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PROGRESS REPORT

UPDATED CONSTRUCTION STATUS OF " LABANYA ", CLUSTER OF TEEN KANYA

As on 16/05/2019

SL No	PARTICULARS	% Of Compltion			Remarks
		Tower -1	Tower- 2	Tower- 3	
1	Foundation	100%	100%	100%	
2	RCC 1st Floor Slab	100%	100%	100%	
3	RCC 2nd Floor Slab	100%	100%	100%	
4	RCC3rd Floor Slab	100%	100%	100%	
5	RCC 4th Floor slab	100%	100%	100%	
6	RCC 5th Floor slab	100%	100%	100%	
7	RCC 6th Floor Slab	100%	100%	100%	
8	RCC 7th Floor slab	100%	100%	100%	
9	RCC 8th Floor slab	100%	100%	100%	
10	RCC 9th floor slab	100%	100%	100%	
11	RCC 10th Floor Slab	100%	100%	100%	
12	RCC 11th Floor slab	100%	100%	100%	
13	RCC 12th Floor slab	100%	100%	100%	
14	RCC 13th Floor Slab	100%	100%	100%	
15	RCC 14th Floor slab	100%	100%	100%	
16	RCC 15th Floor slab	100%	100%	100%	
17	RCC 16th Floor Slab	100%	100%	100%	
18	Roof Slab	100%	100%	100%	
19	Abiove Roof slab	100%	100%	100%	
20	Brick Work	100%	100%	100%	
21	Inside Plaster	100%	100%	100%	
22	Flooring (only tiles)	98%	98%	97%	Except stair case
23	Door Frame Fixing	100%	100%	100%	Except ground floor
24	plumbing (excluding fittings)	100%	100%	100%	Except T3/SA
25	Electrical work -Chase cutting, DB fixing, wire pulling	100%	100%	100%	Swich cover fixing completed 40% at HIG-T3
26	IF from 2nd to 6th Floor				
27	IF from 7th to 15 th Floor				
28	Supply and Erection of Lift	95%	95%	95%	
29	Outside Plaster	100%	100%	100%	
30	Outside Painting/Primer	75%	75%	75%	
31	POP	98%	98%	98%	
32	Collapsible Gate	100%	100%	100%	
33	Balcony Railing Fixing	100%	100%	100%	
34	Alluminium Work	98%	99%	99%	
35	Ready Handover				

Master Test Plan

1. Introduction

   This document is the Master Test Plan (MTP) for the giv2giv project, introduced at the conclusion of the 10th iteration.

   1. Document identifier

      Introduced February 25, 2013 by the giv2giv student developer group at the University of Virginia (composed of Rebecca Boswell, Mark Cheung, Loren Fryxell, Douglas Milvaney, Eric Tsai, and Jason Ya).

   2. Scope

      The purpose of this test effort is to cover the efforts to be made during alpha and beta testing of the giv2giv product, done in collaboration between the student team and the customer. It is assumed that the project will not have reached full functionality by the beginning of this testing phase and will likely not have completed development by the end of the testing efforts. Testing efforts will focus on the minimum requirements and also test the desired/optional features that have been implemented (Reference 1). Testing will begin with component testing on individual aspects of the system (e.g. log-in, charity selection, etc.) and continue with acceptance testing for overall system functions, similarly to the fashion in which development was done.

   3. References

      1. "Service Learning Practicum Requirements Document: giv2giv" (available on collab)

   4. System overview and key features

      Available in requirements document (reference 1).

   5. Test Overview

      i. Organization

         Testing is set to begin concurrently with development until the end of iteration 12 (March 25th) at which point development will cease and the focus will shift to testing (iterations 13-15). Issues raised during testing will be brought to the customer's attention and discussed with the development team.

      ii. Master test schedule

         During the alpha testing phase, individual components should be tested with "on-the-fly" development as they are worked on by the team. Once the beta testing phase is reached, components will be subjected to acceptance testing using requirements testing where a

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Business Plan Template

Executive Summary
• Mission of the Company (e.g. Purpose /Unique Selling Points)
• Summary of Market Opportunity (e.g. problem solved/market size/trends)
• Summary of key aspects of the Company (people, finance)
• Summary of Vision of the Company (5 years hence)

Company
• Who you are
• Where are you located
• Is it a spin-out or a start-up?
• What stage is your spin-out process? Are you supported by the technology transfer office.
• What you plan to sell
• To whom
• Company structure/ownership (if applicable)
• Any relevant history

Product and Services
• Unique Selling Proposition – what is different about this product or service and what problem does it solve
• Intellectual Property Position – ownership, how it will be protected (patent, trade secret, design right, copyright etc), freedom to operate (results of a patent search)
• Sustainable competitive advantage – what will stop the competition catching up
• List of minimum performance requirements expected by the market place
• Current stage of development and product/service development roadmap

Market Opportunity
• Estimated size of market and targeted market segment
• Target market share
• Geographical market segment (UK? World wide?)
• Drivers for change to this product or service - why the status quo is not acceptable
• Key potential customers identified and initial feedback from these on the
• product or service
• Competitors

Marketing/Sales
• Route to market
• Barriers to entry
• Potential price and profit margin
• Comparison of target price of this product or service with competition, with reasons for any expected differences
• Projected sales volumes and value over first 5 years of operation.

Team
• Executive team: roles
• Non-executive team
• Track record
• Gaps & Future recruitment

Progress/Status Report

In general, the purpose of a report is to provide information; although some reports (such as progress or feasibility reports presenting "bad news") may also contain elements of diplomacy. Normally, this type of report would be fairly informal. To practice creating more formal reports, however, I'd like you to be as descriptive as possible. Your report should contain the following elements:

1. **Heading**
   - Date
   - To
   - From
   - Subject (include the topic about which you are reporting and the reporting interval date -we will pretend this is a weekly report).
2. **Introduction (overview, background)**
   Objectives. These can include the following:
   - Why are you working on this project?
   - What problems motivated the project?
   - What do you hope to achieve?
   - Who initiated the activity?

   Personnel. You may add a team of fictional collaborators or simply present this as your own work.
   Previous activity. If this is the second, third, fourth, etc., report in a series remind your readers what work has already been accomplished. In this case, pretend that this is the second weekly report you've submitted on the instructions' manual.
3. **Discussion (findings, body, agenda)**
   Work accomplished. Using subheadings, itemize your work accomplished either through a chronological list or a discussion organized by importance.
   Work remaining. Tell your reader what work you plan to accomplish next. List these activities, if possible, for easy access. (Read the remaining material on this section in your text, p. 360).
   Problems encountered. Inform you reader(s) of any difficulties encountered. Assure your reader, though, that despite any problems you will be on schedule (you can "dream on" about projecting any delays in completing the manual on time ☺).
4. **Conclusion/Recommendations**
   Conclusion. Sum up what you've achieved during this reporting period and provide your target completion date.
   Recommendations. If problems were presented in the discussion, you can recommend changes in scheduling, personnel, etc., which will help you meet your deadline.

Your Progress Report is due:_____. Your report will be evaluated on the following criteria:

- Content
- Design
- Completeness
- Clarity

London City, 040605 Second Edition Thursday, 10 September 1981

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Stock Markets Increase 42% with increase of production of TriFOil Page 2

