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New Esbilac® (2022) – Part 2. Reflections on the changes.

Some who read the lab and performance tests presented in Part 1 may ask “...OK, lots of data, but what does it all mean for wildlife formula?” Following are 7 key takeaways from Part 1 of this series, with each of the points discussed in further detail here in Part 2:

1. Many of the primary ingredients listed on the new Esbilac® label are the same, though listed in a different order, suggesting new concentration levels. Probiotics are still included, and additional *pre*biotics have been added in the form of guar gum and cellulose (fiber).
2. Protein has decreased about 10%, but remains at the guaranteed minimum (33%). This results in an increase in the calculated carbohydrate concentration (plus the addition of the fiber). Previously used formula recipes should be recalculated for the new levels of protein/fat/carbs, in addition to powder weight. This will help to assess an appropriate match to mother’s milk and to determine if recipe adjustments are needed. The WildAgain Formula Calculator now contains these new values in the drop-down menu to assist in these calculations.
3. Dietary minerals continue to be light (relative to other milk replacers), with calcium just above 1%. This may prompt blending with other higher calcium milk replacers, based on the animal’s dietary requirements.
4. The mix of fatty acids has changed significantly, with a 60% increase in polyunsaturated fats and a decrease in saturated fats. This may affect Esbilac’s® previously acceptable shelf-stability. Therefore, increased attention to proper handling and storage may be more critical, in order to prevent the onset of rancidity.
5. Powder consistency is still loose, fluffy and sticky, resulting in an 8-10% average error when measuring by volume (scooping). Weighing the powder eliminates this needless error and accounts for the powder now weighing more than previous formulations.

6. Adding the powder to the warm water (in that order) shows total wetting and sinking in under a minute. However, a thorough 5-minute hand whisk/stir is still required to separate most of the clumps of powder that settle to the bottom. While it then seems dissolved, the powder is still not completely reconstituted at this point.
7. Tests show that 16% of the powder remains dry and not fully reconstituted when mixed and prepared for an immediate use or feeding. Refrigerating the prepared formula for 8 hours improves the powder dispersal/dissolution by 88%. This provides a more complete reconstitution, which is critical for digestion in immature and developing GI systems.

Background

PetAg® announced changes in several of their widely used milk replacer powders on their website (<https://www.petag.com>) in early 2022. Esbilac® was one of the products that was ‘reformulated’/changed. This is not necessarily a cause for immediate concern as manufacturers regularly make product changes from time to time and for many reasons. The results of these changes are often positive and go unnoticed by most consumers. Some previous changes with Esbilac® have been helpful (e.g., improving shelf-life), while some were not, (e.g., the change of the size and digestibility of dicalcium phosphate (DCP) in 2018). As a result, wildlife rehabilitators have become wary about *any* milk replacer powder changes and possible impacts. They want to understand the nature and scope of the changes and consider how to prevent or reduce any possible concerns, preferably *before* any problems develop when fed to very young wildlife in rehabilitation.

The ‘new’ Esbilac® formulation manufactured in 2022 may be a great product – and wildlife rehabilitators may find it effective with wild mammals as is, or when they make some adjustments when using it. The previous article (Part 1.) showed a variety of factual test results on the ‘new’ Esbilac® when compared with previous Esbilac® lots (pre-2022). The test results may be what some rehabilitators want to read, understand, and analyze. Others may say *“...those test results are interesting, but what do they show and how might they affect my decision to use it...”*.

This short article covers a few of those considerations to support that analysis but is not conclusive – nor does it give recommendations, since decisions about use are up to each rehabilitator. Following are some things WildAgain considers when deciding if and how to use any new product or any previously existing product that has just been reformulated, as in this case. These are just some of the considerations in the early decision making. WildAgain believes that rehabilitators will consider more factors throughout the process of selecting and using a milk replacer formula, including the growth, development, and health of the wild orphans.

The product label

As always, first check the product label, with focus on the guaranteed analysis (GA) of the nutritional composition and kcals, ingredients, and mixing instructions. Look at the lot number and expiration date. Also, make a note of the product and lot number, and expiration date, as well as when and where it was purchased. There are some things to learn from the label, including comparing the label disclosures to the actual lab test results in Part 1. Making and keeping such records are essential should any product questions arise after opening and using.

