COURSE: ADVANCED FISH NUTRITION (FIS 504)
UNITS: 2
LECTURER: Dr. S.O. Obasa

1. **Advanced principles of fish nutrition;**
   - i. **Requirement for energy.**
     *Sources of energy in fish feeds.
     *Differences in energy need between fish and other farm animals.
     *The implications of feeding fish with feed that has excess or deficient energy.
   - ii. **Protein requirement.**
     *Functions of protein in fish.
     *Sources of protein in fish feeds.
     *Factors affecting protein requirement in fish.
   - iii. **Vitamins and minerals.**
     *Introduction (Definition and brief explanation of vitamins).
     *Classification of vitamins i.e. water soluble and oil soluble; macro and micro vitamins.
     *Functions of different vitamins in fish.
     *Functions of various in fish and livestock.
   - iv. **Non nutrients feed components**;
     *Introduction (Definition and brief explanation of non nutrient feed component).
     * Sources and effects of non nutrient feed components on fish.

2. **Feed formulation.**

i. Definition. Calculation of different ingredients to be mixed together to form a balance ration.

ii. Requirements of feed formulation.

iii. Different methods of feed formulation.
Pearson's square
Least cost and
Algebraic.

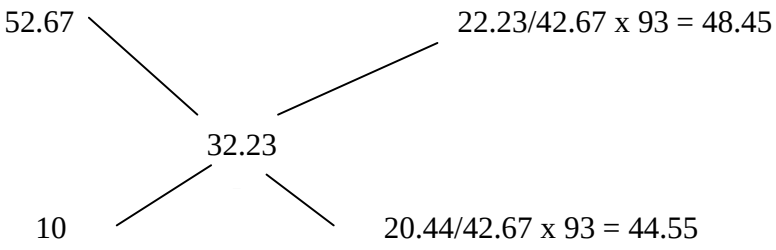
Example 3

Formulate a ration containing 30% CP using fish meal (72%CP), soybean meal (43%CP) in the ratio 1:2. Use maize (10%CP) as energy source..
(Ratios are assigned when using more than one source of nutrient). Fixed ingredients are: vegetable oil =5%, vitamin premix = 1%, di-calcium phosphate (DCP) = 0.5% and salt = 0.5%. Calculate the amount contributed by each ingredient by weight and protein.

Fish meal 72% CP Ratio 1 1x72 = 72
Soybean meal 43%CP Ratio 2 2 x 43 = 86

3 158/3 = 52.67

The target protein in the centre of the square will change due to the addition of the fixed ingredients.
= 100-5.0+1.0+0.5+0.5 = 93
= (30x100)/93 = 32.23



Protein sources contribution by weight = 48.45
Individual protein ingredient = 48.45/3 = 16.15
Fish meal = 16.15 x 1 = 16.15
Soybean meal = 16.15 x 2 = 32.30.
Maize = 44.55
Protein contribution
Fish meal = 16.15/100 x 72 = 11.63%
Soybean meal = 32.30/100 x 72 = 13.89%
Maize = 44.55/100 x 10 = 4.46%
Total = 11.63+13.89+4.46 = 29.98 or 30%