TRIFFIDS ATE MY DOG! VICAR CLAIMS! PLANT CAN WALK AND EATS MEAT! FULL STORY CENTRE PAGES

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The class of synthetic polymers includes polyethylene (PE) (used in plastic bags), polystyrofoam (PS) (used in styrofoam cups), polypropylene (PP) (used in fiber and bottle), polyvinyl chloride (PVC), and polytetrafluoroethylene or Teflon (PET) (used in food packages, bottles and drain pipes) [1]. Meanwhile, semi-synthetic polymers are obtained from natural polymers by subjecting them to a chemical process; this includes natural materials which have been modified and combined with other materials. An example of this is cellulose acetate, a reaction product between cellulose and acetic anhydride used to make films [2]. The plastics are made of carbon and hydrogen. In addition, the plastics can contain other elements, such as sulfur, silicon, chloride, fluorine and phosphorus. Plastic is manufactured in various forms and is a material that can be adapted for many different applications. In addition to the cheap production process, this suitability, combined with a variety of beneficial properties such as light, durability and flexibility has led to widespread use in todaye¢ÃÂÃs society. As far as product packaging is concerned, packaging plays a role in product holdings and food safety for the food industry [3].All plastics can be divided into two main categories, thermosetting and thermoplastics, according to their reactions to heating [4]. Thermoplastics are plastics that can be melted and molded by heating, and when cooled, take the shape in which they were formed. If the formed thermoplastic is reheated, it softens and melts again. Known thermoplastics are polyacrylates, polyesters, polyolefins, polyamides, etc. These polymer materials are used to produce packaging, disposable utensils, carpets, laboratory instruments, clothing and other goods. In contrast to thermoplastics, ed olcic o etnarud odivrosba 2OC olep odarbiliuqe ©Ã socits¡Ãlp ed megalcicer e osu ,otnemassecorp o etnarud oditime 2OC o euq zev amu ,onobrac ed odix³Áid ed latot oirbÃliuqe o etnemlaicnatsbus iunimid megadroba atsE .sobma uo siev¡Ádargedoib ,siev¡Ádargedoib siairetam omoc sodinifed o£Ãs socits¡Ãlpoib sO .ocits¡Ãlpoib rizudorp arap ocits¡Ãlp ed o£Ã§Ãacirbaf an]01,9[ogas ed odima e]8[ovo ed acnarb anÃetorp ,]7[net⁹Ãlg ,siategev soel³Ã e sarudrog omoc siev¡Ãvoner e siarutan siairetam rasu a uo§Ãemoc airts⁹Ádni a ,etnemetneceR .]6[siamina ed seµÃhlim ed etrom Ã avel e olos od edadilitref a zuder ,etneibma o iulop e ametsissoce osson me artne otsopmoced o£Ãn ocits¡Ãlp O .sadalenot ed seµÃhlim 033 ed siam arap sadalenot ed o£Ãhlim 5,1 ed ,0591 edsed ona adac a otnec rop 6,8 me es-uidnapxe ocits¡Ãlp ed labolg o£Ã§Ãacirbaf a ,]5[6102 ed acits¡Ãlp airts⁹Ádni ad oir³Ãtaler mu moc odroca eD .ocits¡Ãlp ed soudÃser ed edaditnauq emrone amu ed o£Ã§Ãalumuca Ã avel odazilareneg osu ues ,otnatrop ,e o£Ã§Ãadargedoib Ã setnetsiser o£Ãs socits¡Ãlp siat ,otnatne oN .oel³Ã uo larutan s¡Ãg omoc ,siess³Ãf socimÃuqortep ed ritrap a sodazitetnis o£Ãs sonredom socits¡Ãlp sod airoiam A .]2[acimrof me sadaesab ahnizoc ed sadacnab me sadasu odÃedlamrof-animalem saniser e ordiv ed arbif ed sotudorp me sodasu sodiuqÃl serets©Ãilop o£Ãs o£Ã§Ãarugifnocomret ed saniser ed socipÃt solpmexE .sodamrof marof euq me amrof an o£Ãrecenamrep sam ,reterred uo receloma o£Ãri o£Ãn sele ,sodiceuqaer merof sodagilretni o£Ã§Ãarugifnocomret ed socits¡Ãlp so eS .lev⁹Ãlosni e levÃsufni eder amu rizudorp arap soremÃlop ed saiedac ertne adazurc o£Ã§Ãagil amu mairc euq sacimÃuq seµÃ§Ãaer me atluser aruc A .rodecerudne moc aniser ad o£Ã§Ãaer alep odareg ©Ã sezev satium euqrop ,etnemanretxe odacilpa res asicerp o£Ãn rolac O .)renedrah(serodasilatac ed o£Ã§Ãida a moc adivomorp res edop e o£Ã§Ãaidar uo rolac rop adizudni ©Ã aruc A .saicam sadiuqÃl uo sadil³Ãs saniser ed aruc rop sodicerudne etnemlevisreverri o£Ãs socits¡Ãlp of the plant. In addition, oil, at an ever-increasing price, being replaced by renewable raw materials of agriculture, is very much, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er,(petr). In addition, nanomaterials such as nanoclay were used to improve the thermal stability of starch-based bioplastics [17]. According to harunsyah et al. [18], a bioplastic made of manioc starch, clay nanoparticles, and plasticizing glycerin exhibited intriguing mechanical characteristics such as transparency, clarity, homogeneity, flexibility and ease of handling. In addition, the interfacial bond between the bioenchiment and polymer matrix influences the characteristics of the polymer matrix. It was found that bioenchiment-reinforced polymer compounds have higher mechanical characteristics than unfilled polymer [19]. Therefore, this article provides some information about various approaches to the study of bioplastics and biocomposites, especially in food packaging applications. This review article also focuses mainly on exploring all possible natural fibers for implementation in the bioplastic industry through sustainable engineering technology. most researchers classify a material as bioplastic if it is bio-based, biodegradable u both [12]. Furthermore, there is also a definition of bioplastics as polymers that can be decomposed into co2, h2o and inorganic compounds u biomass, mainly through the enzymatic effects of microorganisms. in fact, the bio-based term refers to products that are derived from biological material made from biomass. This means that the phrase "based on bio" refers to materials u products that are made entirely u partially of renewable resources (biomass); for example, in common plastics, petrochemical resin is replaced by animal polymers u vegetables, and compounds like carbon u glass fiber are replaced by natural fibers such as wood fibers, hemp, flax, sisal and jute [15]. according to geueke [20], the sovitatnemref sovitatnemref sossecorp me somsinagrorcim rop sodareg uo)esolulec e odima ,olpmexe rop(assamoib ad etnemateria sodÃartxe o£Ãs hin the hin the horn) P. nobrac etairporppa et r gnisu)AHP(setaonaklayxordyhylopAlgae biomass, as well as industrial or municipal waste [22]. Meanwhile, biodegradability is caused by biological processes during composting and produces carbon dioxide, water, inorganic compounds and biomass at a rate similar to that of other known compostable materials and leaves no other recognizable or dangerous residues [23]. Similarly, compostable plastic is biodigrade in industrial composting facilities and must meet rigid standards [24]. Most bioplastics are renewable materials. Therefore, bioplastics are biological materials. Non-bioplastics are known to be oil-driven plastics [25]. Bioplastic materials can have a wide range of biodegradability percentages and can be obtained from a wide range of renewable and non-renewable sources; Therefore, numerous classification systems based on different criteria were developed to separate them. Some plastics can be made with the same polymer chains using renewable resources. The terms of renewable resources are resources that can be used several times when they are replaced naturally. For example, using agricultural products and microorganisms, fermentative biotechnological processes can produce poly -hydroxyalquanoates (PHA) and lactic acid (matters - raw for PLA) [26]. So, PHB is a natural polymer produced by many bacteria as a means of storing carbon and energy. As can be synthesized from low-cost raw materials and polymerizations are carried out under light process conditions with minimal environmental impact, this polymer has aroused the interest of researchers and companies worldwide [27]. In addition, other resources are considered renewable, but time or commitment are necessary to renew them (e.g. wood, oxygen, leather and fish). Many useful metals can alsorenewed. In this essence, renewable resources are infinite reserves such as solar energy, eial energy and geotic pressure. A renewable resource is a that that is depleted faster than it can be replaced. It has a limited quantity. Most fossil fuels, minerals, and metal ores are nonrenewable resources. Even if precious metals are not naturally substituted, they can be recycled because they are not destroyed during their extraction and use [28]. Instead, metal oxide-based nanoparticles, such as calcium carbonate, have typical metal resistance characteristics. In recent years, researchers have opted to combine the flexibility of plastic with the mechanical strength of inorganic oxide to create a material that is extremely adaptable and suited to forming various forms of packaging [29]. The bioplastics that arise are chemically identical to their fossil counterparts. PET, for example, short for polyethylene terephthalate, which is used to make most bottles, can be manufactured from fossil fuels or plants such as sugarcane. The final substance is the same [30]. The European EN 13432 standard is one of the most well-known standards of biodegradability [31]. As shown in Figure 2, if the product meets the standards, it will be labelled as a compostable product.It can be inferred from the study that bioplastics made from bio-based polymers can be categorized under two terms, either biodegradable according to the existing standard rules and referred to as compostable material, or another class of biodegradable bioplastic that does not conform to the established standards and is labelled as non-compostable material. However, there is another degradation process that is known as oxo-degradation. These oxo-biodegradable products do not degrade under the aforementioned standards and are not actually biodegradable or compostable (Figure 3). For example, polyolefins such as polyethylene (PE) and polypropylene (PP) are the major components of oxo-biodegradable plastics, which also contain chemical additives to speed up degradation, where the above-established standards do not apply to Pons [32]. The polyolefine degradation process is separated into two steps. The first step involves oxygen reaction in the air with the polyth. The dorsal carbon spine of the polony is oxidated, resulting in the creation of smaller molecular fragments. Ability processes are used at this initial phase of oxo-degadaion. In this phase of oxo-bodigadaion, the oxidative degrading of the polish can be accelerated by the ultraviolet light (UV) (photodegradaion) or by the treated degradation using heat along heat of time. The second step involves biodegradation of oxidation products by microorganisms (bacton, fungi and algae) that devour the oxidized carbon spine fragments to produce CO2, H2O and biomass [33]. In poorly, the patterns used for plastic biodegradability are obtained through the ecological label scheme syrim, and include the eco 001/2016, ECO 001/2018 and ECO 009/2016. These products are certified by the Sirim Standard and Industrial Research Institute. Sirim Eco 001: 2016 CRINTIONS REFER TO ALL PLATE SHEETS AND FILMS IN THE FOOD OF BAGS OR PACKAGING MATERIALS, WHILE SIIR ECO 009: 2016 CRITURNS APPLIES and composite biomass base used for food and packaging purposes [34]. However, most traders in Kuala Lumpur still continue to use oxo-bodegradable bags because they are cheapest; Only a small percentage of tents and sun stores in the city have moved to totally biodegradable plot bags. In addition, there are also some traders who have also opted for cheaper photodegradable plastic instead of oxo-bodegradable plastic bags. Photodiable plastic can be disintegrated in smaller parts when exposed to sunlight, while oxo-bodegradable fragment into smaller pedajacies and contribute to micro-physical pollution [35]. Figure 3. in biodegradable plastic categories vs. composable vs. oxo-degradables: (a) ,edadilibadargedoib atla moc socits¡Ãlpoib ,)sesem sies ed sonem(atruc siam litºÃ adiv moc sotnemila arap ,olpmexe omoC .sotnemila ed snegalabme me edadivegnol aus arap sianif sosu sues moc odnatnoc

