Studies on by-products of some vegetables processing

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In this i:Ivestigation, utilization of two vegetablecrops by-produotis were studied. The first one was thewater-melon (Ci,t;rullus vulgaris) oultivated by NobariaSeeds Companyto produoe the see ds • The by-product oftb.e crop resembles about 9810. The other one was thegreen peas (Pisl~ sativum) whioh is one of the mostimportant vegeta.ble prooessing orop in Egypt and itsby-proC1.u:Jtresembles about 50% •The objeotive of -,;hese scudte s ino luded thefollowing items::Chemical co~positi0n of raw materials.SCP produ~tion by fungal growth (Aspergillusniger and TriChoderma Viride) from water~elonjuiCe and hydrolyzed peas pee1Cake (the residueafter jui(;e extraction) .•Protein Concentrate from green peas peel juice .•Pectin froJl water-melon peels.The obtained results Could be summarized asfollows:I - Chemical Composition of raw materials:1- The total solids content of water-melon juice(6.7~%) was closely near to that in peel (6.87%).”. ’----~ ~- -----Mos~ of the total solids were soluble. Totalsugars were the main constituent of both juice(5.3EI,%) and peel (3.01%).2- Green peas peel contained high percentage oftotal solids (a::L93J6). To”’:ialcar-bohydr-aties ,crude pr otiet.u , crude fiber, ether extract andash represented 64.74, 11.90, 17.07, 1.28 and5.01% r-e spectiIve Lv,II - ECP production by fungal growth (Asp. niger andTrich. yiride).A- SOP pr oduct Lon fro:n water-melon juice.1) The optimum pH of Trich. viride was 5.5.2) Sugar concentration 2%was tr he suitable concentrationusing incubation period of 4 days inCase of Asp. niger. The suitable sugarconcentration was 2%with incubation periodof 6 days in case of Trich. V iride.3) The suitable inoculum. volume was 15% for bothAsp. niger and Trich. viride for 6 days incubation.4) The best concentration for usi.:lg urea as anitrogen source was 0.2~ for .Asp. niger and0.0’7% tOr Trich. Viride.5) Ammon:Lumsulphate was the s”’..litable nitrogenaour-ce after 6 days Lncubat Lon in Case of ~niger while it was annon fum sulphate and ureamIxtrur-e (1:1) in Case of Trich. V’iride after6 days incubation.B- SOPpr oductn,on from hydrolyzed peas pee 1 Cake.’1) The suitable sulphuric ac Ld concentration toCarry out acid hydrolysis of pe as peel cakewas 0,,5 N. under 1.5 atmospheric pressure.Trich,~ Viride has failed to grow on hydrolyzedpeas pee 1cake t while Asp. niger revealedsuccess.2) The bestr inoculum volume for AS1). niger was 10%’4) The hi.ghest pro”’;ein yield (0.04.81 gm/gmsubstrate)was obtained after 6 days incubation,-using the mixture of ammonium s”o.llphate andurea (1:1).0- Amino ac ids pattern of SOP.1) The amino act.ds Composit ion of botrh Asp. nigerand Trich Viride was at least 17 amino acidsfor the first microorganism and 18 amino acidsfor the second one.2) The amino acids .proportion of Trich. ’Vir-idewas h:Lgher than that of ~ niger.3) The largest pr::>portion of amino acids wereglutamic acid, aspar anrc ac td , tyrosine,glycuLe, alanine and leuCine. The lowestamounts were the sulphur containing aninoacids (methionine and c 7stine) •111- Protein concentrate from green peas peel juice1- Yield and qualityJf unfractionated proteinConcentrate precipitated by heat at 80°0 ford) min. were higher than both of chloroplasticprote in. extracted by heating at 53° C f or- 3J min.and cb.loro?lastic protein extracted by coolingdown to 10°C fo~ 4-hours. The unfracti onatedpro te ill concentrate yie ld was 21.11]%. Itcontained : 34-.933% crude prate Izi , 8.414%asb , 0,.”5J % cr-ude fiber, 4.508 % ether extract,97.016 mg/100 gm chlorophyl A, 28.284 mg/IOOgmcb.lorophyl B and 41.188 mg/100 gm c-ar orenoids •2- The iSCI-electric point of trhe cytoplasmicprote tn , obtained fro:n. supernatant afterextracting the chlor0.i?lastic protein by coolingat 10° 0 for 4 hours, was 4.3- OytopIasmrc prote in yield. precipitated by eitherac i.d