Product composition

How does the product adhere to the Guaranteed Analysis? For the new Esbilac®, lab tests show the protein, fats, and carbohydrates tests levels are closer to label guarantees than in recent years – and that is a positive sign. For domestic use with puppies, people may not notice any change at all, since they generally use it as a supplement to mom's milk and thus feed smaller amounts. However, when feeding as the primary food source for wild mammal *orphans*, even minute changes in proteins and fats can make a significant difference. Such changes in compositions need to be considered when evaluating a formula recipe (already existing or newly created) to compare to the species milk (such as when using [WildAgain's Formula Calculator](#)).

Some of the primary changes to keep in mind include the following:

- Proteins are about 33% of the contents (guaranteed minimum), but about 10% less than in recent lots tested of the previous formulation. As with many milk replacer products, Esbilac® still provides a balance of casein proteins (more gradual digestion) and whey protein (easier and faster digestion).
- Overall fat content remains at around the guarantee of minimum of 40%, but now has a significantly changed fatty acid profile. With a 60% increase in polyunsaturated fats, concerns around rancidity arise since polyunsaturated fatty acids are the most prone to onset of rancidity. More on this later.
- Since the level of carbohydrates is a calculation involving the other nutrients, the decrease in protein level results in an increase in the calculated carbohydrate level (which includes the addition of the fiber).
- Moisture level (water) has decreased to the maximum guarantee of no more than 5%. This should be viewed as positive, as more moisture in a milk powder could make it more susceptible to development of bacteria if it is not stored and handled correctly.

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- Kcals are slightly higher than prior lots – but unlikely to have a substantial impact. Tests showed the kcals in the ‘new’ Esbilac® powder were only 1.6% higher in energy content than the lots tested pre-2022, due to the slight increase in energy-rich fat. This suggests little change in over metabolizable energy, assuming other things are consistent. This includes such factors as formula preparation (reconstitution efficiency), feeding regimen (amount and frequency) and overall animal health (hydration and digestibility).
- Tests show that the concentrations or amounts of most minerals in the Esbilac® have continued to decrease, including calcium and phosphorus. This is not necessarily a problem for puppies receiving only supplemental feedings but may prompt some rehabilitators to consider when using Esbilac® to create a formula recipe to get closer to the species milk composition analysis. It must be emphasized that trying to supplement any minute amount of a mineral in Esbilac®, especially with elemental calcium (e.g., calcium carbonate, calcium citrate), can easily result in unintentional imbalance or overdosing and create extremely high risks – which can be fatal. A highly effective and much safer and easier way that rehabilitators have used to add minute amounts of minerals since 2008 is ‘blending’ Esbilac® with a milk powder from another manufacturer that has higher levels of minerals. Again, [WildAgain’s Formula Calculator](#) provides a tool if wondering how that might be done, providing calculated amounts of calcium and phosphorus for single or multi-product formula recipes.

Product ingredients

Most of the ingredients listed in the ‘new’ Esbilac® appear the same as recent years, though a change in the order listed shows that the amounts have changed. As usual, without a fuller disclosure by the manufacturer, a consumer cannot know about changes regarding the ingredient source, quality, size, digestibility, effectiveness, etc.

PetAg® milk replacer powders contain *probiotics* to support digestion, health, development, and immune response. Esbilac® has included several common and ‘general’ probiotics for years. Those probiotics are more limited in diversity and amounts than in the microbiota for individual species – wild or domestic. Some rehabilitators are exploring natural, effective, and safe ways of building microbiota of the specific species in care rather than relying on those general probiotics in milk replacers or commercial sources.

As for *prebiotics*, researchers have learned that oligosaccharides, a key component of carbohydrates in mothers’ milks, play a crucial role in digestion, development, the immune system, intestinal barrier functions and more. Cows’ milk, the base of many milk formulas, has limited oligosaccharides compared to the milk of humans and many other species. Subsequently, various prebiotics are now added to some human infant formula products and other foods, including animal substitute milk replacers. Prebiotics that play a role like oligosaccharides are being included as a substitute. Esbilac® already contained an oligosaccharide for its prebiotic effect for years: Fructooligosaccharides (FOS). The 2022

formulation has added two more ingredients considered to be prebiotics: guar gum (also a thickening agent) and powdered cellulose, both of which PetAg® obviously considers safe and beneficial.