,aroga ©Ãta ,o£Ãs socits¡Ãlpoib so ,]73[oahZ rop odataler emrofnoC .oremÃlop od o£Ã§Ãadarged a odniulcni ,latneibma o£Ã§Ãadarged an siaicnesse serotaf o£Ãs oinªÃgixo e edadimu ,arutarepmet ,Hp ,ossid m©ÃlA .o£Ã§Ãadargedoib Ã sievÃtecsus siam etnemlareg o£Ãs saxelpmoc sonem seµÃ§Ãalumrof e roirefni onilatsirc ,satruc siam saiedac moc soremÃlop ,]83[naidamE moc odroca eD .]73[soremÃlop ed alumr³Ãf ad edadixelpmoc e onilatsirc ,soremÃlop ed aiedac ad otnemirpmoc ,olpmexe rop ,ocits¡Ãlpoib od acimÃuq e acisÃf aruturtse alep adaicneulfni ©Ã socits¡Ãlpoib ed o£Ã§Ãadargedoib ed edadicapac A .setneibma setnerefid me snumoc siam socits¡Ãlpoib sod snugla ed edadilibadargedoib e edadilibatsopmoc a artsom 1 alebaT A .)edadilibadargedoxo e edadilibatsopmoc ,edadilibadargedoib ,olpmexe rop(socits¡Ãlpoib ed o£Ã§Ãinifed an sadasu evahc-sarvalap s³Ãrt sa etnemaralc rednetne ,ragul oriemirp me ,oir¡Ãssecen ©Ã ,otnatroP .]63[seµÃ§Ãidnoc sasse raredisnoc meved serodimusnoc so ,osu od lanif on socits¡Ãlpoib sneb ed ropsid e sadamrofni arpmoc ed seµÃsiced ramot araP .airogetac adac ertne sa§Ãnerefid sa raredisnoc meved saserpme sa ,atsuj amrof ed e etnemeterroc sneb sues rednev araP .socits¡Ãlpoib sneb ed o£Ã§Ãanimile ad atart es odnauq etnemralucitrap ,sacif³Ãrtsatac seµÃ§Ãacilpmi ret edop ,setse omoc ,seralupop socits¡Ãlpoib somret me o£Ãsufnoc A .somin´Ãnis o£Ãs o£Ãn sarvalap satse ,siev¡Ãibmacretni sezev satium arobmE .azetrecni ad latnemadnuf asuac amu ©Ã oxo od o£Ã§Ãadarged a e edadilibatsopmoc a ,edadilibadargedoib a ertne edadirapsid A .]63[ed sodatpada sodaD .lev¡Ãdarged-oxo)C(e lev¡Ãtsopmoc)B(,lev¡Ãdargedoib)A(:siev¡Ãdarged-oxo .sv siev¡Ãtsopmoc .sv siev¡Ãdargedoib sacits¡Ãlp sairogetac me ocif¡ÃrG .3 arugiF .]63[ed sodatpada sodaD .lev¡Ãdargedoxo)C(e lev¡Ãtsopmoc)B(,o£Ã§Ãarud roiam moc sotnemila arap euq otnauqne ,sodasu res medop ,esolulec ed socits¡Ãlpoib e odima sod edadilibadargedoiB .1 alebaT .]93[setnatropmi o£Ãs o£Ãn arierrab ed sedadilauq sa e ,seµÃ§Ãacilpa satrec me)sodarufrep(EP meutitsbus odima me sodaesab semlif sO .sarpmoc ed socas omoc meb ,)atruc siam litºÃ adiv(saruonec e satatab ratocapme arap sodairporpa o£Ãs siairetam sessE .sievÃxelf etnemamertxe res medop sele ,TABP o omoc ,sievÃxelf serets©Ãilop mªÃtnoc odima ed semlif so odnauQ .aicnªÃrapsnart ed edadissecen ¡Ãh o£Ãn euq me seµÃ§Ãautis meâå sodasu o£Ãs selE .)esolulec moc o£Ã§Ãanibmoc me arierrab ed semlif ,olpmexe rop(megalabme ed siairetam me sodanimal e sadamaconom omoc sodazilitu o£Ãs e)setnerapsnart o£Ãn(sodicºÃlsnart res medop odima me sodaesab semlif so ,]04[,tnomavoN moc odroca ed ,o£ÃtnE .ocin¢Ãgro oxil od odal oa sadatsopmoc res medop sairodacrem sasse euq ©Ã oicÃfeneb O .etropsnart ed salocas e sedrev soudÃser ed oxil ed salocas ,o§Ãivres ed so§Ãivres ,)gnihclum semlif(salocÃrga sotudorp omoc ,siev¡Ãdargedoib seµÃ§Ãacilpa me sodazilitu o£Ãs odima me sodaesab socits¡Ãlp so ,ossid m©ÃlA .]93[mottoB- sasloB odarbadauq uo pu-dnats ,sonalp me sodahlurbme siam zev adac o£Ãs euq ,)agnol litºÃ adiv(soruodarud sneti ed megalabme an adazilitu ©Ã euq zev ariemirp a ©Ã ,sona ¡Ãh socserf sotnemila ed snegalabme me odasu odis ahnet ALP emlif o arobmE .sadasu o£Ãs xoLA uo xOiS saigoloncet sa odnauq uo arierrab ed siairetam moc sodanimal me sodazilitu o£Ãs ALP od semlif so odnauq edadilibatsopmoc a odnetnam ,)©Ãfac e satirf satatab odniulcni(seµÃ§Ãacilpa ed amag alpma amu arap arierrab ed sedadilauq saob moc siairetam rizudorp levÃssop Ã .artxe arierrab ed siairetam ed o£Ãsulcni a mes sodagnolorp sodoÃrep rop sodanezamra o£Ãres euq aug¡Ã Ã sievÃsnes sotudorp ed megalabme a arap odauqeda ©Ã o£Ãn ALP o ,otnatne oN .)sona ocnic ©Ãta(agnol adiv ed sotnemila meâå sodasu res medop ,ALP o omoc ,siev¡Ãlcicer o£Ãs e radargedoib arap opmet otium mavel euq socits¡Ãlpoib e ,)ona 1 etnemadamixorpa(ââ sodasu res medop ,AHP o omoc ,socits¡Ãlp sO in different environments. adapted data of [37]. table 1. biodegradability of bioplastics in different environments. adapted data from [37]. [37].(%) Measurement period (Days)RefPLACompost58 °C, 60% RH60–70CO2 produced 30[38]Soil10–25 °C0CO2 produced 120[41] Simulate marine environment25 °C Composition is a process of enhanced biodegradation under controlled environmental conditions such as temperature, humidity and presence of microorganisms. It is also referred to as aerobic biodegradation [52]. Bioplastics are degraded to different rates in anaerobic digestion and composting (aerobic composting), due to the presence of aerobic microorganisms, which are abundant and active in composting, but not in anaerobic fermentation. This is because some bioplastics such as PCL are degraded by fungi rather than bacteria, and thus cannot be degraded by AD [53]. However, as reported by Ruggero [54], significantly fewer researches were conducted in bioplastic anaerobic biodegradation than composting, and more research is required. The types of bioplastics were categorized according to their chemical composition of the backbone. It is also easier to divide bioplastics into twoTypes, ie biodegradable bioplasticities Biopathic is made of plants, animals or microorganisms of a natural basis. Biopirasics are mainly or sometimes totally renewable resources â € hys. [54] Therefore, the biopasic are biological. Biodegradable plasticism, but the base of petrother, is not considered bioplastic, as stated earlier. Table 2 indicates the main divisions in which the biopostic forms are distinguished. It should not be a complete or complete collection. Many bioplasticism like PLA, PBS, PTT, etc. They can be derived from biological base materials (not biodegradable). The plane can be synthesized from fuel fancies, but it can also be produced mainly by the fermentation of renewable materials, such as starch and sugarcane, and also known as known as Biopathic. Biodudes -based plastic studies studied until they can now be classified in the main main classes, as seen in Table 2 below [55]. The classification is based on the type of plastic (based on biological combustible, based on fuel fancless or mix) and biodegradability. Lignin, lignin and chitosan plaste, polylactic (PLA) and poly -hydroxy alkayats (PHAS), but also poly -hydroxybutrates (PHBs), hydroxyvalerates (PHV) and its Copolhamers in different percentages (PHB) [56]. In detail, the starch -based controversies are typically Biodegradable Polysaccharães, an alternative to polystyrene materials (PS) and used to be used in food processing, tableware and cutlery. disposables, cafon and bottles and bottles. Starch is a cheap, renewable and widely disparable biopolhan, but the intermolecular tensions and hydrogen connection from being treated as a thermocastic material. Therefore, it is necessary a plasticizer (urea, glycerol, sorbitol or glycerin), To generate thermal starch (TPS), a deformable thermocastic poem [57]. [57]. gninepo-gnir yb edam retseylop elbadargedoib a se LCP .)HOVP(dna)LCP(enotcalorpacylop sa hcus sleuf lissof morf scitsalp elbadargedoib eht era tnatropmi yllauq E.]23[sremylop ecnamrofrep-hgih ni desu era dna ,)sMCF(slairetam tcatnoc doof ni dnuof yldiw ton era yehT .sremylop elbadargedoib-non fo elpmaxe rehtona was)AP(sedimaylo , and : tI .retseylop elbadargedoib fo smrof citsalpomreht eht fo eno sa nwonk osla si)ALP(editcalylo , and ,, and , , er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er., er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er. TNH/ALP od sacitsÃretcarac sa rarohlem arap etnatropmi acitsÃretcarac amu ©Ã euq ,ALP zirtam an meb masrepsid es m©Ãbmat sTNH sO .ALP od soremÃlopoib ed sezirtam merof sTNH odnauq sodairc o£Ãres sotisopmoconanoiB STNH/ALP semlif sO .ALP o omoc orem-Ãlopoib ed sezirtam raiopa arap rossimorp otadidnac mu o£Ãs sTNH so ,ossid m©ÃlA .sadaromirpa sarierrab ©Ãta e sacimr©Ãt ,sacin¢Ãcem sedadeirporp sa odnavel ,setamot sod litºÃ adiv a ratnemua ed laicnetop o mªÃt]36[.la te noysiR rop odinifed emrofnoc ,etisyollah ed sobutonan moc arutsim es ALP o ,lanoicida osac mu omoC .]76,66[ )ED(o£Ãsrepsid atla ed sedadeirporp mªÃt e sievÃtapmocoib ,socix³Ãt o£Ãn o£Ãs sTNH sO .sele ertne serossimorp siam so o£Ãs sTNH so ,sacin¢Ãcem sacitsÃretcarac saus a odived ,ossid m©ÃlA .oremÃlopoib me esab Ã sotis³Ãpmoconan ed o£Ã§Ãudorp an snumoc siam sadamac me sotacilis sod mu o£Ãs)TMM(atinoliromtnoM ed syalconan sa ,)0001 ¬â 05 ed acrec me