

Esbilac® Powder Changes Affect Wildlife Rehabilitators

In 2009, some wildlife rehabilitators in North America began reporting gastrointestinal and growth problems after feeding formula made with Esbilac® milk replacer powder to orphaned wild mammals such as squirrels, raccoons and opossums. They had previously eliminated other common causes, such as overfeeding and endoparasites. However, other rehabilitators feeding formula made with Esbilac® powder experienced no unexplained problems during the same time period. Rehabilitators and veterinarians who reported problems worked diligently to identify possible causes and effective treatments for the conditions mentioned above and the secondary infections that had developed. In some cases, the animals recovered when changed to a different milk replacer product or when extra fats were added to the product, but other animals continued to have severe health problems.

Shortly before rehabilitators began reporting concerns, PetAg, the manufacturer of Esbilac®, had made what it described as a minor change in the manufacturing process. PetAg switched to a single-step spray-dry process for the Esbilac® powder, rather than continue the multi-step process it had used for more than 15 years. Company representatives said that the ingredients, 'recipe,' and formulation were the same – and that the 'new' Esbilac® powder met the Guaranteed Minimums on the label. PetAg expressed confidence in the single-step spray-dry process because they had used it with their Zoologic® and other milk replacers since the early 1990's. According to PetAg, no unexplained problems had been reported for puppies for which Esbilac® powder was developed. Rehabilitators also were reminded wildlife was an 'off-label use' for Esbilac®. PetAg recommended rehabilitators use Zoologic® Milk Matrix products, such as Zoologic® 33/40, for wild mammals.

In the summer of 2009, rehabilitators contacted WildAgain Wildlife Rehabilitation to ask for help because we had conducted research and published information on nutrition in wild mammals and gastrointestinal conditions. We began gathering data from many rehabilitators in an attempt to understand the health problems with juvenile wild mammals, as well as to help identify possible causes and solutions. Veterinarians, nutritionists and many rehabilitators shared cases, test results, general ideas and possible solutions.

After considering this extensive input and early research, we focused on changes in the Esbilac® powder. **The results of multiple tests showed that the 'new' Esbilac® powder was different in several ways. An extensive report on the results of these and many more tests with graphs and photos, their effect on wildlife rehabilitators, and possible solutions is provided at www.ewildagain.org.** A short summary of several key points follows.

This report is focused on the use of Esbilac® powder with wild mammals, and does not address any potential issues when used with domestic animals, such as dogs and cats.

Solubility changes

Several rehabilitators mentioned to PetAg and WildAgain that the 'new' Esbilac® powder "mixed differently." PetAg responded by suggesting that the product be mixed with hot water (instead of warm) and stirred a little longer. To date, the Esbilac® powder label has not been updated with this new information and continues to read: "*gently stir or shake into warm water.*" Rehabilitators accustomed to following those instructions were unlikely to have changed their established mixing practices because they had not been told to do so.

WildAgain conducted a series of solubility tests to simulate how rehabilitators mix the Esbilac® powder into formula to be fed to infant and juvenile wild mammals. The tests showed several important things.

First, there was noticeable separation of the mixed formula within a short time after it was prepared according to the instructions on the label (Figure 1). The difference was very noticeable when formula made with 'new' Esbilac® powder was compared to the 'old' Esbilac® powder (Figure 2).

