Milk Replacer Powder Changes Affect Previous Formula Recipes and Reconstitution

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'Baby season' is well underway with orphaned and injured juvenile squirrels, cottontails, opossums, and more being admitted to rehab. Substitute milk formulas are getting even more discussion than usual this year since *some* milk replacer powders have changed and 'new' powders are now on the market. What? The ones I use? How? How can those changes affect rehab and the animals? What new powders? Are they good? It's already busy with texts and calls, new admissions, feedings, everything! I need info now!

Those changes may not affect you immediately *if* you still have milk replacer powders available from last year that had been effective with the species in your care and are *not* purchasing new powders right away. The changes, however, may affect you and animals in your care if you are considering, purchasing or using some of these 'reformulated' powders or some less familiar or new products. WildAgain suggests taking some time to learn about the changes before taking action. If in a hurry and want info beyond the label, social media posts or even reading various resources on this website, here are a few highlights:

Milk replacer powders changes. The Guaranteed Analysis (GA) on labels of most of the products show the same protein and fat percentages (except KMR). The product tests now show less variance from the GA which means the formula recipe may perform differently than when previously fed. This suggests that it would be helpful use the recent test results incorporated into WildAgain's Wildlife Formula Calculator (see below) and weighing recipe ingredients when preparing the milk formula.

PetAg, a large milk replacer manufacturer, changed the formulations of 3 milk replacer powders (i.e., Esbilac, GME, KMR – no longer have white puppies or kittens on the labels), and added another: Goat Milk KMR. While PetAg clearly believes those changes are beneficial, such as adding plant-based prebiotics (fiber), some rehabbers are hesitant when powders undergo a formulation change. These concerns are founded upon difficulties and unexpected results with wild mammal babies after product changes in previous years. Rehabilitators also are curious about other milk replacers, including Fox Valley 32/40, Wombaroo Rabbit and Squirrel milk replacers, MannaPro Kid Goat Formulation and Tailspring Puppy and Kitten milk replacers.

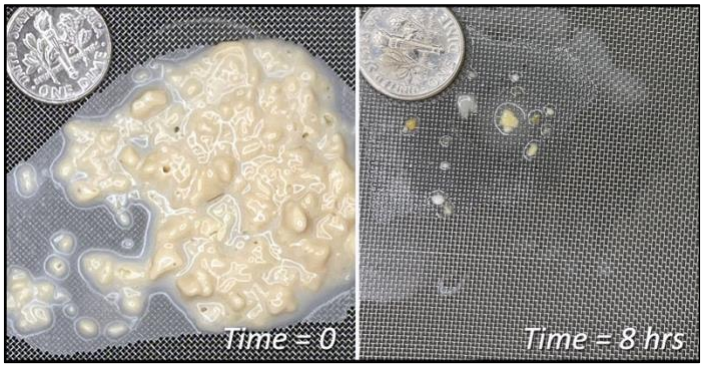
Anticipating those questions, WildAgain recently had 12 milk replacers tested at an independent lab and posted the results on ewildagain.org The results are compared to the prior formulation to help anticipate issues *before* use with wild mammal orphans. The first step was to compare ingredients of the new formulations to the previous products. For example, Esbilac (2022) was compared with Esbilac (21) and Fox Valley 32/40 (2022) compared to the 2019-21 version. Tailspring for puppies was compared to Tailspring kittens. Wombaroo Rabbit, Wombaroo Squirrel, MannaPro Kid Goat were analyzed separately. WildAgain conducted further functional tests including weighing and reconstitution.

A certified, independent national lab then conducted more chemical tests on the 12 powders, such as nutrient composition (e.g., protein, fat, minerals), fatty acid profiles, and peroxide values (for rancidity). Functional tests show how they mixed and what helped improve them. Those test results and photos are posted by individual product (Part 1). Initial analysis and 'key takeaways' of possible affects follow (Part 2).

Rehabilitators are expected to add their own considerations and prioritize selection criteria, such as trends of elevated peroxide values (rancidity); safety considerations of the newly added plant-based prebiotics (even for human infants); availability; cost; and more. The tests and analysis do offer information and considerations for use and decision-making beyond what is included on product labels or product marketing materials. [WildAgain did not conduct any 'performance' tests of the products on animals and cannot comment on their ultimate use.]

Reconstitution. The milk replacer powder labels suggest the powder is easy and fast to use in preparing a final liquid formula (e.g., 'instant-mix'). Yet published scientific papers and rehab practice repeatedly show much more is involved to achieve more complete reconstitution in high protein concentrated powders. Poor reconstitution can result in many concerns when fed to young mammals: digestive issues, reduced nutrition, slower growth, etc. Rehabilitators have been concerned with the poor mixing performance; have tried straining out dry, clumpy powder; changing water temperature; mixing methods (whisk vs blender); allowing more post-mix 'resting time, etc. WildAgain's function testing has resulted in developing an enhanced reconstitution protocol discussed in a Mixing Guide (see below) found on ewildagain.org (explanations + 1-page summary PDF).