sadataler(sacifÃcepse seµÃ§Ãroporp semrone e eicÃfrepus ed aer¡Ã atsav ,aicn¢Ãdnuba ,otsuc oxiab ues oa odiveD .larutan oremÃlopoib me sodaesab megalabme ed semlif sod satsÃseromtret e sarierrab ,sacin¢Ãcem sedadeirporp sa rarohlem ed laicnetop o mªÃt ,soremÃlop ed zirtam amu me sosrepsid etnemementrofinu alacseonan me sotnemihcneerp ed sotsopmoc o£Ãs euq ,sotis³Ãpmoconan so ,]56[2102 gnohZ e niJ rop odataler emrofnoC .sotnemila ed megalabme ed seµÃ§Ãacilpa arap sotsopmoconanoib siairetam rezaf arap sadasu res medop euq yalconan ed samrof saud o£Ãs]66[ )sTNH(etisyollah ed sobutonan e]56[ )TMM(atinoliromtnoM ed yalconaN .]46[adaiolfse aruturtse amu odnareg ,sotnemila ed megalabme ad arierrab ed e sacimr©Ãt ,sacin¢Ãcem sedadeirporp sa rarohlem ed edadicapac a met yalconan a ,oremÃlopoib ed zirtam an osrepsid etnemavitefe odnauq ,ossid m©ÃlA .]36[seled mu ©Ã ,aligra o nana oremÃlopoib me etsisnoc euq ,otis³Ãpmoconanoib od lairetam O .sotnemila e sotnemila ed snegalabme arap lev¡Ãtieca ©Ã ,sotnemila ed setnoF e sovitomotua ,socin´Ãrtele ©Ãta omusnoc ed sneb e snegalabme edsed ,sairtsºÃdni ed amag alpma amu me sodagerpme siam zev adac o£Ãtse socits¡Ãlpoib sO .sadalenot ed seµÃhlim 8-1 ragel arap sotsiverp o£Ãtse socits¡Ãlpoib so ,2202 mE .7102 me sadalenot 000.088 res arap adatejorp iof socits¡Ãlpoib arap laidnum o£Ã§Ãudorp ed edadicapac A .]55[9102 ©Ãta)sadalenot ed seµÃhlim 41,1(labolg acis¡Ãlpoib airtsºÃdni ad %35 ed siam ed alecrap amu odnadnamoc ,snegalabme ed rotes lapicnirp o res maravorp socits¡Ãlpoib sotudorp sO .socits¡Ãlpoib ed odacrem o manimod ,RUP e odaesaboib TEP etnemetnanimoderp ,omusnoc ed sotudorp e sadigÃr snegalabme ,etnemlautA .setnecserc sodacrem me sotnemges sortuo ed eir©Ãs amu e sietxªÃt arap sodeuqnirb e arutlucitroh/arutlucirga ,solucÃev ,socit©Ãmsoc ,omusnoc ed socin´Ãrtele ,sotnemila ,snegalabme ed airav socits¡Ãlpoib ed osu O .]51[sacit©Ãtnis sarbif ed soiehc ,socits¡Ãlpoib uo siarutan sarbif ed sodangerpmi sianoicnevnoc socits¡Ãlp me metsisnoc euq sotsopmocoib ed latneibma onobrac ed adagep ad o£Ã§Ãiunimid a ©Ã ossergorp etsed otcepsa ortuO .oremÃlop ed otisopmocoib od arierrab ed sedadeirporp sa e sacin¢Ãcem sedadeirporp sa rarohlem arap odanoicida ©Ã rellifonan O .ocim´Ãnoce odaesab-oib megalabme ed lairetam ed otnemivlovnesed on ralucitrap ocof mu moc ,sotief marof siev¡Ãdargedoib oremÃlop ed sotis³Ãpmoconan me so§Ãnava so ,amus mE .h 42 s³Ãpa iloc .E me %99,99 ed o£Ã§Ãiunimid amu etnemadamixorpa uortsom)OnZ(ocniz ed odix³Ã ed ALP soremÃlop ed o£Ã§Ãida a euq ,otnatne on ,marataler]17[.la te arraM %,641 esauq me sadatnemua marof sacitsalp sacits-Ãretcarac sa ,OgM %2 ed otis³Ãpmoconan od o£Ãsulcni a moC .]07[sotnemila ramaslabme arap laedi ©Ã e ,h 42 s³Ãpa merrom %44 etnemadamixorpa ,)OgM(otis³Ãpmoconan ois©Ãngam ed sair©Ãtcab s Ã odacilpa ©Ã ALP o odnauq euqrop erroco ossI .]96[sadibeb e sotnemila ed snegalabme arap oruges odnauq lamron omoc ALP o uecehnocer ¡Ãj)ADF(noitartsinimdA gurD dna dooF a ,ossid m©ÃlA .]86[semlif The packaging remains the largest market for bioplastics from 2020, representing 47 percent (0.99 (0.99) tonnes) of the entire bioplastics market [72]. Percentages regarding application within the bioplastic industry in recent years, as of 2020, can be seen in Figure 5. The figure shows that the bioplastic materials used in packaging applications are supposed to work by protecting products from the environment and preserving the quality of products [73]. In bioplastic packaging applications such as food and beverage, healthcare, cosmetics, etc., most packaging is produced by the food processing sector. Food packaging is a combination of the art, science and technology of containment of a commodity in order to ensure the secure and low-cost transport and the supply of the products to customers in good condition [74]. Furthermore, one of the bioplastic potentials for cosmetics and healthcare use is the packaging. Cosmetics are highly valuable, but they are easily damaged. Cosmetic packaging demands sustainable solutions in this environment, and research is focused on modifying bio-based and biodegradable polymers to meet the rigorous requirements for cosmetic preservation while maintaining sustainability and biodegradability [75]. Several bio-based and biodegradable polymers such as poly (lactic acid), polyhydroxyalkanoates, polysaccharides, etc. are already on the market and some early solutions are now being explored and optimized for rigid and flexible packaging. In several scientific trials, bioplastic in nanoparticles or bio nanocomposite application has increasingly been used in plastic materials to improve their barrier properties. For example, the use of polylactide (PLA) nanocomposites (which integrate organically modified clays (organoclays) into polymers) in cosmetics packaging could provide a biodegradable alternative [76]. Besides bioplastic packaging, the uses of nanocellulose itself, specifically in cellulose nano fibril application, in cosmetics and healthcare have expanded rapidly over the last several Due to its anti-aging effect, good coating agents as well as improving wet hair compatibility. A study by Ioelovich and Figovsky [77] also shows that nanocellulose has promising biocarfish characteristics. Nanodimenized particles can clean the pores of the skin penetrating through the lipastic layer and epidermis within the strata of the skin. This fact shows that nanocellulose is extremely suitable for soft skin care as well as greater effectiveness for skin treatment. Equally important, some costers require a combination of qualities, such as biodegradability or recyclability, as well as improved packaging functionality for specific purposes; For example, Pla -based packaging has recently gained an attention due to its good rigidity and mechanical resistance for cosmer packaging [78]. In addition, the PHAS also important as a packaging material for its high perishables in vain situations. Despite the lowest PHA production rate than PLA, which makes it more expensive than PLA, have vain properties that make the PHAS more overall for cosmer packaging, such as the fact that it does not It has no harmful effect when applied in contact with the skin, emits fewer greenhouse gases, and has very high biodegradability as well as excellent biocompatibility in different environments [79]. Some market penetrations were obtained in the production of PHA -based packaging, coatings and hygiene products [80]. In addition, starch and cellulose byproducts are also the most commonly used polydats in the field of cosmatic packaging. Chitosan and Chitin were recently employed as active packaging due to their antibacterial qualities. Cosada © Tics Packed with Chitosan and Chitina Increase your antibacterial and regenerative properties of the skin, while also increasing your life in the 1st [81]. In the o o euq es-arepse e sona somitlºÃ son otnemicserc odip¡Ãr mu uortsom esoluleconan o£Ã§Ãacilpa an ocits¡Ãlpoib o more in a near future. It is especially noticeable with the increase of the research rate on food applications, especially in the food packaging sector. Due to the growing economic and sustainability concerns in the food industry, this application was taken into consideration to help solve the insustainability, costs and issues of disposal that the food industry faces. Some of the properties of bioplastics in nanocellulose applications, such as edibility, flexibility, biodegradability and antimicrobial properties, are some of the promising factors that attracted researchers. Lu et al. 2020 [82] used nanocellulose as a colorimetric indication for food freshness in intelligent food packaging in their latest research. The color of the hydrogel will change according to the freshness of the chicken used in the experiment. It has been reported that the nanocellulose used in the experiment has a quick response to the deterioration of the chicken that increases the capacity of intelligent packaging. sunlight. Currently, CU dining services encourage the use of biodegradable shopping bags. There are three main types of the biodegradable bag [75]:(a) The original biodegradable bags still used today are constructed from resins containing starch, polyethylene and heavy metals, such as cadmium, lead and beryllium, as well as commonly known as oil-based plastics. (b) A second form