

PUPPY NUTRITION & HAND REARING

COLOSTRUM

Success in hand rearing puppies greatly improves if they receive colostrum at birth. Colostrum is the first milk produced by the bitch, and has high levels of immunoglobulins. These are proteins that provide immunity to infection by microorganisms such as bacteria or viruses. Puppies are born virtually devoid of immunity and must acquire their initial immune protection from colostrum. Puppies that don't receive adequate colostrum (eg due to orphaning or caesarean section) have a weakened immune system and an increased risk of disease, particularly in the first three weeks of life. Colostrum is only produced for a short time after birth, and studies indicate that intestinal closure to the absorption of immunoglobulins may occur as early as 16-24 hours after birth in puppies¹.

If puppies don't receive colostrum from the bitch then they can be fed with **Impact Colostrum Supplement**. Impact is made from bovine colostrum powder which contains intact immunoglobulins (IgG, IgA) as well as other antimicrobial proteins such as lactoferrin and lactoperoxidase, which may provide intestinal protection. Bovine colostrum has been shown to be effective against a wide range of common pathogens (e.g. rotavirus, *E. coli*) known to cause acute diarrhoea and enteric disease in puppies^{2,3}. Dogs supplemented with bovine colostrum have also demonstrated an improved immune response to canine distemper virus, as well as increased gut microbiota diversity and stability⁴.



Impact should be fed as soon as possible after birth, and preferably before milk formula is fed. The dose is based on the body weight of the puppy as per the instructions provided with the product.

First 12 hours after birth: Prepare a daily dose of Impact and feed $\frac{1}{4}$ of the amount every 2 hours. Do not feed milk formula during this time, as this can reduce the ability to absorb the immunoglobulins from the intestine¹.

12 to 48 hours after birth: Commence feeding milk formula every 4 hours. Prepare a daily dose of Impact and feed $\frac{1}{4}$ of the amount, mid way between milk feeds. Do not mix or feed Impact with milk formula.

MILK FORMULA

Different species of mammals produce milks of different composition in order to satisfy the nutritional requirements of their growing young⁵. The table below shows the difference in composition between the milks of cows, dogs and some commercial milk replacers.

	Solids (g/litre)	% Protein	% Fat	% Carbohydrate	Energy (kJ/litre)
Cow's Milk ⁵	127	27	29	38	2700
Dog's Milk ⁶	227	33	42	17	5400
Wombaroo Dog™	215	34	37	18	5000
Divetelact™	200	24	30	37	4200
Biolac™	200	31	31	30	4400
Animalac™	175	30	11	49	3100

Dog milk has a relatively high concentration of solids, elevated fat and protein levels and low amounts of carbohydrate. This results in a milk with twice the energy concentration than cow's milk. The high levels of carbohydrate (mainly lactose) along with its low energy value makes cow's milk an unsuitable substitute for hand rearing puppies.

Comparing the commercial formulas listed, **Wombaroo Dog Milk Replacer** has the most similar nutritional composition to that of dog milk. All other products are significantly deficient in either protein, fat or energy, when compared to mother's milk. Some products attempt to counter this by feeding at higher rates, but this often leads to diarrhoea. Excessive carbohydrate could also lead to digestive upset and imbalance of gut bacteria. The type of fats present in the milk are also important, with puppies requiring elevated levels of omega 3 & 6 fatty acids for optimum development⁷. Wombaroo contains added essential fatty acids including EPA, DHA (omega-3) and Linoleic Acid (omega-6) in quantities exceeding the nutritional guidelines⁸.

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USING DOG MILK REPLACER

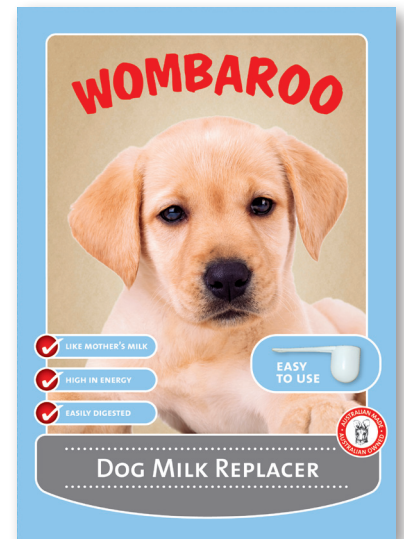
To make 30mL of milk: mix 1 level scoop of powder (6.5g) with 25mL of pre-boiled warm water.
To make one litre of milk: mix 215g of powder with 850mL of pre-boiled warm water.

Add half the water to the powder first and mix to a paste. Then add the remaining water and mix thoroughly. Pre-boil the water to ensure it is sterilised. If the water is too hot it can cause the milk to curdle. If it is too cold then it will be difficult to mix the powder. Wombaroo contains elevated fat levels, so the milk needs to be well mixed to prevent it from separating out. An electric whisk can be used for mixing larger quantities. Milk can be stored in the fridge for up to a day or can be frozen for up to 2 weeks. It is useful to make milk up in larger volumes, and store it frozen in small portions (eg ice cube trays), so that the required daily feed volumes can be easily thawed out. Once thawed out, discard any unused milk, and wash feeding utensils thoroughly.

FEEDING: Warm milk to about 35°C. Feed from a bottle with teat, a **Wombaroo SD** or **Wombaroo LD** teat is recommended for small and large breeds respectively. For some breeds a **Wombaroo F** teat may be used. In emergency cases tube feeding may be required, but this should be performed under veterinary guidance. Feed every 2 hours for the first 3 days, reducing this to every 4 hours by week one and every 6 hours by week two. Stimulate puppies to defecate and urinate after each feed. Encourage puppies to lap once their eyes are open and voluntary bowel motions begin. To avoid dehydration give puppies a drink of pre-boiled water between feeds, particularly in hot weather. Always offer puppies drinking water once their eyes are open and they become active. Consult your veterinarian or breeder for particular advice about caring for your breed of puppy.

GROWTH: Different breeds of dogs have different growth rates. It is important to weigh puppies regularly to verify weight gains and determine if the correct volume of milk is being fed. Overfeeding milk can cause diarrhoea so feed the suggested volumes for the weight of the puppy, as listed on the pack.

WEANING: Puppies should begin to show interest in solid food at about four weeks of age. Start by offering a small portion of dried puppy food soaked in milk. Continue to increase the solids and reduce milk intake until they are fully weaned at about eight weeks.



REFERENCES

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