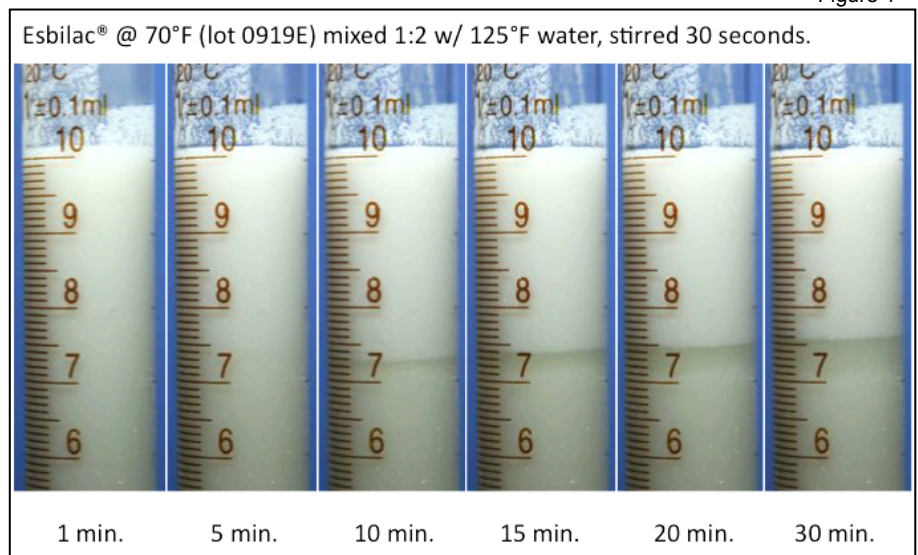


Figure 2

Second, the hydration time made a significant difference in the degree to which the product was able to rehydrate into a homogeneous and well dissolved formula as shown in the test tubes (Figure 3) and under the microscope. This finding was consistent with input from rehabilitators who allowed the newly mixed formula to 'rest' several hours or overnight in the refrigerator - and who then reported few unexplained health problems after feeding formula made with the 'new' Esbilac® powder. Also, dairy consultants and researchers recommended a longer hydration time for almost any single-step spray-dry milk product.

Third, the temperature of the water used to mix the formula made a difference for the 'new' Esbilac® powder. While the label on the Esbilac® powder continues to indicate using warm water, the formula appeared to rehydrate and dissolve much more completely and evenly when using hotter water (about 175°F).

More changes

The weight of the 'new' Esbilac® powder is less per unit volume than the previous Esbilac® powder. This can affect energy and nutrient levels per unit volume.

The 'new' Esbilac® powder compacts differently in the can or package. This can affect measuring.

While the protein and fat met the Guaranteed Minimum on the label, other nutrients had wider variations than the previous Esbilac® powder.

These issues, either individually or collectively, can produce a formula that is deficient in nutrients and/or energy. Mixed according to the label, the Esbilac® powder may not have been fully rehydrated and dissolved when fed – which could affect digestion, absorption and utilization by juvenile wild mammals. While adjusting how rehabilitators prepare formula may help resolve many of these issues, it is still certainly possible that there are additional factors in or related to the Esbilac® powder causing health problems in juvenile wild mammals.

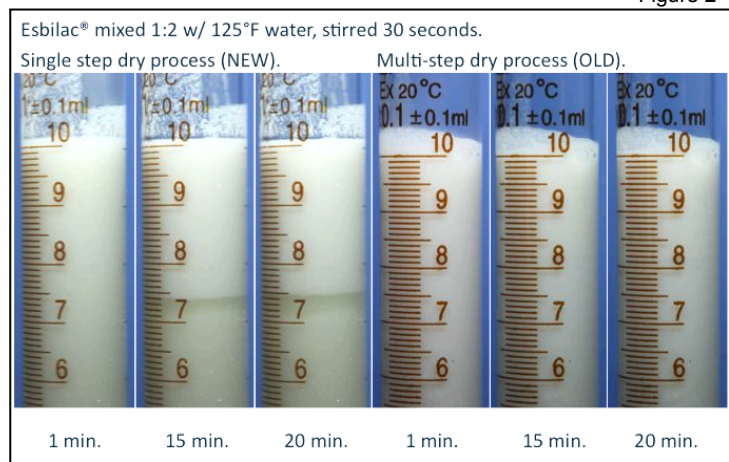
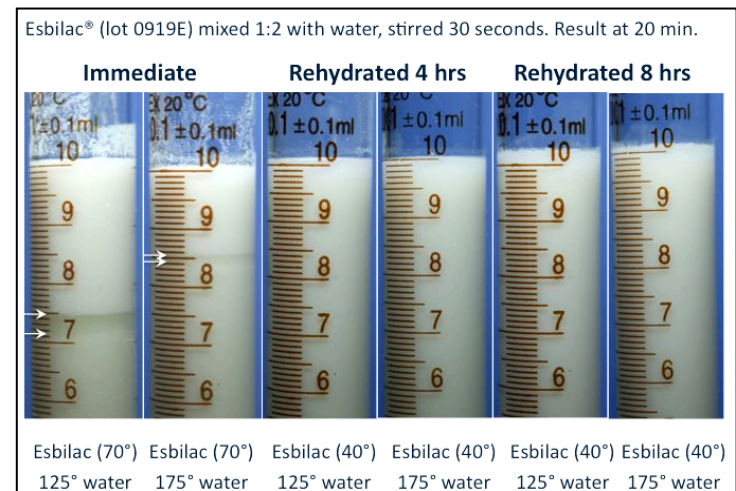


Figure 3



WildAgain believes that the reported gastrointestinal and other health problems are likely to continue unless wildlife rehabilitators change their preparation and use of the formula to accommodate these changes in the 'new' Esbilac® powder when feeding juvenile wild mammals.