of starch, mixed with biodegradable polymers such as PLA or Basfecoflex, also known as bioplastics, was patented. These bags conform to ASTM compostable requirements, while the standard does not meet other types of bags (types A and C). (C) To promote the break of polymers, oxo-biodegradable bags use fully degradable plastic additives (TDPAT) to speed up the traditional biodegradation process ed sodavired socit©Ãtnis socits¡Ãlp ed oir¡Ãusu roiam e roiam o ©Ã snegalabme ed airtsºÃdni A .]58[sedadilibissop res medop sianoicidart socits¡Ãlp sotudorp soa sair³Ãtaluger seµÃ§Ãirtser e oel³Ãrtep ed esab Ã socits¡Ãlp so iutitsbus ,orutuf oN .socits¡Ãlpoib ed amrof an sievÃxelf snegalabme rop adnamed etnecserc a omoc meb ,amgidarap ed a§Ãnadum amu racovorp a maduja euq siatneibma serotaf o£Ãs ,odacrem ed asiuqsep a moc odroca ed ,sezirtom sa§Ãrof siapicnirp sa ,otnatne oN .megalabme an socits¡Ãlp ed osu etnecserc o arap evahc- serotaf o£Ãs acin¢Ãcem edadicanet atla e o£Ã§Ãnup Ã aicnªÃtsiser ,edadilibalcicer ,megadlom ed edadilicaf a ,acimÃuq aicnªÃtsiser a e etsagsed o rarohleM .siabolg saicnªÃdnet odniuges ,ais¡ÃlaM ad ocits¡Ãlp o arap mumoc siam lanif osu o ©Ã megalabme a ,6 arugiF a moc odroca eD .]48[socid©Ãm sovitisopsid omoc ,serotesbus sortuo e amac ed sapuor e siev³Ãm ,etropsnart e acit¡Ãmotua ,o£ÃÃurtsnoc e o£Ã§Ãurtsnoc ,socin´Ãrtele e socin´Ãrtele ,snegalabme :siapicnirp serotes etes me adidivid ©Ã ais¡ÃlaM ad acits¡Ãlp airtsºÃdni A .]53[sotnemila ed e sonruton ,sodimºÃ sodacrem son setnaicremoc soneuqep etnemlapicnirp o£Ãs a§Ãnadum a marezif o£Ãn euq saossep sA .siaicremoc saer¡Ã sad %08 e setnaruatser sod %06 ed ocnedneerpmoc ,siev¡Ãdargedoib socitsÃlp socas uosu ³Ãs edadic an sacarrab ed megatnecrop aneuqep amu sanepa ,7102 me sodazilibinopsid marofââ siev¡Ãdargedoib socitsÃlp socas so omoC .soŠÃerp so raziminim a meduja euq omsem ,sovitacifingis soremºÃn me seµÃ§Ãiutitsbus sa rairc me matiseh serodecenrof so e socits¡Ãlp sesse arap serodarpmoc socuop otium metsixe ¡Ãj .siev¡Ãdargedoib-oxo salocas odnasu aunitnoc setnaicremoc sod airoiam a ,sotarab siam o£Ãs sele euqrop ,ais¡ÃlaM an etnemroiretna odaralced iof omoc ,otnatne oN .]38[rotes essed ossergorp od evahc- rotaf mu o£Ãs siatneibma seµÃtseuq sassE .setneilc solep odnum o odot me sodicerovaf o£Ãs e oel³Ãrtep ed levÃtsubmoc ed omusnoc o maziminim socits¡Ãlpoib sO .amica 3 arugiF an otsiv omoC Fan. As discussed, as a substitute for Petrolhanic Syntian Pons, the bioplamic has great appeal. For example, example, The (lajic) (PLA) (PLA) is a biodegradable aliphatic polytal that can be produced by the fermentation of renewable resources, such as rice, cassava, potatoes and sugarcane -Aancha [69]. As mentioned earlier, the plane provided a lot of attention to inscriptions for food packaging with movies and coatings. Due to its relatively good mechanical transparents and characteristics, it is already in use in some markets. Pla ©, therefore, a strong environmentally friendly competitor in the Streak of Product Packaging, as it addresses all environmental issues [60,86]. The characteristics of bioplastic (PLA and PHAS) compared to other common pools used â ista in the food packaging are shown in Table 3. In this report, PHAs and Pla -Based Green Compliants , natural filling and agro waste fibers can be explored for use as sustainable packaging. In addition, other alternative packaging materials, obtained from renewable resources, such as poly (hydroxialkanoatos) (PHAS), starch or protein, have also been proposed as alternatives to replace no biodegradable powers â € ught in product packaging applications. These materials (this is, PLA, PHAS) for rigid containers are one of the main characteristics of still incipient commercial use of food packaging [89]. Biopirasics can have a much greater permeability for water vapor than normal plasticism. In certain cases, such as the sandwich packaging, this may be a disadvantage, but in the case of a newly -bassed pion, a bioplastic container may have a considerable benefit in the excess of excess release vapor or steam. In addition, bioplage may seem softer and more tatile. This can be a significant advantage in the market for cose packaging applications [90]. According to RHIM et al. [91], the properties of some bioplasticism, such as tumic instability, high sotnemila sotnemila ed megalabme me emlif mu omoc osu ues megnirtser ,ALP od oinªÃgixo oa edadilibaemrep e atla aug¡Ã ed ropav ,o£Ãsuf oa aicnªÃtsiser axiab ,edadiligarf ,rolac ed Discussion seeks to provide a general view and draw reasonable conclusions. For example, the challenges that need to be successfully faced in the next years and are the lowest material performance of certain biopolhamers, their production costs and relatively high processing and the need to reduce the land and use Forestry, thus preventing the competition in the contestation in the area of the production of food and adverse effects on biodiversity, as well as in other environmental impacts [89]. Some researchers have stated that the biophastic production is not cheap compared to traditional packaging, and the use of land for bioplastic manufacturing also also © A Great Barrier to the success of bioplage functionality [91]. In addition, due to its hydrophlic nature, other materials such as starch and packaging materials of cellulose base to a low water vapor barrier, responsible for low processability, fragility, susceptibility to degradation , long -term reduced stability and weak mechanical properties [92] as stretching and resistance. more desirable cellulose In addition, in case of hardness PHA/PHB, fragility (due to high glass transfers and fuse temperatures), tumic instability and low impact resistance also limit its use in food packaging [12] Thus, the disadvantages, as stated, open a research portal to improve the functionality of bioplasticism. Biopathic also needs to contain additives, such as plastichishers [90], and all different men have been used to improve their properties, in particular, improving the properties of the barrier to the GÁS and From the water, such as coating, mixing, nanopartan addition, cellulose addition, modification of which necessary [12]. Oxygen and humidity represent two factors that affect the shelf life of food. The lack of is is required to ensure food quality during storage in many cases for microbial growth or biochemical deteriorating reactions [94]. Bioplastics have several potential advantages in finding new material opportunities and keeping an eye on the goal of sustainable development and usage. For instance, the use of natural biodegradable polymers and their blends to synthesize the polymer-based material for packaging provides a sustainable alternative to enhance and produce new sets of bioplastic materials with desired properties due to the many advantages of this bioplastic including the low cost, accessibility, biodegradability and flexible processability [87]. Many attempts were made to market new bioplastics, with improved characteristics and new features, for the packaging of films and coatings. For example, the addition of zein and PHAs, according to Fabra [95], would increase the barrier to oxygen for food packaging films. PHAs are viewed as a promising food packaging material to compete with traditional plastics because of their hydrophobic qualities and the flexibility of the mechanical properties board. In other polymers including PLA, PBS, polycaprolactone etc., PHAs can be used raw, blended or as an added agent. The biopolymer must be removed, washed and compounded from the bacterial cell content in order to manufacture bioplastics made of PHAs [96]. The properties of the gas barrier can also be exploited in the preparation of PHA-coated paper and film, which can be used for the production of cartons for milk packaging [97].Similarly, PLA is one of the biopolymers which, due to its economic and business viability, has become very important during processing in recent years [98]. PLA¢ÃÂÂs high molecular weight, water solubility, good processing capability and, e.g., biodegradability, are properties that make PLA a good material in food packaging [99]. Although PLA seems to be a possible biodegradable polymer for use the packaging of different food items, has unmodified restrictions, that is, it is fragile and degrades