

# Effect of processing and storage on the nutritive value of chickpeas and lentils and their suitability for growing children

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## ABSTRACT

Chickpeas and Lentils, being economical of protein, calories, certain vitamins and minerals are an important components in the diet people of various ages. These undergo substantial quantitative and qualitative losses as a result of insect infestation during post harvest handling, processing and storage. Their suitability and acceptability by infants and children in the form of processed diet during different phases of health and disease are studied in detail.

Bold grains varieties can be milled more easily than small and medium varieties. The maximum dhal yield was observed in chickpea variety C-44 (74%). The losses of dhal yield during storage ranged from (6.4 - 19%) in different containers. The maximum yield in dhal was observed in earthen pot.

Germination is the least expensive and best way to process legumes. The initial viability percentage in chickpea variety was found in C-44 (70%) and in Masoor 85(100%). After storage, viability percentage decreased from (76 - 100%) in chickpeas and (72 - 80%) in lentils varieties.

Storage reduces the physico-chemical and nutritional qualities of legumes. There were considerable losses among physico chemical parameters including seed size, volumes, hydration capacity, swelling capacity, after storage in both varieties of chickpeas and lentils. Storage of chickpeas and lentils for 6-18 months resulted in hardening which necessitated increase in cooking time. There were losses of protein (13-28%), fats (29-78%) and ash (4.3-19.4%); and increase of crude fibre (5.0-48%) in both varieties of chickpeas and lentils after storage for 18 months. The minimum losses of various nutrient in the two legumes was found in earthen pot.

Chickpeas and lentils contain anti-nutritional factors as well including tannic acid and phytic acid which were found to decrease after storage from 13-64% in both types. Two weaning foods (Cepulac and Pulcelac) based on blend of chickpea/lentils with rice and sucrose were formulated and evaluated chemically. These milk cereal blends, 'Pulcelac' versus 'Cepulac' provided (per 100 kcal) protein (8.4 vs 8.6g), fat (0.6 vs 1.5g), carbohydrates (81.9 vs

80.2g), crude fibre (0.5 vs 1.2g), ash (0.5 vs 0.7g), Ca (28.2 vs 34.6mg), P (146.2 vs 150.2 mg), Fe (2.6 vs 2.6 mg), Na (8.8 vs 3.0 mg), K (300 vs 144.6mg), and 367 vs 368 kcal/100g. They were fed to fifty children of different nutritional status, aged 3-60 months and compared with fifty age matched control on other weaning food. The infants and children consuming Cepulac and Pulcelac showed improvement in the nutritional status and blood parameters as compared to the control. These weaning foods were found nutritionally sound, palatable and acceptable by the children.

Lactose free milk based on chickpea was developed and specially compared with 'isomil' (soy protein formula) in its nutritive value. Chickpea milk versus isomil provided (per 100 kcal) protein (13.6 vs 13.7gm), carbohydrate (77.4 vs 52.4gm), fat (2.9 vs 28.0gm), ash (1.6 vs 3.4gm), Ca (548 vs 53mg), P(258 vs 38mg), Fe (10.6 vs 9.0mg), Na (7.6 vs 24mg), K (0.8 vs 8.0mg), Mn (3.0 vs 0.15mg), Mg (338 vs 38mg), Zn (3.8 vs 3.8mg), and 389 vs 515 kcal/100gm. Chickpea milk was fed to thirty infants of different nutritional status aged (1-12) months with persistent diarrhea. There was improvement in their nutritional status and blood parameters. The children recovered from diarrhea in less than five days. No case of lactose intolerance was found. Chickpea milk proved to be highly effective in the management of persistent diarrhea.

Seven common dishes of chickpeas were prepared and analyzed chemically. They contained (8.9 - 21.1%) protein (N x 6.25), (3.1 - 21.8%) fat, (53.4 - 75.9%) carbohydrates, (1.6 - 11.1%) crude fibre, (1.2 - 5.9%) ash, (226 - 360mg) Ca, (126 -315mg), P (3.8 - 8.2mg) Fe, (1.8 - 5.4mg) Zn, (1.5 - 5.4mg) Mn, (0.6 -1.1mg), Cu, 370 - 490 kcal per 100gm. All chickpea products provided 7-23%, 7-40% and 52-78% of the total calories from protein, fat and carbohydrates respectively. The nutritional quality of all products except Halwa was adequate to meet the protein requirement of all age groups when compared with reference protein energy ratios.