function will result in the form shown below.

For the purpose of this "getting started" guide, the only information of importance on the above form is the Plant Code "1" in this example. Even the Plant name is optional, but certainly recommended for ease of identification when multiple plants have been defined.

For more detailed information pertaining to the other information on the Plant Maintenance form, refer to the on-line Help.

Ingredient Costs at Manufacturing Locations (Plants):

You may define two costs for each Ingredient in Concept5 at each manufacturing Plant. These two costs are identified throughout the system as the "Owning" cost and "Market" cost. You may use these two costs any way you see fit.

Although there are several ways to maintain these costs in the system, the most straightforward way, and the only way discussed in this guide, is to select the "Ingredient Cost" command button located on the Main Menu. After selection of this function, you will be asked whether to show all ingredients, or only ingredients with Non-zero costs, and whether or not to show out-of-stock ingredients.

Further selection of the "Show Cost" function will result in the form shown below.

Ingredient Cost Maintenance - Plant: 1 (Silver Springs Feed Plant)

Plant: 1   Silver Springs Feed Plant   Help

Sort on Code   Sort on Name   Copy Costs to Plant....   Print   **Edit**   Exit

Ingr Code	Ingredient Name	Owning $/Ton	Market $/Ton	Out-of Stock
1	Corn, Ground (Overlay)	110.00	100.00	☐
2	Soy Meal	202.00	210.00	☐
3	Oats	175.00	180.00	☐
4	Corn, Rolled	104.00	100.00	☐
5	Wheat	115.00	115.00	☐
6	Calcium Carbonate	20.00	21.00	☐
7	Urea	172.00	172.00	☐
8	Beet Pulp	129.00	131.00	☐
9	C/S Meal	140.00	150.00	☐
10	Mono Amon Phos	400.00	400.00	☐
11	Alfalfa Pellet	110.00	110.00	☑
12	PROBIOS	530.00	600.00	☐
13	EQUIVALENT TEST	172.84	176.60	☐
14	VIT/MIN PX PAK	3,335.00	3,335.00	☐
15	MOLASSES, CANE	91.00	93.00	☐
16	C/S WHOLE	135.60	135.60	☐
17	C/S HULLS	75.40	75.40	☐
18	ORGANODINE	15,600.00	15,600.00	☐
19	SOYBEAN HULLS	75.00	80.00	☐
20	MONO SOD. PHOS.	510.00	510.00	☐
21	MIN AID	80.00	80.00	☐
22	WHEAT MIDDS	80.00	90.00	☐
23	Soybean Meal	225.00	230.00	☐

The cost units in the Owning and Market cost columns will be either $/Ton, $/Lb, or $/100Lb depending on your selection of the "system option" shown on page 3. The Stock Status column allows you to specify ingredients which are currently Out of Stock, and cannot be used in any Least Cost Reformulation of Product Specifications.

Manufactured Product Definitions:

"Products" in the Concept5 Formulation System is the term used to define a feed or food made up of a combination of "Ingredients" in proportional amounts as specified in a "Formula". Since each product in Concept5 is stored within a "Plant", you should pay careful attention to the "Current Plant" at the top of the Main Menu (if you are working in a Multiple Plant system).

All functions pertaining to Products are accessed from within the Product Maintenance form, by selecting the "Product Maintenance" command button located on the Main Menu. After selection of this function, the following screen will appear:

Although this form has several Tabs, and a lot of detailed information, only a few of these are important for the purpose of this getting started guide and will be discussed below. Detailed information pertaining to all of the other data is available in the Help system.

Product Name:

Although this is an optional field, it is recommended that each product in the system be given a name for ease of identification. Product names may contain up to 40 characters.

Formulation Batch Size:

This is a required field on the Product form, and if no entry is provided will "default" to 2000 pounds if the system units are U.S., or 1000 kilograms if the system units are Metric.

When formulas are viewed on the Trial or Prod'n View/Modify form, the ingredient amounts in the formula will be shown in both Pounds (or Kilograms if Metric) and Percent of batch. The "formulation batch size" determines the formula total in terms of pounds or kilograms.

Allow Least Cost?

If you do not use Least Cost Formulation, and merely maintain the current formula for this product by manually changing the amount of each ingredient in the formula, select "No" to this question and proceed to the discussion of Trial/Production Formula View/Modify.

You will note that if the response to this question is "No", you will no longer see the "Formulation" button, and your only way to view and/or modify your current formula(s) is by means of Trial or Prod'n formula View/Modify.