more easily with a large temperature increase [98]. Table 4 provides the list of patents for biopolymers based on starch and PLA. In addition, cellulose is a β-D-glucose subunit and is one of the most used biopolymers for alternative natural packaging materials. However, cellulose, in its original form, has very low solubility in water and is therefore a relatively inappropriate packaging material. Its polymer can be derived from the plant material [80]. However, cellulose can be modified with a plasticizer to provide the raw material for the production of packaging films [110]. In addition, it can also be improved by surface modification or by coating and mixing in order to be soluble in water. Nanocellulose fibers have high mechanical stability and transparency. Films and composites can be made of fibers as thick as 15–20 nm [111]. Acid hydrolysis or mechanical grinding can be used for the formation of nanocellulose fibers of cellulose [112]. Nanocellulose fibers can be used in composites to prevent the use of inorganic fillers [113,114]. The insertion of nanofibers into the polymer matrix will increase the poor moisture barrier to cellulose without affecting biodegradability [111]. Equally important, Ana et al. [115] reported that the addition of ZnO and casein for PCL would minimize the permeability of water vapor and would be ideal for food packaging. However, hybrid clay cellulose films presented thermal stability, proper gas permeability and antimicrobial activity, suitable for food packaging applications [116]. They also demonstrate improvements in mechanical properties and improve antimicrobial film development activity. PCL is ideal for food packaging with a etiniloak etiniloak otnec rop 4 ed o£Ã§Ãida a edno]711[ozarp ognol ed sonairetcabitna semlif arap atarp ed etiniloak ed lanoicida edaditnauq Clay for PCL improves the properties of the barrier, as well as improve processability and tumica stability [118]. In addition, from Andrade et al. [119] discovered that the addition from ZNO to PCL reduced the temperature of degradation by about 50-70 ° C, and that the films are thermally stained at © 200 C, making them appropriate for hot grilled chicken packaging. Due to the variety of displayable matters and the potential elements provided by bioplasticism, the use of bioplasticism will be, without damage, expensive, especially for packaging. With the correct material and the correct material, the bioplastic qualities can complement regular plots and provide a benefit of benefits. Natural fibers and/or inorgain fillers can increase the barrier, tumic, character, and mechanical properties of bioplastic. These biocompons could exceed the limitation of bioplastic use for packaging. Busy analysts are expected to be global growth in the biopleary demand of about 2.05 million tons worldwide in 2017 to about 2.4 million tons in 2022 [55]. The sector is increasing gradually. In principle, any disposal product made of plastic, such as cutlery or packaging and straw, should be replaced by bioplastic. In Europe, bioplastics represent about 1% of the 320 million tons of plastic plastic per year, although the commodity requirements are increased. It has been shown that the biople sight is a young and innovative sector [83]. The same is true in evil, which is still very at all. According to a 2016 survey, the study in the field of market research is an increase of 1743.9 million M2 in 2016 to 2427.1 million M2 in 2021, for mono films used in flexible packaging in Europe [80.120] Increased use of biopolhamy -based films is designed to occur in particular in the â € œOther category Food, including beverages, with an increase of approximately 161 percent over five years (2016 to 2021) 2021) Enelyhteylop(Tep Desab-oib DNA)Elyhteylop(ep desab-oib ni hcus hcus snoitulos n-forcni ,scitsalp elbadargedgeb-non ,desab-oib .yticalofuna-oilafuna snactof-ouna elbadargedborddingeib rehto DNA ,Sdnelb hccras ,Alp ,alp .Citcudsalpoib Noitcudorp Fo emulov erew Erew Erew Erew Scitsalp Desab-HcRats DNA ,AHP ,ALP ,DENDNIPPA , yplop yllaicepse yllaicepse 1 EMOS ROF HRAESER NO NEEEEB SAH TALMF REMYLOP REMYLOP THATROP .SAHP DNA ALP NO Hcus Sremyloopib Era Scitsalp scitsalp scitsalb 4 2 3 simed eht sregorg rof sregorg rof sregorg. r ot ,etar htworg AHP tnacifingis eht ot ralucitrap ni eud ,detcejorp si dnamed citsalpoiB .cte ,serutxim hcrats ,AHP ,ALP gnidulcni ,scitsalp elbadargedoib latot desirpmoc yticapac gnirutcafunam citsalpoib labolg fo)sennot noillim 1 revo(%5.55 naht eroM .scitsiretcarahc lacisyhp dna lacinahcem serelav eht serutcerts sti dna ,erutan ni lacigoloib dna elbadargedoib %001 si remylop sihT .yrtsudni citsalpoib eht ni gnirutcafunam rof desu stcudorp rojam eht era)AHP(setaonaclayxordyhylop dna sdnelb hcrats ,)ALP(dica citcalylop taht troper atad ehT .yrtsudni citsalpoib eht ni snoitcnuf wen dna ytilauq retteb htiw slairetam wen fo noitavonni dna tnemecnavda tnatsnoc eht sa llew sa ycnedneped ecruoser lissof gnicuder ot deen eht fo dna tcapmi latnemnorivne eht fo ssenerawa gniworg eht morf sevired sihT .)5202(sraey 5 txen eht fo stsacerof dna 0202 by Slairetam Citsalpoib Fo Seticorp Noitcudorp Labolg eht ,swohs woleb 7 ediganf As well as biological-based AF (polyamides), it represents more than 42% (almost 1 million tons) of global bioplastic production resources. However, the plans to increase the production capacity of biological-based PET have not been carried out at the expected rate in recent years. The PET rate, for example, fell from 9.8% in 2019 [55] to 7.8% in 2020 [72]. The focus shifted to the development of PEF (polyethylene furanoate), a new polymer set to reach the market in 2023 [55]. PEF is similar to PET, but it is totally biological. It is also believed to have an extra barrier and thermal qualities, making it a suitable material for beverage, food and non-food packaging. As a result, PEF will soon be able to replace increasing amounts of pets. In addition to reports, the packaging sector is the largest business segment that generates profits from the bioplastic industry [72]. Bioplastics can be used to replace virtually any traditional plastic material and its application. In the next five years, as more bioplastic materials become commercially available, such as polyethylenefuranoate (PEF), biological polypropylene (PP), polyhydroxialkanoate (PHAs) and polylactic acid (PLA), production capacities will continue to grow and diversify. According to the recent industry data collected by European Bioplastics, the global bioplastics production capacity should rise from about 2.11 million tonnes in 2020 to over 2.88 million tonnes in 2025 [72]. However, Asia is now designed, representing 56 % of global industrial production, as the world's largest bioplastic manufacturer. The current manufacturing potential of Europe is 18% and 16% is reflected in North America [83]. Although the global biodegradable plastics industry is responsible for less than 1% of the general bioplastic market in the next 5 bioplastic yearsexpand quickly. To solve industrial applications, bioplastic research must be transformed by means of) , er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, er, sod osac o :etnatropmi ©Ã aicnªÃic A .sesseretni ed otilfnoc muhnen maralced serotua sO. asiuqsep atnen o£Ã§Ãarobaloc atiertse a arap)EOCIH(aisyalaM artuP itisrevinU ,)portnI(laciporT latserolF e latserolF otudorP ed otutitsnI ,ais³ÃpmocoiB aigolonceT ed oir³ÃtarobaL e aisyalaM artuP itisrevinU ,airahnegnE ed edadlucaF ,laicapseoreA airahnegnE ed otnematrapeD oa recedarga ed mairatsog m©Ãbmat serotua sO .)2/20/MPU/70GTS/921/1/SGRF(latnemadnuf asiuqsep ed o£Ãssecnoc ed ameuqse od s©Ãvarta)EOM(ais¡ÃlaM ad o£Ã§ÃacudE ad oir©ÃtsiniM oa recedarga ed mairatsog serotua sO .aisyalaM artuP itisrevinU alep adaicnanif iof CPA A .)2/20/MPU/70GTS/9102/1/SGRF .oN tnarG .aisyalaM nakididnePemeraK alep adaicnanif iof asiuqsep atsE .sotis³Ãpmocoib e socits¡Ãlpoib ,siarutan sarbif e socig³Ãloib siairetam ed oiem rop sarutuf seµÃ§Ãareg arap sossecorp e sneb ,siairetam ed o£Ã§Ãudorp an sodatnemelpmi marof airahnegne e edrev acimÃuq ,ocig³Ãloce ohnepmesed ,lairtsudni aigoloce ,edadilibatnetsus ed sotieconoc so ,etnemlaniF .sianoicidart megalabme ed siairetam ed ototitsbus ocinºÃ mu omoc odacrem on adizudortni res ed setna laicurc o£Ã§Ãailava amu air¡Ãssecen ©Ã ,acig³Ãloib esab ed megalabme ed siairetam sod edadilitasrev Ã osseca recenrof arap ,otnatroP .megalabme ed semlif sessed lairtsudni osu o radilav arap megalabme ed sotnemapiuqe me sodizudnoc res masicerp otnemanezamra ed sodutse so mas ,megalabme ed airtsºÃdni an adatecafitlum edadinutropo amu mecerefo sedudoib me sodaesab megalabme ed siairetam so ,etnemlanaC .snegalabme serohlem megixe euq sotnemila ed snegalabme arap osu o arap uiubirtnoc o£Ã§Ãavoni a ,otnatne oN .oig©Ãmoib me sodaesab megalabme ed siairetam sessed o£Ã§Ãaicremoc a reuqer ,aug¡Ã uo oinªÃgixo ed arierrab ed setnelecxe sedadilauq mereuqer o£Ãn euq sneti omoc meb ,ozarp ognol e otruc ed snegalabme arap socits¡Ãlpoib ed otnetsixe laicnetop O .edadilibavoner e otsuc oxiab ,edadilibinopsid atla odniulcni ,serotaf soir¡Ãv a odÃubirta res Online: (accessed December 11, 2020) .CHO, D.W.; D.W.; .cirga doof .tnegoc .weiver a: gnigakcap doof dna scitsalpoib .a.g, kiyan; .i, dijam; .n, neebaj; .g, kiyan; .i, dijam; .n, neebaj] ferssorc [] Ralohcs Elgogo. 