Organic Diets for Small Poultry Flocks

Most organizations that certify organic poultry and eggs require that most or all of the ingredients in poultry rations be organically grown. The feed ingredients cannot be derived from genetically modified crops, and generally, no animal products such as meat meal or bone meal are allowed. As a result, the number of ingredients available is more limited than for normal poultry rations. Because animal products cannot be used, special care must be taken to provide adequate sources of protein and phosphorous in the feed. Another concern is that medications cannot be added to organic feeds to control intestinal parasite infections such as coccidiosis. Other tools such as litter management or vaccination must be used to control these diseases.

Philosophy of Diet Formulation

The diets formulated in this factsheet will be acceptable to some, but not all, organic certifying organizations. When producing certified organic meat or eggs, always check with the certifying organization whether the feed is acceptable **before** feeding it to poultry flock. The diets have been formulated for small flock owners and have fewer ingredients than will be found in commercially prepared organic rations. As much as possible, ingredients that are grown or that can be readily purchased in Manitoba are used in the diets. The diets are not formulated for maximum growth rate or egg production. Some of the diets are lower in energy and protein than commercial feeds and rely on the birds increasing their feed intake to consume the nutrients that they need. If you are planning to produce poultry on a commercial scale or as a source of income, organic feed should be purchased from a commercial feed mill.

Feed Ingredients

It may be possible to buy a complete commercially prepared organic poultry ration or an organic supplement which can be mixed with organic grain on-farm to produce a complete diet. If commercial feeds or supplements are unavailable, a number of ingredients are needed to mix a balanced diet on-farm.

Wheat - is one of the best cereal grains to feed to poultry and organic wheat is commonly available in Manitoba. It is a good source of starch for energy and moderate source of protein. Any variety of wheat, including hard red spring and durum, can be fed to birds, although some are slightly more digestible than others. Some shrunken or sprouted kernels can downgrade wheat for use in human foods but in many cases the feeding value of the wheat will remain acceptable for poultry.

Barley and Oats - can be used to replace half of the wheat included in the poultry diets listed in this factsheet. For example if a ration calls for 600 kg of wheat, you can use 300 kg of wheat and 300 kg of barley or 300 kg of wheat and 300 kg of oats as an acceptable alternative. Oats and barley are lower in energy and crude protein and higher in fibre than wheat but are still acceptable ingredients. Unless an enzyme is added to aid in the digestion of the sticky starches found in barley and oats, young birds may have a temporary diarrhea when these ingredients are first fed. Despite this problem, oats and barley can be fed at moderate levels to birds of any age. Be careful not to feed low bushel weight cereal grains - especially oats with a high proportion of hulls.

Roasted Soybean Seed - is a good source of protein and fat for poultry. Soybean seed contains a trypsin inhibitor that can severely interfere with digestion in a bird's gut and the seed must be

heat treated to inactivate this compound. Roasting is a fairly common method of heat treating seed and roasted soybean seed has been used successfully in organic diets in Manitoba. The processing cost to produce roasted soybean seed is lower than for soybean meal. Roasted soybean seed is sometimes referred as being "full-fat" because the oil has not been extracted from the seed. Because of the high unsaturated fat content of the seed, feeding 20% or more soybean seed may produce a slight fishy taste in the poultry meat or eggs.

Soybean Meal - is the best protein source for chickens and turkeys. Unfortunately, organic soybean meal is very expensive because the seed must not only be grown organically but also be processed organically. In making the meal, the oil must be mechanically removed without the aid of the solvents used at most commercial soybean plants. The limited supply of organic soybean seed and the small number of organic soybean processors has served to increase the price of organic soybean meal to approximately four times that of regular soybean meal. Despite the cost, organic soybean meal may still be attractive, especially in turkey diets where high levels of protein are needed. Soybean meal can be included in the diets in this factsheet by removing the roasted soybean seed from the feed and adding back an amount of soybean meal equal to 80% of the formulated inclusion rate for soybean seed. As an example, in a roaster finisher diet containing 100 kg of roasted soybean seed, all of the soybean seed can be removed from the diet and replaced with 80 kg of soybean meal. Replacing the roasted soybean seed in this manner will reduce energy and modestly increase protein in the diets; the bird performance should be the same or better than the diet containing the roasted soybean seed. No soybean meal is produced in Manitoba and the cost of importing the meal can be high.