Trial View/Modify button:

See Page 14.

Prod'n View/Modify button:

See Page 14.

Formulation button:

See Page 15.

Trial/Production Formula View/Modify:

Selection of either the "Trial View/Modify" or "Prod'n View/Modify" button on the Product Maintenance form will result in the following screen, with only slight differences. The form shown was displayed by selecting the "Trial" button, so in the brown banner on the left side of the screen is "Trial Formula", and a command button "Store to Prod'n" appears. If the form is displayed by selecting the "Prod'n" button, the words "Production Formula" would appear in the banner, and the command button "Store to Prod'n" would not be shown.

The current formula (Trial or Production) will appear in the grid on the left, and the nutrient composition of the formula will appear in the grid on the right. If there is no formula for the product, the grid on the left will be blank, and the Amount column in the Nutrient grid on the right will contain 0.0 for each nutrient.

Formulas are added or modified by clicking the "Edit" button on the form. Each time an ingredient is added to the formula, or the formula amount of an ingredient is changed, you will see an instantaneous updating of the formula "totals" box at the bottom left, and the Nutrient Composition grid at the right.

Least Cost Formulation:

Selection of the "Formulation" button on the Product Maintenance form will result in the following "Buffered Least Cost Formulation" screen.

This screen is referred to as "Buffered" because nothing done on this screen will result in permanent changes to your database unless you specifically choose to "Save" your changes. Since virtually EVERY piece of data affecting the calculation of the least cost formula can be modified here and the product reformulated, that makes this screen the "ultimate what-if" tool.

Keep in mind that the primary purpose of this screen is for Least Cost Formulation. If you work with "fixed formulas" which are not allowed to change based on changing ingredient costs and nutrient composition, and stated product "specifications", then the Trial and/or Production View/Modify screens are much more suitable for use.

For the purpose of this "getting started" document, only the Ingredients and Nutrients tabs of the Buffered Formulation screen will be discussed. See the online Help file for more detailed information on all of the features.

The list of Ingredients on the Ingredient tab (shown on the previous page), and the list of Nutrients on the Nutrient tab (shown on the next page) make up what is commonly referred to in least cost formulation terms as the "product specifications".

Full Screen Formulation – Ingredient Tab:

The Ingredients included on this grid are those which are **_"allowed"_** in the formula for this product, along with any minimum amount required, or maximum amount allowed. You are not allowed to enter or change any actual formula "amounts" on this screen. The actual formula amounts are computed by the least cost formulation calculations.

The columns titled "OS" and "Sup" contain check marks for any ingredients which are Out of Stock at the current plant, or Suppressed in the current product. If either of these columns is checked, that ingredient will not be allowed in the formula if you re-formulate this product.

Before making any changes to the information on this screen, you must first click the "Edit" button. You will then be allowed to Add more Ingredients or Remove one or more of the existing ingredients from the product "specifications", or change any of the minimum and/or maximum amounts.

You may re-formulate (run least cost formulation) at any time by clicking the "Formulate" button. This will initiate a built-in "Linear Programming" algorithm to perform the Least Cost Formulation of the product subject to all of the current specifications. On most newer computers running Windows XP Professional, the time required for re-formulation is near instantaneous, and the screen will be updated with the results of the formulation run.

Any numbers in the minimum and/or maximum columns appearing in bold blue color indicate ingredient amounts in the solution which are "at a limit". For any "non-fixed" ingredients which are "at a limit", there will also appear a value in the Rest Cost column. This value is the change in the cost per ton of the formula if the ingredient limit is change by 1 percent.

Above the ingredient grid you will note "check boxes" for changing the ingredient order to either ingredient code order, or descending amount used in the current formula. Also there are check boxes to change the ingredient amounts shown to either Pounds (or kilograms if metric) per Batch or Percent of Batch.

Full Screen Formulation – Nutrient Tab:

The Nutrients included on this grid along with the minimum and/or maximum amounts make up the nutrient requirements portion of the product specifications. It will be noted that some of the nutrient limits (shown above) in this grid are bold blue in color. This allows a quick visual identification of which nutrients are actually "at a limit" in the current least cost formula.

Accompanied with all nutrients which are "at a limit" will be a Restriction Cost and a Restriction Increment. The Restriction Cost is the change in the formula cost per ton which would result from a change to the nutrient limit by the Restriction Increment amount. The restriction increment for each nutrient is user defined, and is entered in the column titled "Shadow Incr" on the Nutrient Definitions form (see Page 6).