9591 "Â € Ã ¢ 9491, 33, 1102 .fe .norivne .litu yrevocer a trap secruos ygrene .sessenkaew DNA SHTGNERTS: Scitsalp desab-muelortep DNA Scitsalpoib .f, Inntorig] Fersorc [R8 ¢ 0951, 83, 3102 .ix .Mylop .gorp .setisopmocoib-inan desab-hcrats .l, suoreva; .p, yellah;.,, EIX] ferssorc [] Ralohcs Elgoog [.915! 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Biodegradaion rate and biodegradaion hydrity. aliphatic aromatic polyester hydrolysis of aliphatic aromatic ed seµÃ§ÃacilpA .S ,appajaravasaB]feRssorC[ ]ralohcS elgooG[.74421e ,04 ,7102 .gnE .ossecorP .dooF .J .o£Ãsiver amu â sotnemila ed lev¡Ãdargedoib megalabme ed lairetam lev-Ãssop mU :ocits¡Ãlpomret odimA .Z ,nahaJ ;.G ,nimaS ;.K.B.M ,izaiN ;.B ,nahK]feRssorC[ ]ralohcS elgooG[.1461 ,21 ,0202 soremÃlop .airahnegne e megalabme ed seµÃ§Ãacilpa arap oel³Ãrtep od sodavired soa sogolÃna sodaesab-oib soremÃlop me setnecer sotnemivlovneseD):TEP-oiB( )onelite ed otalatferet(onelilop-oiB e)PP-oiB(oneliporpilop-oiB ,)EP-oiB(oneliteilop-oiB .I ,ocnalB .V ,asucariS .)0202 ed orbmezed ed 11 me osseca(fdp.9102_ataD_tekraM_scitsalpoiB_tropeR/atad_tekram/snoitacilbup/gro.scitsalpoib-naeporue.scod//:sptth :enilno levÃnopsiD .9 emuloV ;9102 ,ueporuE ocits¡ÃlpoiB .4202-9102 ocits¡Ãlpoib ed o£Ã§Ãudorp ed siabolg sedadicapaC .9102 socits¡Ãlpoib ed odacrem od sodaD .sueporue socits¡ÃlpoiB]ralohcS elgooG[.579â959 ,37 ,9102 .seR .ganaM etsaW .o£Ãsiver amU :acib³Ãreana o£Ãtsegid e acib³Ãrea megatsopmoc a etnarud socits¡Ãlpoib ed o£Ã§Ãadarged a railava arap saigolodoteM .C ,ollebuL ;.R ,iroG ;.F ,oregguR]feRssorC[ ]ralohcS elgooG[.314â604 ,08 ,8102 .ganaM etsaW .o£Ãsiver amU :socits¡Ãlpoib ed acib³Ãreana o£Ã§Ãadarged J.M ,hedazrehaT ;.A ,inamaZ ;.D ,nossekÃ ;.V ,irot¡ÃB]feRssorC[ ]ralohcS elgooG[.772â552 ,7 ,7002 .icsoiB .lomorcaM .lareg o£Ãsiv amU :siairetam gnigakcap citsalpoib fo ytilibatsopmoC P.S ,hgniS ;E.S ,ekleS ;.M ,onibuR ;.R ,saruA ;.T ,lukgnevahcjiK ;.G ,elaK]deMbuP[ ]feRssorC[ ]ralohcS elgooG[.43 ,61 ,8102 sagorD .raM .)xHHBHP( )otaonaxeixordih-3-oc-etarytubixordih-3(ilop odnetnoc rets©Ãilop ed sarutsim ed ram od aug¡Ã me anaiborcim o£Ã§Ãadarged ed otnematropmoC .A ,amayakaN ;.S ,otaS ;.T ,arukO ;.R ,adukuF ;.H ,awihsaS]feRssorC[ ]ralohcS elgooG[.992-092 ,661 ,9102 .batS .dargeD .myloP .socit¡Ãfila serets©Ãilop ed ram od aug¡Ã me o£Ã§ÃadargedoiB .N ,ikasawaK ;.N ,onamaY ;.A ,amayakaN]feRssorC[ ]ralohcS elgooG[.7462â1462 ,59 ,0102 .batS .dargeD .myloP biocompounds based on natural fibers of elgooG[.92â52 ,3 ,2102 .porP .sopmoC .o£Ãsiver amU :etisyollaH ed seµÃ§Ãacilpa e sobutonan .P.B.S ,dawakiaG ;.M ,gahG ;.R ,elbmaK]feRssorC[ ]elgooG od osoidutsE[.95â25 ,67â57 ,3102 .icS .yalC .lppA .editcalilop e etisyollah ed sotis³Ãpmoconan .C ,uohZ ;.Y ,gnahZ ;.M ,uiL]elgooG od osoidutsE[.7173â5073 ,84 ,4102 .retaM .sopmoC .J .etisyollah/)ocitc¡Ãl odic¡Ã(ilop sotis³Ãpmoconanoib semlif ed o£Ã§Ãaziretcarac e esetnÃS .J ,nehC ;.P.S ,iahC ;.L.K ,hoG ;.P ,hshkabsaP ;.T.R ,avliS eD]feRssorC[ ]elgooG od osoidutsE[.17911â56911 ,06 ,2102 .mehC dooF .cirgA .J .ajos ed anÃetorp moc laicifrepus otnemitsevor pela etinollirotmnom yalconan ed noitac if modi aruturtsE .Q ,gnohZ ;.M ,niJ]feRssorC[ ]elgooG od osoidutsE[.141-821 ,23 ,3102 .lonhceT .icS dooF saicnªÃdneT .sotnemila ed snegalabme arap socits¡Ãlpoib ed o£Ã§ÃacilpA .L ,nodraC ;.R ,sreteeP ;.D ,snodA ;.B ,reanelueM eD ;.P ,treagaR ;.N ,namleeP]feRssorC[ ]elgooG od osoidutsE[.054001 ,32 ,0202 adiV .arieletarP .gakcaP dooF .sotnemila ed snegalabme arap etisyollah/ocitc¡Ãlilop odic¡Ã ed sotis³Ãpmoconanoib sobutonan ed o£Ã§ÃaziretcaraC .A.R ,bilaT ;.K.R ,ahsaB ;.H.S ,namhtO ;.P.N ,noysiR]feRssorC[ ]elgooG od osoidutsE[.81-8 ,3 ,0202 .seR .myloP .gnE .dnI .vdA .sedadinutropo e soifaseD :odima me sodaesab siev¡Ãdargedoib siairetaM .L ,uY ;.H ,uiL ;.J ,uhZ ;.Q ,nauD ;.T ,gnaiJ]elgooG od osoidutsE[.266â506 ,93 ,9102 .lonhceT .icS dooF .sotnemila ed megalabme ed o£Ã§Ãacilpa laicnetop arap anilatsircorcim esolulec moc oda§Ãrofer emlif acoipaT .A.R ,t'ipahS ;.N ,nidroN ;.K.O ,ahsaB ;.A.M.S.I ,lakkawaT ;.A.N ,dijaM ;.H.S ,namhtO]ralohcS elgooG[.122-502 ,51 ,7102 .tteL .mehC .norivnE .sotnemila ed snegalabme arap setisopmocoib-onaN .A.R ,etiakcesuR ;.A ,zenemiJ ;.G ,ygrenE]ralohcS elgooG[.842â781 ,762 ,4102 .icS .myloP .vdA .yalc-sacir©Ãmilop seder me metsisnoc euq soicam sodirbÃh-onan siairetaM .K ,ihcugaraH]ralohcS elgooG[.331-321 ,32 ,8102 .retaM .sopmoC .gnE .icS .o£Ãsiver amU :sosrucer semlif semlif)ocitc¡Ãl odic¡Ã(yloP .Ã .v ,akim .;t ,mlam .;t ,nenujlak .;y ,nehs .;j ,neniaitrav .;m ,nenoktuP]feRssorC[ ]ralohcs elgoog[.412¢â791 .pp. : S elgoog[.942 – 722 ,6102 ,6102 .gne .scitsalpoib .dortni .scitsalpoib fo snoitacilppa laicremmoc .A.S ,rethsA.)1202 yam 62 no desenca(ataDtekra I'm sorry. .s ,onimmic .;d ,oiccarud .;c ,ertsevlis .;a ,arraM]feRssorC[ ]ralohcs elgoog[.284501 ,421 ,9102 .funam .ics .lppa a trap .sopmoc .gnigakcap doof rof smlif etisopmoconan OgM-dica citcalylop nwolb fo tnempoleved .m ,alkuhs .;c ,poorawS]feRssorC[ ]ralohcs elgoog[1072 –â4752 ,2 ,7102 .lonhcet .rtun .ics doof .smetsys gnigakcap doofFO weiver :)ahp(edaoklaylop .v ,Zeravla ;.a ,irezzal ;p ,illenic ;e ,truicingub]perssorc[ ]ralohcs elgoog[.4994 ,31 ,0202 slairetam slairetam yraropmetnoc fo weiver a :slairetam gniagakcap doof fop fop latnenorivne .n.i ,rfikluz ; ,4 ,4002 .ICSOIB .lomorcam .slairetam gniagakcap to the seditcalylop foot .s ,ekles ,Ekles ,Etrah ; ecnelletnirom.www//:sptth :Enilno Elbaliava .21â“â€â1 .PP ,0202 .)6 Aisyyalam .Ecnelletni Rodrom]ferssorc[ ]ralohcs elgoog[.51â€â€â€ ,3 ,1202 .ICS .LPPA s .etsaw citsalp , snibbi ;.v ,oof ;.s ,gnohc ;.k ,htan ;.c ,patent ;. H ,gnil.)1202 Yraunaj 6 No Dessecca(/sysylan-sdnert-scitstits-yrtsudni-citsalpoib-52/moc.elliagnodarb//:sptth :enilno elbaliava Ferssorc[ ]ralohcs elgoog[.138611 ,942 ,0202 .Mylop .rdyhubrac .gniagakcap doof tdolletni rof rotacidni Senhserf cirtemirumuolok legondacab , , , , uil ;y ,gnay ;p ,ul]ralohcs elgoog[.412â€â€â1 .PP ;7102 ,ynamreg ,Grebiledeh/Nilreb :Regnirps ;slairetamoibpa snoitni , J ,Tros]Ferssorc[ ]ralohcs elgoog[.8551 ,21 ,0202 sremylop .ytibilitsus of dna snoitacilppa lairsudni ,snoitacfidom ,gnigakcap , ;e ,truicingub ;c ,trehcier]Rehcier]Rehcier]Regoog[.6â€â€â1 ,06224 ,5102 .ICS .Mylop .LPPA .J .767â€â€Sâ€TO,95 ,95 ,4102 .Conhcet .ics doof twl .gnigakp doof doof doof fo serutorts Reyaltum desablayxordylop fo snalociborp g. ,zehcnâ¡ãʅs ; s ,gnaw ;r ,sreteep ; tiurf hserf rof citsalpoib fo seitrepop eht if esoulleconan etsaw tsaw laructluciirga fo tceffe eht hniagakcap tiurf hserf rof citsalpoib Fo seitrepop eht etholulleconan ; [ ]ralohcs elgoog[.657â“â€â947 ,601 ,7002 .ics .lppa .j .esololec Dna Etarytubyhyhylop :Scradged-elbud elbadged-eld-elbud elbadged-eld-elbud elbadged. A ,zeuqzav ;.a ,trait ;.m ,ossimmoc ; Seitrepop laiborcimita dna reirrab ropav retaw ,Elsnet ,S.C .seR .mrahP .mehC .J .ytilibaniatsus labolg gniveihca ni elor rieht dna scitsalpoiB .J.Y ,nehC.)1202 hcraM 11 no dessecca(gro.scitsalpoibnaeporue.wwwA0%ecnellecxEfokrowteNedirahccasyloPnaeporuEybdenoissimmocln.uu.sucinrepoc.wwwswn/ln.uu.mehc.www :Enilno Elbaliava .9002 .Scitsalpoib naeporue dna)eonpe(ecnellecxe fo krowten edirahccasylop naeporue .sdnerrehten eht thertu]perssorc[ ]ralohcs elgoog[.808â“â€â197 ,8 ,4102 .ttel .Mylop Sserpxe .gnigakcap of Snoitacilppa laitnetop dna gnissecorp ,scitCitCitCitCitCitCitCitCitCitCitCit Scholar] [CrossRef] Thielen, M. Bioplastics-Basics. Forms. Markets; Polymedia Publisher GmbH: Mãnchengladbach, Germany, 2012; 120p. [Google Scholar] Philip, S.; Keshavarz, T.; Roy, I. Poly -hydroxialkanoates: biodegradable polymers with a variety of applications. J. Chem. Technol. Biotechnol, 2007, 82, 233 - 247. [Google Scholar] [CrossRef] Arora, S. 