The following images show the improvement from the instant mix (left) versus the enhanced protocol (right) resulting in 91% less dry powder:



WildAgain's Wildlife Formula Calculator Updates and Expansion. The new test results, products and more have been incorporated into the Formula Calculator to make it easier to adjust recipes to better match the composition for the species milk (such as knowing how much water is actually needed). This is important since some of lab test

results revealed differences in the various milk solids than disclosed on the labels that can affect the nutrition in the formulas when prepared. Using the Formula Calculator makes it easier and faster for rehabilitators to consider a species milk composition and how a formula recipe compares, regardless of ingredients, powders, and amounts. The calculator is a downloadable Excel spreadsheet with user-friendly drop-down menus. It is updated frequently as new lab tests are performed. Reading the accompanying instructions makes it easier and faster to use correctly.

The Formula Calculator also helps convert recipe volumes (parts) into weights in (grams) for various amounts of mixed formula, like ½ cup to 1 quart. That allows the user to construct a recipe in 'parts', but then more accurately prepare the recipe by weighing the ingredients in grams. Since the products have different textures, scooping by volume creates unintentional measuring error that alter nutrition in the desired recipe.

COST ESTIMATOR (*Approx.*)
(See 'TNA Data & Cost' tab for instructions)

10 cc's	**$0.09**	*100 cc's*	**$0.93**
25 cc's	**$0.23**	*1 cup*	**$2.41**
50 cc's	**$0.46**	*1 pint*	**$4.82**

The Formula Calculator also provides a Cost Estimator for the ingredients in a recipe amount. Costs of the products in the calculator have been linked to the amount of product in the recipe and then provided by various volumes (i.e., cc's, cups). While 'default' costs (per oz) are preloaded in the calculator for the various products, a user can override those by inputting their own actual costs to get a more precise estimate of the prepared formula.

Elevated peroxide values in GME and KMR (2021). Since fats are a key nutrient in mother's milks, the milk replacer powders contain relatively high levels of fats. The fat requirements vary by species – and milk powders contain different amounts (e.g., 25%, 40%, 50%) and different types (primarily vegetable oil). Fats can become rancid when exposed to higher temperatures and air. They can be exposed to heat during transport and storage (e.g., warehouses, rehab facilities), and air once opened, such as when rehabilitators 'repackage' milk powders to share.

While unopened powder is expected to be fresh, WildAgain had the independent lab test the milk powders for rancidity. Most of the milk replacer powders have shown acceptable stability with low peroxide values (<10) close to the typical 24-month expiration date (that's good!). Two of the powders (i.e., GME, KMR) had elevated peroxide values when containers from several lots were first opened – which can affect animals fed those products. Consider discarding any powder with a rancid or off-odor when opening a container or later use.

Wildlife formula and feeding section
Rehabilitators know that wild mammal young admitted to rehab while dependent on their mother's milk *need* a substitute milk replacer. Since such wild mammal milks are not available for purchase, rehabilitators turn to select milk replacers. They have used many products, recipes and more in trying to create an effective formula for a species – with widely varying results and opinions. This frequently expanding section offers resources to support rehabilitators working on this complex subject.

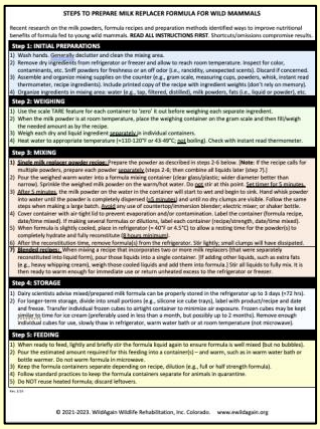
More resources. New resources, articles, videos and online classes are becoming available to help rehabilitators understand the function and use of the Formula Calculator to construct and compare formula recipes to match species milks and effective reconstitution. Keep checking back.

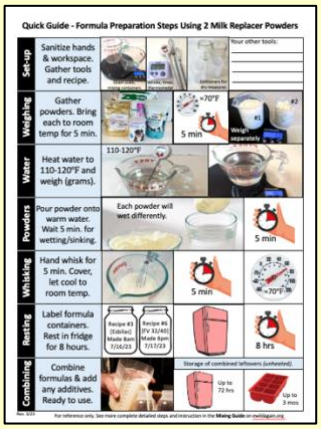
Formula Mixing Guide

Steps for improved reconstitution of milk powders.

A full discussion of the improved milk powder reconstitution process (explanations and steps) is available in detail on the Formula Mixing Guide page at ewildagain.org. Following the science of effective reconstitution for powdered milk products, the Guide outlines the required stages of effective reconstitution, which goes well beyond a simple mix and stir. An average 80% improvement from a simple 'instant mix' was achieved with the 12 recently tested powders, with some improving 95-98%. Benefits of a more fully reconstituted powder include a more complete and digestible liquid provided to very young animals; far less lumpy, dry powder particles to clog feeding utensils or being removed with a strainer; and most importantly, minimizing digestive upset from feeding only semi-wet, dry powder that can lead to serious health issues, such as diarrhea, dehydration, and malnutrition.

The Guide is available in a 1-page PDF as well as a new 1-page 'Quick' Guide intended to be a summary reminder of the steps in this new protocol. It works well to copy both pages front and back.





Click the "Mixing Guide" button at the very bottom of any page in the ewildagain.org website.