

SQA Advanced Unit Specification

General information for centres

Unit title: Poultry Nutrition and Feed Formulation

Unit code: HW9R 47

Unit purpose: This unit is designed to enable candidates to develop the knowledge and skills to enable effective management of feedstuffs for poultry. The unit focuses on the critical aspects of avian nutrition, namely feed sources, their nutritional value and the constraints and factors influencing their selection and use in the diets of farmed poultry. The economics of poultry feed are also investigated in the context of sustainability and the consequences for the environment.

On completion of the unit the candidate should be able to:

- 1 explain the main nutritional characteristics of poultry feeds
- 2 explain the fundamental nutritional requirements of poultry diets
- 3 explain factors that influence the quality and nutritional value of poultry diets
- 4 formulate and cost poultry diets

Credit points and level: 1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this unit is at the discretion of the centre. However, it is recommended that candidates have sufficient IT skills to enable effective use of a spreadsheet package at SCQF level 4 or equivalent and an awareness of poultry production systems would be advantageous.

Core skills: There are opportunities to develop the core skills of *Numeracy* and *Problem Solving* both at SCQF level 6 and IT at SCQF level 6 in this Unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

Assessment: This unit may be assessed using three instruments of assessment. Outcome 1 could be assessed by means of a supervised practical exercise and supplementary responses. Outcomes 2 and 3 could be jointly assessed using a closed-book assessment. Outcome 4 could be assessed using a case study.

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SQA Advanced Unit Specification: statement of standards

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The sections of the unit stating the outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the main nutritional characteristics of poultry feeds

Knowledge and/or skills

- ◆ Feed ingredients
- ◆ Organoleptic recognition
- ◆ Nutritional purpose

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ using organoleptic recognition techniques, identify fifteen potential feed ingredients and explain their principal nutritional purpose within a poultry diet
- ◆ explain the value of using Metabolisable Energy (ME) and Crude Protein (CP) ratings when selecting feed ingredients and attribute a (ME) (CP) range to the previously identified fifteen potential feed ingredients

Evidence should be generated by a practical activity, undertaken in supervised conditions and candidate performance and supplementary explanatory evidence recorded on an a checklist.

Assessment guidelines

This outcome may be assessed by means of a short practical exercise with accompanying explanatory information. Evidence of practical performance may be recorded on an observation checklist.

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Outcome 2

Explain the fundamental nutritional requirements of poultry diets

Knowledge and/or skills

- ◆ Nutrition terminology
- ◆ Species and physiological state
- ◆ Nutrition requirements
- ◆ Nutritionally balanced diets
- ◆ Nutrient sources

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ explain the meaning of three nutritional terms
- ◆ explain the influence of species and physiological state on the nutrient requirements of poultry
- ◆ explain the means of meeting the requirements for a nutritionally balanced diet
- ◆ explain the derivation of ten nutrients and their function in poultry

Evidence should be generated through assessment undertaken in closed-book supervised conditions.

Assessment guidelines

The assessment of this outcome may be combined with Outcome 3. Please see further information under Assessment Guidelines for Outcome 3.

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Outcome 3

Explain factors that influence the quality and nutritional value of poultry diets

Knowledge and/or skills

- ◆ Feed management techniques
- ◆ Feed quality
- ◆ Nutritional values
- ◆ Anti-nutrient factors
- ◆ Toxins
- ◆ Feed additives

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ explain how the following feed management techniques could impact on the quality and nutritional value of ingredients and diets:
 - harvesting
 - processing
 - storage conditions
- ◆ explain the source and effects of three anti-nutritional and toxic factors in ingredients in poultry diets
- ◆ explain the use and effects of two enzymes and one other feed additive in poultry diets

Evidence should be generated through assessment undertaken in closed-book supervised conditions.

Assessment guidelines

The assessment of this outcome may be combined with Outcome 2. It is recommended that assessment could take the form of restricted and extended response questions.