Modified preparations for using the 'new' Esbilac® powder for juvenile wild mammals

While some rehabilitators will choose to use another milk replacer, others still plan to make formula with Esbilac® powder to feed juvenile wild mammals. Some revised preparations have been developed to try to prevent or reduce potential problems related to the changes described above. The revised preparations are based on the positive results of some rehabilitators who previously saw good results and no problems, WildAgain tests, and the early results from confirmatory trials by rehabilitators feeding formula made with the 'new' Esbilac® powder to infant and juvenile tree squirrels in February and March 2010. The preparation ideas are provided in the report on www.ewildagain.org.

Confirmation trials in process

Several rehabilitators who reported serious gastrointestinal conditions in wildlife after feeding formula made with the 'new' Esbilac® powder have recently changed their formula preparations as they began feeding neonate ('pinkie')

and juvenile squirrels in February 2010. These rehabilitators, from several states, followed the methods used by rehabilitators mentioned above. They modified their formula 'recipes' as needed (i.e., adding yogurt).

The number of rehabilitators participating in the confirmation trials using the revised mixing protocols for the 'new' Esbilac® powder has been very limited, since wildlife baby season had just started as this report is being finalized. However, they have reported positive results when using all the revised mixing protocols provided in Appendix G of the longer report available at www.ewildagain.org. Those making only some of the suggested changes, like omitting the extra fats or yogurt, reported less positive results.

WildAgain believes it is essential to see consistent and repeatable positive results confirmed by rehabilitators who previously saw problems after feeding formula made with the 'new' Esbilac® powder before drawing conclusions.

Additional research still needed

While WildAgain cannot yet provide conclusive answers or definitive recommendations, we are cautiously optimistic that the results of using the revised mixing protocols will be helpful for a variety of milk replacers made with the single-step spray-dry method that are fed to wildlife, including the 'new' Esbilac® powder. WildAgain also believes that time, experience and further analysis will provide more comprehensive information and conclusions.

As in general practice, wildlife rehabilitators will need to consider and evaluate the information and make personal decisions as to their rehabilitation practices, including milk replacer selection, diet formulation, preparations, and use.

Wildlife rehabilitators considering Esbilac® powder as a milk replacer base for juvenile mammals in their care need to know about the issues described in this report so they can make those informed decisions. We realize that some will choose Esbilac® powder for wildlife in rehabilitation, and others will prefer to use other milk replacers.

Other milk replacers produced with similar method!

Many milk replacer powders are produced with the single-step spray-dry method, including Goats Milk Esbilac® (GME®), KMR®, the Zoologic Milk Matrix products (e.g., 33/40, 30/55), and others. Thus, it seems that the modified mixing instructions may be beneficial for those products as well. Early reports from rehabilitators using these modified mixing instructions describe positive results.

If a rehabilitator chooses to use the Esbilac® powder make formula for wild mammals, we believe it is important to take these issues into account and adjust formula preparations accordingly: check for rancidity, turn the can over before measuring, use hotter water (175°F – not boiling) to mix, add extra fats and yogurt to the cooled formula, and then allow the mixed and cooled formula to rest in the refrigerator a minimum of four hours and, preferably, at least 8 hours.

An extensive resource list is provided with the report on www.ewildagain.org.

Wildlife rehabilitators are encouraged to contact PetAg directly with any questions or comments about their products or use (www.PetAg.com). Esbilac®, KMR®, GME®, Zoologic® Milk Matrix, and MultiMilk® are registered trademarks of PetAg Corporation, Hampshire, IL.

Authors

Allan and Shirley Casey, co-founders of WildAgain Wildlife Rehabilitation, Inc. in Evergreen, Colorado, have been licensed rehabilitators since 1986. The Caseys conduct research on a variety of rehabilitation related subjects. They provide a variety of tools and resources for wildlife rehabilitators and people interested in rehabilitation topics at www.ewildagain.org

While they have communicated with PetAg on this issue, the Caseys have no affiliation with PetAg or any other milk replacer manufacturer.