Peas - provide moderate levels of protein and starch for poultry. The protein level is much lower and quality more variable than soybean meal or roasted soybean seed. Peas are particularly low in methionine (a component of protein that is important for normal feathering and growth) and should not be used as the sole protein source for young birds. Peas, however, are readily grown in Manitoba and organic peas are sometimes available. Cull peas, which are not suitable for the human market, can be relatively economical for poultry.

Limestone - is the most common and economical source of calcium for bone development and shell quality.

Dicalcium phosphate - is one of the mineral phosphorous sources that is commonly used in organic diets. Because meat and bone meals are not allowed in organic diets, it is essential to provide a mineral source of phosphorous to promote good skeletal health. The mineral sources used in poultry diets have been acid treated to remove heavy metals that can be toxic to the birds. Untreated rock phosphates that are sometimes used as phosphorous fertilizers in organic crop production can be harmful to birds and should not be used. The feeds in this factsheet have been formulated assuming that dicalcium phosphate contains 22% calcium and 18.5% phosphorous. Slight alterations in the amount included in the diet may be necessary depending on the actual calcium and phosphorous levels in the dicalcium phosphate.

Salt - is essential for growth, production and appetite in poultry. Nutritionally, common table salt is adequate as a feed ingredient but some organic producers do not like the iodine added to it. Non-iodized salt is sometimes used and kelp is added as an iodine source; care must be taken not to add too much kelp or the birds suffer from iodine toxicity.

DL Methionine - is a concentrated form of methionine, one of the important building blocks of protein needed by birds for growth, feathering and egg production. Because animal protein by-products cannot be used and organic soybean meal is very expensive, most organic poultry diets use some purified methionine. All of the diets presented in this factsheet contain DL Methionine;

failure to add it to the diets will result in poor production, uneven flocks, and in severe cases, cannibalism.

Lysine HCl - is a concentrated form of lysine, another essential protein building block required by chickens and turkeys. The added lysine in the diets in this factsheet help to maintain normal production and are particularly important in the high protein diets needed by turkeys. Failure to add extra lysine to turkey diets can add weeks to the time needed for turkeys to reach market weight.

Vitamin-Mineral Premixes - provide a broader range and higher levels of vitamins and minerals than possible by using "old-fashioned" ingredients such as milk, green feed and fish oil. Indeed, many organic certifying organizations will not allow fish oils to be added to poultry diets even though they can be good sources of vitamins A and D. To see old style diets where no or few commercial vitamin sources were used, see the factsheet, "Poultry Rations and Feeding Methods", on the Manitoba Agriculture and Food web site. Use of a commercial vitamin-mineral mix is strongly recommended. Always follow the manufacturer's recommendation for the amount of vitamin-mineral premix to add to the feed. Some vitamin-mineral premixes contain iodine and will allow non-iodized salt to be used in the ration.

Enzyme Supplements - are mixtures of enzymes that have been produced by bacterial fermentation. These enzymes can assist the birds in digesting the sticky starch compounds found in oats, barley, and to a lesser degree, wheat. The enzymes help to reduce the variation in feeding value between different loads of a cereal grain. Some enzymes are specifically designed for use with an individual type of cereal grain such as barley while others will work well with a variety of cereal grains. These enzyme preparations are particularly beneficial in young birds because they have immature digestive tracts. The actual add rate of feed enzyme should be varied according to the manufacturer's recommendations.

Examples of Organic Diets

(Note: It is important to always check whether a diet is acceptable to a organic certifying organization. These diets will be acceptable to some, but not all, organizations.)

1) Roaster Chickens

It is recommended that the starter diet be fed for the first four weeks of age. Birds from four to six weeks old can be fed a mixture of half starter and half finisher. From six weeks to market, the finisher should be fed. Approximately, three kg of starter and nine kg of finisher are needed to produce a roaster with a live market weight of four kg or a carcass weight of 2.8 kg. These diets are designed to intentionally slow growth rate compared to commercial rations.