(1.399%) or heat at 80° C for 3) min.(1.6.':)1%) was lower than that obtained byunfractionated (21.111%) or ch-lorop1asticpr obetn extracted at 53°0 (18.586%) or 1000(15.602%). On the other hand cytoplasrnicpr ate in cant ained higher crude prote in (57.95 %and 5:4.74% for ac i'i and. he at Perc ipitationrespective~i)-, than that obt;abed by unfractionated(34.933%) Or chloroplastic proteillextra.cted at 53°0 (28.865%) and 100e (32.144%).4- Amino ac Ld.s c OiJ1posL:ionof unfractionated andchloroplastic pr:Jbeins extracted by eitherheat at 53°0 or lOe 0 were well balanced andcontained high level of most e saen-r La.L aminoac ids. They were lower in sulphur cant am ingamino ecLds ; methionine and cyati.ne.5- Oa, K, Ph, Fe and Mg were determi:.:led inunfraGtionated, chloroplasti~ and cytoplasmicprete In concen-:;rate froin. peas peel jUice, andcompar-ed with recomended adults allowance inU.K. Hundred grams of protein concentratecoverEtd '1;heGa and Fe daily requirement. Theyalso (~o:;'J.taineda fair amount of Mgwhich coversabout half t:J.:9human daily requirement.IV - Pectin from water-.i:DBIon pee 1.1-Fract Lons of water~elon pectin.Water soluble pectin in pretreated solar driedpee 1 (5 Oaking in hot water at 20°0 for 10 min ,bef or-s drying) was low3r than. both of fresh peeland se lar dried peel. Most of the pectin inwater-melon peels was in the form of ammoniumoxalate 5·) luble pectin.2-Effect of extract ion me'~hods on the yield ofpec t inThe extraction of Pectin from water-melon peelsby ammoniumoxalate 0.5% at 80°0 for 1 hour,Hcl 2% at 80°0 fOI' 1 hour, citric acid 4% at80°C for 3 hours and tartaric ac t.d 4% at 8000for 3 'aour-s gave yield of 10.33, 4.04% , 4.099%and 9.14% respectivel;r.3- Effect of ammoniumoxalate concentration andextrac":;ion tem;erature on pectin yield.Increasing temperature from 00, '90 to 10000was aceompanied by high significant increasingin pec1;i.n yield. There were no significantdifferences between 0.5%, 0.75% and 1.0%ammoniumoxa.Latie Concentration. Interactionbetween temperature and ammoniumoxalate concentrationwas not sig:2ificant.4- Effect' of extraction tiempe r atrur-e on quality ofpeccin obtained from solar dried peel andpretreated solar dried peel compared withcommarct a.L apple pectin.A-Chemical 'Z'J:'opertie s:Increasing extraction temperature of pect infrom 80 to 1000 C was accompanie'i by increasing yielcl~-,ash % and r-e dic i.ng powe.r-; In co~trast it .led todecrease 311hydrogalacturonic acid A.G.A. % ,methoxyl % and acetyl% in both solar dried andpretreated solar dried water-melon peel pectin.Generally pretreated so lar dried peel pectin washigher in A. .G.A. % and methoxyl % and lower inash% and zedac tng pOWerthan solar dried peelspectin. Commgrcial apple pectin was lower inA.G.A.% and ash%.#while higher in.reducing powertQan water-melon pectin.B- P'aysical. properties:Increasing extract ion temperature of Pectin from80 to 100 led to Incr-e ase the .c olor of dry pectinand pH of 0.5% pectin so lution.. While it led todecrease the molecular weight, jelly grade, opticalrotation of pectin and flow time of 8.1 and 0.2%pectin soJ.uti ens in both solar dried and. pretreatedsolar driE~d water-melon peels pectin. The appearanceof all 0 .;i % pectin solutions was turbid. Thephysical properties of water-melon pectin was in thesame range: of conmer-c i al app18 pac tin •It was r-e commendedto extract pectin at BOca forone hour from pretreated aoLar dried. water-melon peels.