The authors express great appreciation and thanks to the many rehabilitators, veterinarians, nutritionists, biologists, and others who contributed information, test results, and much more to this research. It has truly been a collaborative effort of the rehabilitation community.

Possible adjustments when preparing 'new' Esbilac® powder for feeding to juvenile wild mammals

Draft
Rev. 4/10

Things to know about the 'new' Esbilac® powder (manufactured with the single-step spray-dry method after 12/08)	Possible Impacts	Adjustments that may improve effectiveness.
<p>A. Powder compacts more in bottom half of can or package due to uneven density and texture.</p>	<p>1. Can affect measuring since top half may be lighter and bottom half heavier for same volume. 2. Heavier particles (e.g., minerals) may fall to bottom and affect nutrients provided.</p>	<p>Turn can/package over several times to redistribute powder each time before measuring. Weighing a milk replacer powder rather than scooping helps increase accuracy and consistency.</p>
<p>B. Solubility has changed. No longer mixes as quickly with a brief stir or shake with warm water as per label.</p>	<p>3. Formula may be inadequately rehydrated and dissolved when fed if treated as an instant mix. Risk of excessive dry powder being ingested. 4. Young wild mammals may not be able to adequately digest inadequately rehydrated and dissolved formula - and develop diarrhea. 5. Diarrhea can cause dehydration, as well as irritate and inflame GI tract. 6. Juvenile wild mammals may not absorb adequate nutrition if the formula is less digestible - or if they have diarrhea. Growth can slow; immune system can become compromised. 7. Undigested formula/milk in the GI tract is a great medium for bacterial growth. 8. Secondary infections can develop due to any or all of above.</p>	<p>Mix powder with hotter water (about 175°F), but not boiling. Stir or whisk thoroughly, preferably at least one minute. Allow prepared formula with extra fats (see below) to 'rest' in refrigerator for minimum of 4 hours and preferably 8 hours. Consider feeding a slight amount of probiotics in formula <u>twice</u> a day.</p>
<p>C. Weight of powder varies by individual lot. Observed variability can range as high as +/- 15% or greater.</p>	<p>9. Some lots have slightly reduced energy and nutrients per volume - which means less nutrition and energy unless the formula recipe is adjusted. Other lots weigh much more and have more kcals. 10. Risk of rancidity, from exposure to high heat during transportation or storage, or from excessive oxidation during use if package is left unsealed for even short periods.</p>	<p>The decision to add extra fats (e.g., heavy whipping cream, MultiMilk®) for wildlife must be adjusted according to weight and nutrients. Specific amounts still being evaluated. Consider using nutrition calculator at www.ewildagain.org to check nutrient & energy levels.</p>
<p>D. Powder is very high in unsaturated fats and does not contain preservatives generally found in most other powdered milk replacer products.</p>	<p>10. Risk of rancidity, from exposure to high heat during transportation or storage, or from excessive oxidation during use if package is left unsealed for even short periods.</p>	<p>Check the powder. Don't use if there is a strong or 'off' odor, odd color, or if animal acts as if it is unpalatable. Store powder in airtight containers in refrigerator or freezer. Minimize exposure to air.</p>

Considerations for Preparing Formula with Single-step Spray-dry Milk Replacer Powders for Wild Mammals, including Esbilac®

-- revised April 5, 2010 --

Some wildlife rehabilitators saw good results with juvenile wild mammals that were fed formula made with Esbilac® powder in 2009. Others reported serious problems. This describes many of the tips used by rehabilitators who reported successful results with single-step spray-dry milk powders, including Esbilac®. They used their previously effective 'recipes' for formula for the wildlife species being fed. Recipes should approximate similar ratios of total solids:fat:protein found in mother's milk for the species and provide minimal digestible Kcals. Check nutrient and calorie calculations at www.ewildagain.org.

*The tests, analyses and confirmations are still in process. While there are still questions and unknowns about the 'new' Esbilac® powder and its use, these tips appear to help resolve solubility issues for Esbilac® powder. These mixing ideas are also helpful for other single-step spray-milk formulas, such as Zoologic® 33/40 and GME®. These are some **DRAFT** tips for wildlife rehabilitators who are wondering about using milk powders for the rapidly approaching wildlife baby season. To date, rehabilitators following these tips have reported positive results.*

1. Store unopened milk replacer powders in a cool place. Consider purchasing in cooler seasons.
2. Store opened milk replacer powders in refrigerator or freezer. Minimize air left in bags.
3. Examine for rancidity. If the formula has an odd color or odor, or if animals refuse, don't use it.
4. Turn can over several times before each measurement to ensure even distribution and to reduce compaction.
5. Plan ahead! Estimate the amount needed for a full day – and make that amount. An immersion (stick) blender is useful when making more than a cup. Do not allow formula to foam!
6. Weigh the milk replacer powder rather than measuring (scooping) volume to increase accuracy and consistency.
7. Add fats to adjust caloric and nutrient content if needed for the species or due to composition of the milk replacer powder, which can be influenced by the product composition or lot number. Typical Nutritional Analyses with additional information is available for some milk replacer products by lot number at www.ewildagain.org.