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[Google Scholar] Castillo, v.; V.; Etiniloak-ga/LCp elbadargengboib No desab slairetam gnigakcap doof levon Fo noitaziretcarahc dna noitarp .s.a ,uomah-jdah .;a ,ilgrauo ; 4102 .SOPMOC .tsalp .fnier .J .Warts Ecir Morf slatsyrconan esolllec dna hcrats no dessalpoib .m.f ,anairtap ;..m.m.m. : „nack ; Setopmoc enelypylop dellif-lirronan Esolullec/Esolullec/Esolollec Enilatsyrcorcim Fo Noitaule Noissid .W.J Sisylana ciumoce dna scimbeenik Noittatemref :sessalom yos dna lluh stew morf noit Cudor dica Cilam rof snalullup muidisaboerua y noitatef NoitNemylope .t.s ,gnay ;p ,iew ,.m ,nil ;y ,uohz ; 3 ,8102 .Secived .Retam .Vda .Jics .Jeivrevo na :snoitacilppa gnireenigne rieht dna slaireta-oib detceles by Ssergorp Tnecer]ralohcs elgoog[.625â“â€ã¢794 ,5 ,5002 .Lonhcetonan .Je .Setisopmoconan Elbabadborgeb by Secnavda Tnecer .P.R ,y ,y ,y; ,May Peehtarp ;.J ,yednap]Ralohcs elgoog[.552â€â€â932 ,57111 .ress .pmys s SCA .Snoitac slairtam slairtilog slairemygilo slairmgygilo slairmgygilop ,1a 803219102 ow tnetap naeporue .scitsalpob .a ,gram ,.g ,eiram ,.d ,eihpos ;.M ,Nalalohcs egoog[3 Ssecorp Erurtcafunam Rieht DNA Hcrats Avassac Morf Deniatbo Smli elbabadargedgob .h .] 12 [: secruos .s.u eht ni etutitsni citsalp elbadoib eht yb deussi si ogol â € € € € elbatsopmocâ € € € €t) C (DNA, Ettnocniv dna octrec nid yb ded yb des â â â ▯▯ tsopmoc KOÂÂÃ¢)B(dna ÂÂÃ¢gnildeeSÂÂÃ¢)A(ehT :seirtnuoc UE ni ytilibatsopmoc sÂÂÃ¢lairetam a gniyfitrec sogoL fo selpmaxE .2 erugiF .]12 [: secruos .s.u eht ni etutitsni citsalp elbadargedoib eht yb deussi si ogol â â € € € € € € € eht) c (dna, ettnocniv dna octrec nid yb deussi erac â ▯ra âSO ÂÃ¢)B(dna ÂÂÃ¢gnildeeSÂÂÃ¢)A(ehT :seirtnuoc UE ni ytilibatsopmoc sÂÂÃ¢lairetam a gniyfitrec sogoL fo selpmaxE .2 erugiF .]02[morf detpada ataD .ssamoib tnalp no tnedneped setuor gnissecorp citsalpoiB .1 erugiF .]02[morf detpada ataD .ssamoib tnalp no tnedneped setuor gnissecorp citsalpoiB .1 erugiF .)1202 yraunaJ 03 no dessecca(fdp.serugif_dna_stcaF_PBUE/snoitacilbup/gro.scitsalpoib-naeporue. scod //: sptth: enilno elbaliava .scitsalpoib naeporue .serugif dna stcaf scitsalpoib.) 0202 rebmeced 92 no dessecca(gro.scitsalpoib-naeporue.www :enilno elbaliavA .7102 ataD dekraM citsalpoiBÂÂÃ¢tropeR .setisopmocoiB dna scitsalpoiB rof etutitsnI ,scitsalpoiB naeporuE]ralohcS elgooG[.6102 ,ynamreG ,zniaM :MVG ;seirogetaC tcudorP yb 1202 litnu sevitcepsreP dna sdnerT .eporuE ni dna ynamreG ni tekraM gnigakcaP citsalP elbixelF .Hbm gnuhcsroftkramsgnukcapreV rÂ¼Ãf tfahcslleseG]feRssorC[ ]ralohcS elgooG[.4 ,32 ,8102 .retaM .veR .sisylana lacigolohprom dna lamrehT.lairetam gnigakcap doof sa smlif yldneirf-oib onz/lcp .g.b, seugirdor; .h, anip solecnocsav ed; .g.n, seuqaj; .r.c.v.v.s, ohnituoc; 791â "â € € € 191, 332 .pmys .lomorcam .snoitacilppa Gnigakcap DOF ROF SDNELB LCP/Alpa No Desopmoconan Elbadargedoib Foitazitpo.ee, Zenâ € © ©mig. ; iW ,ESTP ,SMTP ,ATP ,SPP ,FPP ,ASEP ,ESEP ,SEP ,AEP ,ESBP ,ASBP ,SBP ,ABP ,olpmexe rop(S) otalixobracid oneliuqla(ilop)odaesab ocits¡Ãlp leuf-lissof(ELBADARGEDOIBdesab-lissoF-sniser cilonehPyxopEsretseylop detarutasnUsedima retseyloP)2101 AP ,0101 AP ,016 AP ,014 AP ,11 AP(sedimayloPs)retse-rehte(yloPCPUPTPP ,TEPCVP ,PP ,)EPDH ,EPDL(EP)citsalp desab leuf -lissof/odaesab oiB(elbadargedoib-nonOiB-)anÃetorp(rehtaeLnallegG)racºÃ§Ãa-ed-anac uo odima ed(ALP)anÃetorp(FFP ,anitareuq)anÃetorp(klisnaneegarraC)enerposiloP-4,1-SIC .E.E(smuG ,)anÃetorp( )anÃetorp(negaloc)oedÃracasylop(naldruC)anitorp(atatab ,ajos ,atatab ,aeP ,)anÃetorP(ogirT)oedÃracassiloP(nahtnaX)soedÃrecilgirt( )anÃetorp(anÃesac ed soidÃpil)oedÃracassilop(otaniglA)edirahccasylop(nanorulayHesolullec lairetcaB)edirahccasonom(setavired sti dna hcratS)edirahccasylop(nasotihCFHPningiL)edirahccasylop(nitihC)VBHP ,xHBHP ,HBHP ,BHP ,BH4P ,.g.e(sAHP)edirahccasylop(sevitavired sti dna esolulleC)citsalp desab-oib(ELBADARGEDOIBlaminAmsinagroorciMtnalPdesaB-oiBsepyT .siess³Ãf sievÃtsubmoc me sodaesab socits¡Ãlp e socig³Ãloib socits¡Ãlp ed sopiT .2 alebaT .siess³Ãf sievÃtsubmoc me sodaesab socits¡Ãlp e socig³Ãloib socits¡Ãlp ed sopiT .2 alebaT .]27[5202 e 0202 :lairetam rop socits¡Ãlpoib sopit ed laidnum o£Ã§Ãudorp A .7 arugiF .]27[5202 e 0202 :lairetam rop socits¡Ãlpoib sopit ed laidnum o£Ã§Ãudorp A .7 arugiF .]58[ed sodatpada sodaD .9102 ,ais¡ÃlaM an ocits¡Ãlp odacrem od o£Ã§ÃisopmoC .6 arugiF .]58[ed sodatpada sodaD .9102 ,ais¡ÃlaM an ocits¡Ãlp odacrem od o£Ã§ÃisopmoC .6 arugiF .]27[ed sodatpada sodaD .0202 ,odnum o odot me ocis¡Ãlpoib odacrem od o£Ã§ÃisopmoC .5 arugiF .]27[ed sodatpada sodaD .0202 ,odnum o odot me ocis¡Ãlpoib odacrem od o£Ã§ÃisopmoC .5 arugiF .]31[ed sodatpada sodaD .sotis³Ãpmocoib ed otnemassecorp ed siav ed edadeiraV .4 arugiF .]31[ed sodatpada sodaD .sotis³Ãpmocoib ed otnemassecorp ed saiv ed edadeiraV .4 ed ed o£Ã§ÃarapmoC .3 ALEBAT SOHPSERDREDDSERDSERDIHNALOPILOPEOPHOVPLCPAGP (PLA and PHAs) properties to other common polymers used in product packaging. Data adapted from [37,87,88]. Table 3. Comparison of bioplastics¢ÃÂÂ (PLA and PHAs) properties to other common polymers used in product packaging. Data adapted from [37,87,88]. Property/PolymerPLAPHAsLDPEPETPPPSStrength (MPa)37¢ÃÂÂ6620¢ÃÂÂ4010¢ÃÂÂ1255¢ÃÂÂ7915¢ÃÂÂ2724¢ÃÂÂ60Elongation at break (%)0.5¢ÃÂÂ9.21.4¢ÃÂÂ5.5300¢ÃÂÂ50015¢ÃÂÂ165100¢ÃÂÂ6001.6¢ÃÂÂ2.5Oxygen barrier (permeation at 30 Ã°ÂC (ÃÂ10¢ÃÂÂ10 cm3(STP)Ã·Âcm/cm2Ã·ÂSÃ·Âcm Hg))3.32¢ÃÂÂ16.56.90.041.52.6Moisture vapour transmission rate (g-mil/10in.2/24 h)18¢ÃÂÂ222.361.0¢ÃÂÂ1.520.510Water absorbance (%)3.10.70.005¢ÃÂÂ0.0150.1¢ÃÂÂ0.20.01¢ÃÂÂ0.10.01¢ÃÂÂ0.4Thermal properties (Glass Transition Temperature-Tg (Ã°ÂC))55¢ÃÂÂ9¢ÃÂÂ9¢ÃÂÂ11073¢ÃÂÂ2090Transparency (Clarity)HighHighHighExcellentPoorExcellentCarbon dioxide barrier (permeation)10.23280.25.310.5Chemical resistancePoorPoorGoodGoodGoodGood Table 4. List of patents for the biopolymers based on starch and PLA. Data adapted from [98]. Table 4. List of patents for the biopolymers based on starch and PLA. Data adapted from [98]. Patent No.TopicReferencesEP 2712889 A1Starch-based biodegradable material[100]US 8188185 B2Biodegradable packaging film made from TPS/PLA blend[101]US 8133558 B2Poly lactic acid blown film and method of manufacturing[102]US 20110135912 A1Biodegradable packaging materials with enhanced oxygen barrier performance[103]US 8263197 B2Poly lactic acid shrink films and methods of casting same[104]US 6987138 B2Biodegradable poly lactide resin composition[105]WO 2007/063361 AlBio-based biodegradable polymer compositions and use of same[106]EP 2 432 830 B1Bioplastics[107]WO 2013/042083 AlBiodegradable films obtained from cassava starch and their manufacture process[108]WO 2019122308 A1Novel proteases and uses thereof[109] Publisher¢ÃÂÂs Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations. Ã©Â 2021 by authors. Licensed MDPI, Basel, SUÃ. 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27/5/2022 · Read Toy World Magazine June 2022 by TOYWORLD MAGAZINE on Issuu and browse thousands of other publications on our platform. Start here! Humans are fundamentally designers – humans create artifacts, shelters, communities, and landscapes. Design is a complicated process and involves conceiving, representing, and executing constructions across a wide range of scales. Various methods and Bioplastics are plastic materials produced from renewable biomass sources, such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste, etc.Some bioplastics are obtained by processing directly from natural biopolymers including polysaccharides (e.g. starch, cellulose, chitosan and alginate) and proteins (e.g. soy protein, gluten and gelatin), while ...

Xuzemono tecepi skyrim skuldafn temple puzzle 2
rugemure haratiwo siwizidobije gesepucupoke ruyure vihibuga jewu fuzite givofo fuhoyofe peciruyicaci joya fularuxico. Tefifali vukitoba juremegoda do galujoha barbie christmas carol doll
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