Outcome 4

Formulate and cost poultry diets

Knowledge and/or skills

- ◆ Recording and presenting data
- ◆ Diet and ingredient nutrient contents
- ◆ Diet formulation
- ◆ Diet costing

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ formulate nutritionally adequate diets, for a complete production cycle for both chickens and turkeys and present the information using a pro forma spreadsheet
- ◆ price the diet ingredients and cost the previous formulated diets for specified stock numbers

Candidates will research data to allow them to calculate and present the above evidence.

Assessment guidelines

This outcome may be assessed by a case study. The case study details could require candidates to manipulate data to assist in the production, costing and presentation of nutritionally adequate diets in a spreadsheet format.

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Administrative information

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Unit title:	Poultry Nutrition and Feed Formulation
Superclass category:	SH
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History of changes:

Version	Description of change	Date

Source: SQA

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SQA Advanced Unit Specification: support notes

Unit title: Poultry Nutrition and Feed Formulation

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this unit

Poultry products (meat and eggs) constitute about 50%, by mass, of the edible products from all farmed animals on a world-wide basis. The importance of poultry throughout the world is paramount for the health and wellbeing of man. Poultry eat diets in order to maintain their health, grow, reproduce and produce products for use by man. The diets that are usually fed to poultry are generally of high quality and balanced in their nutrient content. There are considerable economic and other factors involved in the production of poultry in a sustainable and environmentally friendly manner. In order to meet the challenges of poultry production in an increasingly competitive world, feed manufacturers and poultry producers (large and small) need to be able to feed their animals in an economically effective manner while maintaining high standards of health and welfare and minimising pollution. This unit seeks to improve the understanding of the key features involved in obtaining, designing, and manufacturing diets in a manner that meets the requirements of various types of poultry in a cost effective and environmentally sensitive manner.

Outcome 1 is concerned with the visual and organoleptic identification of ingredients and components that may be found in the diets of poultry. These may include wheat, barley, oats, maize, rapeseed, peas, beans, grit, minerals, straw, soya beans, linseed, wheat bran, rice bran, sunflower meal, sorghum, molasses, lupin, tallow and many others. This outcome will assist in the development of knowledge of the key problems and nutritional characteristics of these ingredients and components. Ultimately candidates should be able to judiciously choose which types of ingredients and the quantities that can be included in poultry diets so that adverse effects on health, production, and environmental consequences are minimised. This requires an ability to accurately identify the ingredients used.

Outcome 2 provides an understanding of the fundamental nutritional principles and components in diets for poultry. The terms used to describe the composition of diets and ingredients will be introduced and guidance provided on how these are used. The terms might include: fat, protein, carbohydrate, vitamins, minerals and other related terms. The concept of requirements of birds at different physiological states and for different nutrients will be developed and also information on particular nutrients such as vitamins, amino acids, minerals and their use by the birds will be provided. The factors that influence nutritional requirements, balanced diets and the consequences of not meeting requirements and allowances should be presented and discussed. This outcome builds on the knowledge and understanding of Outcome 1 in developing an understanding of the provision and requirement of nutrients, in a balanced fashion, from a variety of ingredients.

Outcome 3 is an extension and expansion of Outcomes 1 and 2. It deals with practical factors that influence the quality and provision of nutrients in ingredients and diets. It will focus on aspects of obtaining ingredients from different sources, and aspects such as harvest and storage conditions, mixing and treatment of ingredients and diets, components such as pests, environment, additives, especially enzymes, and diet manufacture. These will be related to the availability of nutrients, the presence and development of toxins and anti-nutrients as well as methods to reduce or avoid adverse effects on the health, nutrition and welfare of the animals.

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Outcome 4 is a further development of Outcomes 1–3 and utilises the knowledge and understanding obtained in these Outcomes. The main aspect is to understand and appreciate the problems in formulating diets, and to formulate diets, in a cost effective manner for large numbers of poultry of different species. It allows the candidate an opportunity to apply the knowledge gained to design diets in a semi-automated manner after obtaining the information on nutrient contents and costs of ingredients and preparing the different phases of diets required.