While Esbilac® is clearly intended for use with young puppies, questions arise due to the fact that powdered cellulose is generally banned for use in human infant formulas ⁽¹⁾. Research continues to question, investigate, and assess the safety of guar gum in foods for human infants and young children ⁽²⁾. As a result, wildlife rehabilitators may have questions about the guar gum and exact type of cellulose being added to Esbilac® - and their safety when used with young wildlife. Some rehabilitators may assume those prebiotics in the new Esbilac® are beneficial and safe, and use it immediately, while others may delay the decision due to the questions of safety with young wild mammal of various species.

Weight of the product

Tests show that the weight of a tablespoon of Esbilac® has gradually increased over previous years. This could affect the amount of nutrition in the mixed formula, unless the person mixing it adjusts the amount by weighing it and making corresponding adjustments in the recipe (including water). Knowing the weights have changed and could change in future lots, it is even more prudent to weigh the ingredients when preparing a formula (rather than scooping a given volume). In addition, more moisture in a milk powder could make it more susceptible to development of bacteria if it is not stored correctly.

Most of the milk replacer powders used to make formulas for wildlife vary in weights, both from lot to lot, and even within a package. This is because loose and fluffy powders are susceptible to compaction. Esbilac® is a perfect example of a powder weighing differently between lots and within a container. While many manufacturers describe measuring by volume, this results in different density of formula batches – which can affect nutrition, the amount of fluids ingested, and more. As said before: weigh the ingredients of the formula. [For more info on this, click here.](#)

Mixing instructions on the label

Mixing instructions on the label state to add powder into warm water, gently stir to mix, and then feed immediately – or at least within 24 hours. Reconstitution tests conducted by WildAgain and presented in Part 1 show that the Esbilac® does appear to be milky and dissolved within a couple of minutes. However, the test photos reveal (by using the various sized sieves/filters) that it is NOT completely dissolved – and has a thick paste-like sludge by the time it is trapped by the smallest sieve. For improved reconstitution, consider deviating from the label mixing instructions as described in the reconstitution section below.

Product storage, shelf life and rancidity

Lab tests for rancidity (Peroxide Value - PV) performed on Esbilac® since 2008 have not previously revealed problematic levels in Esbilac®, indicating a relatively acceptable degree of shelf-stability. As mentioned earlier, the overall amount of fat in Esbilac® is close to the guarantee on the label, similar to previous years. Fatty acid profile tests reveal that the *types* of fats have changed to a higher percentage of polyunsaturated fat – which is susceptible to faster rates of rancidity when exposed to air, heat, sunlight, and not stored properly. The PV test conducted for the new Esbilac® sample was performed 7.5 months after the manufacture date and demonstrated acceptable range. Subsequent PV tests and rancidity levels could change based on: (1) the length time between manufacture and use, (2) exposure to heat in transport or during storage at a warehouse or rehabilitation facility, and (3) exposure to air when opened for use or when repackaged for ‘sharing’ with other rehabilitators.

To reduce the chances of rancidity onset, good practices include: (1) purchasing and using Esbilac® closer to the manufacture date ([check lot number](#)), (2) choosing transport and storage that minimizes risk of exposure to heat and air, and (3) [continuing to monitor for rancidity](#) each time a container is opened. These steps are important for ALL high-fat content milk powders – and not limited to Esbilac® and PetAg products. Milk powders that become rancid and used to make formula can cause a variety of palatability, digestive and health problems for young animals. It is important to prevent or reduce the chance of such problems. including monitoring the animal’s willingness to eat and evaluating their overall health.

