

Dr Mac's Guidelines on Nutritional Requirements of Lories and Lorikeets

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Nutritional adequacy is imperative to maintain health and optimise reproductive output of lories and lorikeets. Unfortunately, many people believe that a diet comprising simple sugars and high protein will adequately substitute the wild diet of nectar and pollen. Many breeders also provide multivitamin supplements *ad hoc*, resulting in vitamin imbalances with dire consequences. We provide you with a brief overview of nutritional requirements of nectarivorous psittacines and how **Dr Mac's Organic Origins** can optimise nutritional intake of lories and lorikeets.

Should Formulated Foods be Fed Exclusively?

The provision of a formulated diet is not meant to substitute fresh foods. There are many nutritional benefits from fresh foods such as phytonutrients and antioxidants. Plant sterols compete with cholesterol for absorption into the gut and other polyphenols possess anti-inflammatory properties. However, formulated foods provide the extra nutrients lacking in the commercially available fresh foods we provide to birds in captivity. **Dr Mac's Organic Origins** nectar diets are best mixed with a puree of fruit, vegetables and sprouted seeds. This enhances the nutritional value and prevents settling out of valuable nutrients.

Do Lorikeets Need a Sugary Diet?

It is true that lorikeets feed on foods in the wild that have high concentrations of sugars. However, these carbohydrates are not the same as refined sugars that are added to many commercial diets to sweeten the foods and make them more palatable. The raffinose sugars contained in many plant and insect exudates are less digestible than those composed primarily of sucrose and pass undigested through the stomach and upper intestine. The beneficial action of raffinose sugar is akin to fibre.

Raffinose sugars

Raffinose sugars promote colonisation of beneficial gut bacteria and act as anti-infective agents. Gastrointestinal flora of healthy birds consists primarily of gram-positive bacteria, with variable numbers of *Bacillus* and *Lactobacillus* species. In contrast, unhealthy birds have a predominance of gram-negative bacteria that can be pathogenic.

One can add probiotic flora to the diet to increase populations of *Lactobacillus acidophilus* (produces lactic acid and reduces gut pH) and *Bifidobacterium bifidum* (inhibits growth of *Escherichia coli*) but raffinose sugars alone can promote colonisation of bifidobacterium species and promote healthy gut populations. Raffinose sugars can also decrease the incidence of *Salmonella enteritidis* on egg shell surfaces, and in egg

white and egg yolk, generally decreasing populations of potentially pathogenic Enterobacteriaceae groups.

Therefore, replacing a wild diet that contains a high proportion of raffinose sugars with a diet consisting only of simple sugars that are highly digestible, may influence gut bacterial populations and increase colonisation by potentially pathogenic bacteria. Dr Mac's products contain ingredients with raffinose sugars as well two probiotics in spore form. Live probiotic cultures containing *Lactobacillus* species are inactivated at temperatures above 45°C, whereas those in the spore form are heat resistant and become active when transported to the digestive system.

Cutting Back on Sugar

Dr Mac's products do not contain refined sugars as sweeteners. They contain organic malt, which releases sugars into the water over time. Consequently, the foods may not initially appear palatable to birds that have been raised on a diet high in refined sugars. It is akin to cutting down on the amount of sugar in your tea or coffee – initially the drink tastes very bland and unappealing to the palate. Lorikeets will adapt to the lower sugar content of these diets if the products are mixed with a puree of their favourite fruit and vegetables. For optimal results, include a puree of sprouted seeds. Foods can also be fed dry when birds adapt to the lower sugar content.

Do Lorikeets Require High Concentrations of Vitamin A?

There are many misunderstandings about the vitamin A requirements of birds. Vitamin A is an essential vitamin for growth, reproduction, eyesight and maintenance of healthy epithelial layers in the reproductive, urinary, respiratory and gastrointestinal tracts. However, plants do not contain vitamin A and providing birds with multivitamin supplements that are usually high in vitamin A can be problematic. Instead, birds in the wild consume provitamin A carotenoids that are converted to vitamin A on an 'as needs' basis, thus avoiding toxicosis. Excesses of vitamin A can damage epithelial linings and increase cellular access by pathogens. It can also interfere with the uptake of vitamin D and E, contributing to developmental abnormalities and infertility.

Comparative studies between wild and captive lorikeets indicate that even low levels of dietary vitamin A can accumulate to excessively high levels in the liver in a short space of time. This contributes to infertility and feather pigmentation aberrations.

A safer way to supplement birds for vitamin A is to provide provitamin A carotenoids in the form of spirulina. Spirulina is a blue-green alga that forms the natural diet of many wild flamingos. It is a highly concentrated source of β -carotene, which is readily converted to vitamin A. Spirulina is also a potent antioxidant, protecting cells and boosting the immune system.

