Chemical ans technological studies on soybean proteins

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A comparative study ilr soyprotein isolates and protein productsproduced from defatted soymeal prepared by both cold and hot processwas carried out, and the effectof some conditions for soymeal processingon chemical characteristics of the produced soyprotein isolates wasinvestigated. Another aim of study was to improve the quality of panbread, biscuits products andbaby foods by adding defatted soyflour andsoyprtoein isolates at differellt levels to prepare well balanced, highlynutrient and acceptable foods iJr young age children. -The most important reslllts could be summarized as follows:1-Raw materials contained 8.71%moisture for soybean seeds, 8.58% fordefateed soyflour prepared by cold process and 6.58% for defattedsoyflour prepared by hot process. Protein content ranged from42.35% for soybean seeds,54.93% for defatted soyflour prepared bycold process and 50.88% for defatted soyflour prepapred by hotprocess. Ether extract rauged between 21.13% for soybean seeds,1.71% for defatted soyflour prepared by cold process and 5.41% fordeffated soyflour prepared by hot process. Available carbohydratesranged from 32.00% for soybean seeds, 36.87% for defatted soyflourprepared by cold process and 36.98% for defatted soyflour preparedby hot process. Crude fiberranged from 5.71%,5.86% and 6.54% forsoybean seeds, defatted soyflourprepared by cold process and defatted soyflour prepared by hot process; respectively. Ash content ranged between 4.51%, 6.49% and 6.73% for soybean seeds , and bothdefatted soyflour prepared by cold .and hot process; respectively.2- The optimal condition for alkaline extraction of proteins from soybeanwas at pH 9 and II followedby precipitating at a range of pH 4, 4.5and 5. 3- Optimal protein recoveryand protein yield were accomplished uponprecipitation at pH 4.5, regardless of the pH of extraction, the proteinisolates content was 9(.04%, 91.88% when pH 9 and 94.73%,93.29%, when pB;,-n in UHDSFand HDSF; respectively. 4- The total soluble sugars _ total fermentable sugars amounted to 7.22%, 8.05% and 5.090/0,5.61%in defatted soyflours prepared by hot and cold process, while tll:yreached 1.9%, 2.55% and 3.84%,4.41%in soyprotein isolates; respectively.5- Defatted soyflour prepared by cold process contained 11.46 J.U’mgoftrypsin inlnbitor acitvity and 3.27% phytic acid while that prepared byhot process was of 9.66 J.U’mgand 3.75%; respectively. Trypsininhibitor activity decreased more than 50%, while phytic aciddecreased at a per cent nearly of 90 in soyprotein isolates, preparedfrom defatted soyflours at the different used pH values of extractionand precipitation.6- The most predominant nitIogeneous component of soyprotein Wl)Sglobulins which represented 74.44 and 74.47% of total proteins indefatted soyflour and soyprotein isolates prepared by cold process,while they reached 75.44 and 75.04 in those prepared by hot process.The second fraction of total proteins was albumin containing 9.63% oftotal proteins in defatted soyflour and soyprotein isolates prepared bycold process: while it amountedto 7.74% and 8.25% in those preparedby hot process, respectively. Non protein nitrogen fraction showednearly similar values in both defatted soyflour and soyprotein isolateseither prepared by cold or hot process. No significant difference couldbe observed in prolamin and glutein per cent of total proteins, in bothdefatted soyflour and soyprotein isolates prepared by cold and hotprocess. 7- Higher solubility of protein isolates prepared from cold defattedsoytlour than those of heated was observed. 8- The effect of addition of soyflour as well as soy isolates to wheatflour at the various levels of supplementation on the rheologicalproperties of wheat dough was evaluated using Barbender Farinographand Extensograph.9- The addition of either of DSF Or SPI at levels of 5, 10,

15 and 20%resulted in a remarked increase in crude protein and ash contents ofbiscuits and pan bread products, however, it resulted in decrease inboth fat, fiber and carbohydrates.10- Physical properties of biscuits and pan bread product supplementedwith 10%DSF or 5% SPI and 10% of eitll’€rDSF or SPI; respectively,revealed higher scores which were nearly to that of control.11- All blends of the suggested formulas of baby foods contained therequired amounts of protem. fat, carbohydrates, ash and fiber.12- Organoleptic evaluation of baby food blends supplemented witheither DSF or SPI revealed that the suggested blends containing 35%DSF and that of 10% SPI, obtained the highest scores. 13- The predominant amino acids in biscuits and pan bread productswere glutamic acid followed by aspartic, however, the neutral aminoacids comprised the major part in biscuits and pan bread products.14- The lower values for methionine and cystine indicated tlJat sulfuramino acids constituted the smallest fraction in the total amino acids of both defatted soyflour and soyprotein isolates. 15- Soyprotein isolates exhibited higher amount of total amino acids than defatted soyflour.16- The ratio of essential amino acids to total amino acids wasunchanged for biscuits product, while this ratio was slightly changedfor pan bread product.17- Soyprotein isolates showed higher values than defatted soyflour ofessential amino acids, chemical scores, protein efficiency ratio, andbiological values. 18- The addition ofDSF at levels 10% or SPI at levels of 5% and 10% DSF or SPI; respectively in both biscuits and pan bread products,resulted in an increase in values for raffinose, stachyose, sucrose andgalactose in addition DSF than SPI.19- The effect of addition of 5% and 10% DSF or SPI to the quality ofsoybean products (biscuits and pan bread products) markedlyincreased the mineral contents such as iron, manganes, zinc, copper,sodium, calcium, potassium and phosphorus. 20- The addition of DSF or SPI to the prepared baby food blends,showed a marked increase in mineral content.