The 2022 Esbilac® sample was 7.5 months post manufacturing when tested for rancidity, with a PV test result of 2.4. This would be about 30% into the product’s disclosed 24-month shelf life. This result is well within the max PV of 10. Four pre-2022 samples had been previously tested (2017-2019) with a mean test PV of 6.6 (ranging from 2.5 to 12.4). Esbilac® continues to be more shelf stable than the other PetAg® products of GME® and KMR®. The increase in polyunsaturated fats could, however, affect the shelf life and could accelerate the onset of rancidity as time passes from manufacture of the Esbilac® powder until when fed. Any newly opened can or package should always be assessed for sensory traces of rancidity ([Click here](#)). Proper storage and handling will help to ensure the product does not exceed maximum PV levels within the stated shelf-life, as based on the expiration date stamped on the can or package. One very surprising change in the label directions for storage is that an “*...opened container can be kept at room temperature for up to 2 months and then ... refrigerated up to 1 additional month...*”. The prior label directed the user must refrigerate an opened container for up to 3 months. This change is surprising as it is rarely advised to store powdered milk products of any kind above refrigerated temperatures of 40 degrees (F), especially for reconstituted whole milk products with very high fat contents. Such handling practice would likely lead to a much faster onset of the rancidification process in the remaining powder. This can be highly problematic, especially for young animals in critical growth periods and with developing immune systems.

Reconstitution

This refers to how the milk powders disperse and dissolve in liquid - which affects the amount of nutrition available, digestibility and more. There are several steps involved in [reconstitution, including wetting, sinking, stirring, and resting](#). The preparation may take a little planning and time to make the formula in advance to allow it to rest in the refrigerator for 8 hours. But doing so can significantly affect and improve the animal's health, growth, and development. It absolutely makes a difference in the growth, health, and well-being of the wild orphan.

To summarize the steps to effective reconstitution: (1) add the powder to warm water and allow up to 5 minutes to wet and sink, (2) hand stir or whisk until no dry clumps of powder are visible, (3) allow the prepared formula to rest in the refrigerator for 8 hours prior to use.

Other factors that can affect success of any powdered milk replacer product

Product quality, availability, and costs. Availability and the ease of obtaining a product may be factors – but will vary depending on things such as manufacturing capacity, supply chain issues, distributors, storage, and shipping. The new formulation is still difficult to locate (October 2022), even after 10 months after the new product was launched by PetAg®. Quality control is another factor – and, as with all products, which continues to deserve monitoring by the end user in its performance with the wild mammal orphans. Cost of the product is certainly another factor that will influence purchase and usage over other similar milk replacers. With the current scarcity of the new formulation, cost comparisons are not something WildAgain can provide at this time.

Effective rehabilitation practices are always important (e.g., hydration, providing supplemental heat for neonates or as appropriate those with compromised health, minimizing stress, treating parasites, keeping accurate and thorough daily and records).

Effective feeding practices. Feed considering the appropriate amount and frequency for the species (e.g., do not over- or underfeed during a 24-hour period) and use clean and appropriately sized feeding utensils. Equally as important is monitoring stool - frequency, amount, and consistency. This can provide direct clues whether the milk replacer (product and formula recipe) is working successfully with the specific species, age, and health of the animal.

Modifications for off-label use. Esbilac®, a milk replacer powder developed and sold for puppies, contains 33% protein, 40% fat and other nutrients. All other mammal species milks have a different % composition of protein, fat, carbohydrates, kcals, etc. Rehabilitators should review published scientific milk composition analysis studies for their species. Recipe modifications are generally needed to create a closer match to the milk of the wild mammal species in their care. Calculating formulas for different species can be a complex and time-consuming exercise – consider using the Wildlife Formula Calculator.

Modifications through blended formulas. Many times, matching mother's milk can be more closely achieved by blending several milk replacer powders and possibly adding other ingredients. Since individual powdered milk replacer products will reconstitute in slightly different ways, specific blending protocols should be followed to do so effectively and safely. This means reconstituting each powder individually and combining only after each has fully reconstituted in liquid form. ([Mixing Guide](#))

More. Stay alert to and consider expanding research related to nutrition, health and more that can affect these topics, such as microbiome, glycans, oligosaccharides, manufacturing changes.

Disclosures

Esbilac® is manufactured and sold as a food supplement for dogs, and not intended to be a sole source food for developing puppies. Wildlife rehabilitation is considered an off-label use.

Product assays performed by the independent lab, as presented in Part 1, and referred to here in Part 2, adhere to the *Official Methods of Analysis of AOAC INTERNATIONAL* (Association of Official Analytical Chemists) and the *Official Methods and Recommended Practices of the AOCS* (American Oil Chemists Society).

The authors have no conflicts of interest with the independent lab, or any of the products or manufacturers discussed in this article.

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