Ingredient	Roaster Starter, 18% Protein	Roaster Finisher (peas & soy seed), 14% Protein	Roaster Finisher (peas only), 14% Protein
	Amount, kg/tonne		
Wheat	561	760	667
Peas	250	100	293

Roasted Full-Fat Soybean	146	100	0
Limestone	14.13	14.42	14.52
Dicalcium Phosphate	18.62	15.93	16.00
Salt	2.97	2.92	3.07
Lysine HCl	0.54	0.88	0.44
DL Methionine	1.93	0.52	0.96
Enzyme[1]	0.50	0.50	0.50
Vitamin-Mineral Premix[1]	5.00	5.00	5.00
Total	**1001**	**1000**	**1000**

[1] The enzyme and vitamin-mineral premix should be added according to the manufacturer's recommendations.
Caution: This feed does not contain medication to control coccidiosis.

2) Laying Hens

The 16% protein laying hen diet should be fed from the start of egg production, through peak production, and until egg production has declined to 85% on a hen-day basis. At 85% production, the flock will average six eggs per week from each hen alive in the flock. In a good flock, the birds will remain above this production level until 45 weeks of age. The 14% protein laying hen diet can be fed after egg production dips below 85%. Both of these diets are relatively low in energy and the hens will eat more than on commercial ration. Also, in cold weather it will be more difficult for the hens to consume enough energy to maintain maximum egg production.

Ingredient	**Layer Diet, 16% Protein**	**Layer Diet, 14% Protein**
	Amount, kg/tonne	
Wheat	474	561
Peas	333	327
Roasted Full-Fat Soybean	77	0
Limestone	92	92
Dicalcium Phosphate	14.29	10.83
Salt	3.07	2.68

DL Methionine	1.60	1.47
Vitamin-Mineral Premix[1]	5.00	5.00
Total	**1000**	**1000**

[1] The vitamin-mineral premix should be added according to the manufacturer's recommendations.

3) Turkeys

These turkey diets will produce slower growth rates than commercial diets, due in part to the lower levels of soybean meal in the rations. For simplicity, only three feeds are used in the feeding program (starter, grower, finisher). Commercially, the type of ration could be changed five or six times over the life of the flock. It is important to add the protein sources used in these diets (soybean meal and seed, peas, Lysine HCl and DL Methionine); failure to provide enough protein can add months to the time needed for the birds to reach market weight.

The starter diet should be fed for the first six weeks age, the grower from six to 10 weeks of age and finisher from 10 weeks of age to market. Either the 17% or 15% protein finisher diet can be fed but the turkeys will eat more of the 15% protein finisher. A turkey will eat approximately three kg of starter, five to eight kg of grower and 12 to 20 kg of finisher. Market weight of the turkeys will have a significant effect on total feed consumption. A hen will consume 20 to 25 kg of feed to obtain a live weight of 9 kg (7 kg carcass weight) while a tom will eat 35 to 45 kg of feed to reach 15 kg in live weight (12 kg carcass weight).

Ingredient	**Turkey Starter, 26% Protein**	**Turkey Grower, 21% Protein**	**Turkey Finisher (soy seed), 17% Protein**	**Turkey Finisher (peas), 15% Protein**
	Amount, kg/tonne			
Wheat	504	656	737	603
Soybean Meal	298	150	0	0
Peas	0	0	0	361
Roasted Full-Fat Soybean	150	150	228	0
Limestone	15.91	12.18	10.70	11.17
Dicalcium Phosphate	21.00	19.02	15.23	15.85
Salt	2.90	2.75	2.70	2.91
Lysine HCl	0.91	3.22	1.02	0.00
DL Methionine	1.67	1.45	0.34	0.84

Enzyme[1]	0.50	0.50	0.50	0.50
Vitamin-Mineral Premix[1]	5.00	5.00	5.00	5.00
Total	**1000**	**1000**	**1000**	**1000**

[1] The enzyme and vitamin-mineral premix should be added according to the manufacturer's recommendations.
Caution: This feed does not contain medication to control coccidiosis.