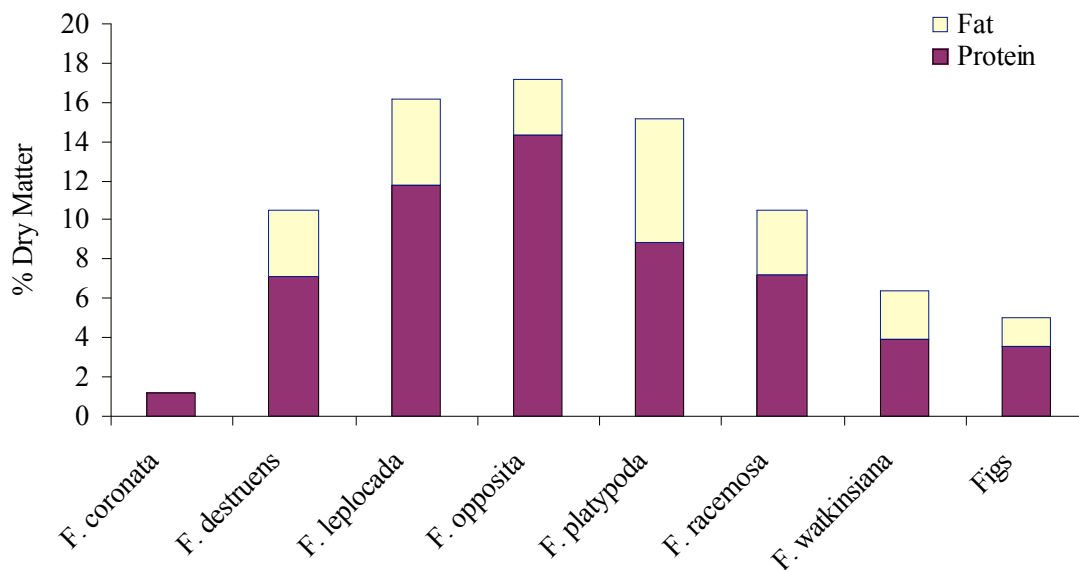
Do Lorikeets have High Protein Requirements?

High protein diets are often prescribed for lorikeets due to the high protein concentrations of pollen. However, protein requirements of nectarivores are generally low and excess dietary protein can place a strain on the kidneys and promote other illnesses. The protein and amino acid concentrations of floral nectar alone generally fail to meet protein requirements of nectarivores and birds in the wild supplement their diets with pollen. Protein concentrations of pollen can be as high as 33%.

However, the nutritious protoplast is extracted through the pores of the pollen grain, a process that is dependant on the length of time the pollen is retained in the gut. Providing a diet of simple sugars that are readily digested and are not retained in the gut for significant periods of time, may influence a bird's ability to extract the nutrients from the pollen grain. All of Dr Mac's nectar diets contain high concentrations of pollen and raffinose sugars that slow down gut transit time.

While pollen contains high concentrations of protein, less than 10% is digested. Nestlings have a greater ability to digest pollen than adults, meeting the higher protein requirements of growth. Lorikeets also have low protein digestibility with scientific studies showing that a rainbow lorikeet requires as little as 2.9% protein, as long as the essential amino acids (building blocks of proteins) are provided in the right concentrations.

Fruits are generally poor sources of protein and should not comprise the major part of a lorikeet's diet. Native fruits often contain higher concentrations of protein than the domesticated commercial varieties. Many wild fruits also contain high concentrations of fibre, as high as 57%, slowing down gut transit time to increase digestibility of pollen.



Fat and protein concentrations of wild figs and commercially available figs.

Is Egg a Good Protein Source for Lorikeets?

Aside from the risk of salmonella contamination, feeding animal-based protein to psittacines is not advisable. Animal proteins are high in the amino acid methionine, which is readily metabolised to a toxic by-product called homocysteine. This homocysteine damages endothelial linings of blood vessels, making platelets stickier than normal and promoting fat build-up in artery linings. Chronic kidney disease and atherosclerosis are associated with high levels of homocysteine. Gout is also commonly associated with animal protein due to the high concentrations of purine. Dr Mac's products contain only plant-based protein.

Iron Storage Disease

Iron storage disease is problematic in a number of lorries and lorikeets maintained on commercial foods. In the past this has been attributed to the high iron content of these foods but vitamin A and vitamin C enhance uptake of iron. Many commercial products and multivitamin supplements contain high concentrations of vitamin A and may promote the development of iron storage disease. Dr Mac's lorry/lorikeet diets are low in vitamin A and high in β -carotene. This enables birds to convert the provitamin A carotenoids to vitamin A only when required, minimising the tendency to accumulate vitamin A to toxic levels in the liver. For species susceptible to ISD, fruits low in vitamin C should be selected. Those to avoid include cantaloupe, orange, papaya and strawberry.

Summary

In summary, a diet of commercially harvested fruit and concentrated sugar syrup do not reflect the nutrient compositions of wild diets. **Dr Mac's Organic Origins** Lorry/Lorikeet diets are formulated especially for psittacine nectarivores, optimising nutrition for lorries and lorikeets to enhance health and reproduction.

For more information on lorikeet nutrition refer to the following review:
McDonald, D.L. (2003) 'Lorikeet Nutrition.' *Seminars in Avian and Exotic Medicine*. 12(4): 195-204.