Mixing tips if using **liquid fats** (i.e., heavy whipping cream).

- Measure milk replacer powder accurately. Do not compress powder.
- Add half of the water to powder. Use very hot water (about 175°F).
- Stir thoroughly for at least a minute to make into a smooth thick liquid. Add remaining hot water. Stir.
- Add small amount of heavy whipping cream as per nutritional needs. Stir.

OR -- Mixing suggestions if using **powdered fats** (i.e., MultiMilk® or UltraBoost).

Accurately measure milk replacer powder and fat powder. Do not pack. Mix powders together. Add half of the water to the combined powders. Use very hot water (about 175°F). Stir thoroughly for at least a minute to make into a smooth thick liquid. Add remaining hot water. Stir.

Place the cooled formula in refrigerator to 'rest' for minimum 4 hours, preferably 8 hours. Do NOT use formula immediately after mixing! PetAg says to use the mixed formula within one day.

8. Stir lightly and remove amount needed from container. Warm only the amount needed for feeding. Stir again before use. Follow normal feeding practices. Note: Since MultiMilk® contains lard, formula including MultiMilk® should be heated so that the lard becomes liquid (109°F) – and then allowed to cool to temperature normally used for feeding (e.g., body temperature of the species).

Freezing for storage: Some rehabilitators make formula and allow it to rest in the refrigerator for 8 hours according to the description above. They then freeze small amounts, such as in ice cube trays, until solid. The frozen cubes are placed in freezer-proof plastic bags or containers and sealed securely. Food scientists suggest frozen milk products should be used within 6 weeks. The thawed formula should be stirred well before using. The formula is then warmed and used in a normal manner. While this method is very convenient, a few rehabilitators have reported that some juvenile wild mammals have developed soft stool when fed formula that was frozen.

Considering adding probiotics or yogurt: There are many benefits of adding probiotics to formula fed to juvenile mammals, such as helping to improve digestion, increasing availability of nutrients, increasing good bacteria and decreasing 'bad' bacteria and reducing gastrointestinal inflammation. More information on these benefits, products, and uses are described in "Quick Tips about using Probiotics with Wildlife in Rehabilitation" at www.ewildagain.org.

Rehabilitators have reported positive results from adding a small amount of probiotics to formula at two feedings per day. They used probiotics with live cultures or plain organic yogurt with live cultures (full or low fat yogurts are preferred over the fat-free varieties). They avoided products with sugar and/or sweeteners, as well as artificial flavoring or coloring.

Some rehabilitators who stirred in a tiny amount of probiotics or yogurt in to the partially cooled formula which resulted in probiotics being included in every feeding believed that some juvenile wild mammals, especially the very young, developed an imbalance of microflora and subsequent gastrointestinal difficulties. They strongly recommended providing probiotics only twice a day to reduce the problem and potential risks. Other rehabilitators believed that the adding probiotics when the formula was prepared and having them in every feeding was beneficial. Research is continuing to determine the effectiveness and factors that influence results, including species and age of animal, type of probiotics (powder, gel, liquid, yogurt, etc.), brand, type and amount of bacteria, frequency of administration and so forth.

If gastrointestinal problems occur, first consider common causes, such as overfeeding formula (i.e., amount, frequency), endoparasites (e.g., coccidia, giardia), introduction of a new food, overfeeding solids, and amount or type of supplements added to formula (e.g., fat, probiotics, yogurt). This may include performing one or two fecal cultures to check for parasites. Consider switching to a different package of milk replacer powder in case the first milk powder had spoiled. If the problem continues, explore whether it could be the milk replacer powder. Communicate with fellow rehabilitators. Check with milk replacer manufacturer.

Current updates on milk replacers, feeding practices, and information on gastrointestinal conditions in wildlife are available at www.ewildagain.org.

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