

NUTRIENT EVALUATION OF PROCESSED PEAS AND CHICKPEAS USING THE LABORATORY RAT

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Peas (*pisum sativum*) and chick peas (*Cicer arietinum*) are important sources of protein and energy for both humans and animals. However, the presence of certain anti-nutritional factors (ANFs) and the inadequacy of sulphur-amino acids (SAAs) has been associated with low nutritional value. The present study investigated the nutritional value of peas and chickpeas under the process of traditional cooking (boiling) or extrusion, a new technique being employed by food industries. The effect of complementarity between chickpeas or peas and wheat on improvement of protein nutritive value was also evaluated.

Eighty-four male Sprague Dawley rats of six weeks of age were divided into 14 experimental groups. They were fed diets consisting of extruded wheat or sugars as carbohydrate source, and casein was the protein standard in the control diets. The diets were adjusted to provide similar levels of protein (15.5%), dietary ad libitum for 21 days. Body weights of animals were recorded weekly, and body weight gain (BWG) was used as part of the assessment of nutritional value.

BWG of rats fed on chickpeas, regardless of processing methods and dietary carbohydrate source, was similar to that of casein diets (133.2g v 138.1g), and significantly greater than those on peas (101.6g, $P < 0.01$). Rats on raw chickpeas or peas had significantly lower BWG than for those on the control ($P < 0.01$). Rats on raw cooked or extruded chickpeas grew faster than those on raw chickpeas ($P < 0.01$). A similar result was also observed with the animals on peas. No difference was found between cooking or extruding chickpeas or peas.

Regardless of the processing method, a combination of chickpeas or peas with wheat significantly improved the BWG of rats compared to those on the sugar supplemented diets. The improvement was greater for rats on peas than those for chickpeas (from 76 to 127.1g for peas v from 118.1 to 148.3g for chickpeas). Although rats fed on peas plus sugar had only 16% BWG of those on control, the BWG of rats given cooked or extruded peas plus wheat increased to a level equivalent to those on casein. Rats on cooked chickpeas plus wheat had significantly higher BWGs than those on casein (161.3g v 138.1g, $P < 0.05$).

These results support the evidence that low nutritive value of chickpeas and peas is caused by the presence of ANFs and poor quality of protein. These can be improved by cooking or extruding the legumes, or/and combining with cereals (such as wheat) which are good sources of SAAs.