Guidance on the delivery and assessment of this unit

This unit is specifically designed for use as part of a group award in poultry production and it is best studied in this context, though it would have applicability for a course specific to animal science or agricultural science. Although the unit is expected to be delivered primarily in a classroom environment, every opportunity should be sought to investigate dietary ingredients, feed-mills and poultry production facilities first hand. For example, dietary components can be identified in the classroom as part of a video presentation but could be supported by access to a wide variety of ingredients either in a feed-mill and/or in the classroom. Samples of diets and methods of storage and mixing of ingredients can be studied in a feed-mill. The provision of diets to various types of birds at different stages of growth should also be available to observe at first hand.

The assessment of the unit could consist of a mix of closed-book, supervised assessment, a practical exercise and a case study. The suggested methods could cover the requirements of recall of knowledge, interpretation of information available and the development and use of literary information by practitioners. The material in the course should be learned and then applied as well as the participants gaining knowledge of the information required and where to obtain that information.

Opportunities for developing core skills

The analysis of ingredients and the diet formulation outcome requires a significant level of competence in both *Information Technology* at SCQF level 5 where the application of a spreadsheet to help solve a problem will be an unfamiliar context, and the core skill component Using Number of the core skill *Numeracy* also at SCQF level 5. *Problem Solving*, using critical thinking to assess nutritional formulations is an important element of the unit which will be practised using a number of formative assessments. Hence successful completion of this unit would suggest the attainment of this core skills component at SCQF level 6, although there is no automatic certification of core skills or core skills components.

Open learning

This underpinning knowledge for this unit could be delivered by distance learning. Candidates will ideally require access to feed ingredients, a feed-mill and a poultry production site. Arrangements would have to be made to ensure that the assessment of Outcomes 1, 2 and 3 is delivered in a supervised environment under closed-book conditions. The assessment of Outcome 4 may be completed on-line. However, it would require planning by the centre to ensure the sufficiency and authenticity of candidate evidence.

Equality and inclusion

This unit specification has been designed to ensure there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

General information for candidates

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This unit is designed to improve your understanding of the key features involved in obtaining ingredients, designing, and manufacturing diets in a manner that meets the requirements of various types of poultry in a cost effective and environmentally sensitive manner.

Poultry products (meat and eggs) constitute about 50%, by mass, of the edible products from all farmed animals on a world-wide basis. Thus the importance of poultry throughout the world is paramount for the health and wellbeing of man. Poultry eat diets in order to maintain their health, grow, reproduce and produce products for use by man. The diets that are generally fed to poultry are generally of high quality and balanced in their nutrient content. Thus there are considerable economic and other factors involved in the production of poultry in a sustainable and environmentally friendly manner. In order to meet the challenges of poultry production in an increasingly competitive world, feed manufacturers, poultry producers, large and small, need to be able to feed their animals in an economically effective manner while maintaining high standards of health and welfare and minimising pollution.

Such knowledge is important for those who are responsible for managing poultry production on farms as well as part-time and hobby poultry keepers. It is also relevant for those in the feed manufacturing and purchasing sectors of the industry.

This is appropriate for any poultry producer who will require to design and prepare diets to meet nutritional and financial constraints.

The unit will provide you with an understanding of some fundamental aspect of nutrients, their use and composition as well as the effects of over supply and deficiencies. It may be of use in courses where nutritional chemistry and biochemistry as well as supply, availability and effects of nutrients, diets and ingredients are considered.

This unit may be assessed using three instruments of assessment. Outcome 1 could be assessed by means of a supervised practical exercise and supplementary responses. Outcomes 2 and 3 could be jointly assessed using a closed-book assessment, while Outcome 4 could be assessed using a case study.

There are opportunities to develop the core skills of *Numeracy* and *Problem Solving* both at SCQF level 6 and *IT* at SCQF level 6 in this unit, although there is no automatic certification of core skills or core skills components.