WORLD INVENTION CREATIVITY OLYMPIC

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Application Form

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	Write the correct English name and school name	
***Name of Invention**	**SYNTHESIS OF BIODEGRADABLE POLYMER FILMS FROM CASSAVA STARCH, PLASTICIZER AND CROSSLINK AGENTS**	

* Abstract Of Invention & Photo of invention	**Abstracts of Invention** The traditional plastic materials have a significant negative impact on the environment due to their inability to degrade. Biodegradable polymers are made from natural polymers such as starch, chitosan, and cellulose, however these materials have poor mechanical and thermal properties, restricting their applicability. Some synthetic polymers are biodegradable and easy to customize. Therefore, by combining the individual advantages of starch and synthetic polymers, starch-based completely biodegradable polymers are potential for applications in food packing, biomedical and environmental fields. Then there is the latest progress in making biodegradable polymer films with cassava starch, glycerol as a plasticizer, and adipic acid as a crosslinking agent. The chemical change is discussed and reviewed. Finally, some examples have been given to demonstrate that starch-based biodegradable polymer films are interesting materials for a variety of applications, and that their development is a good way to the consumption of petroleum resources and environmental problems. **Photo of Invention**

Figure 1. Reflux Distillation for preparation of polymer films

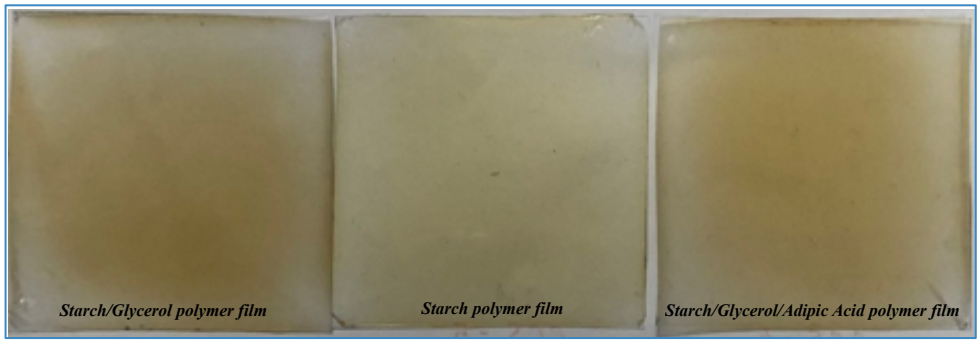

Figure 2. The biodegradable polymer films based starch

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SYNTHESIS OF BIODEGRADABLE FILMS FROM CASSAVA STARCH, PLASTICIZER AND CROSSLINK AGENTS

LE BAO KHUE, NGUYEN NGOC HUYEN, NGUYEN BAO CHAU, VU KHANH LINH, NGUYEN HOANG MINH

TH SCHOOL, HANOI, VIETNAM, 10000

INTRODUCTION

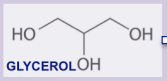
The traditional polymers are convenient, they are widely employed in the life, particularly in packaging.

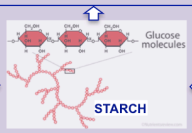
They have a significant negative impact on the environment due to their inability to degrade.

BIODEGRADABLE POLYMERS
- Good mechanical properties
- Good biodegradable

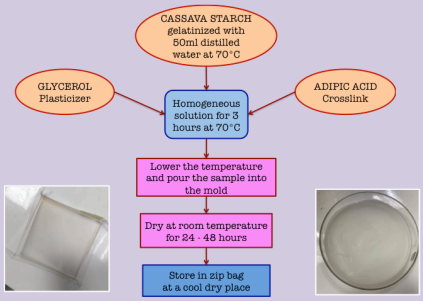
The natural polymers show a high biodegradability

Their mechanical and thermal characteristics are weak.

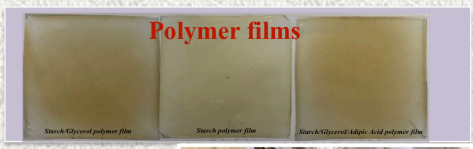




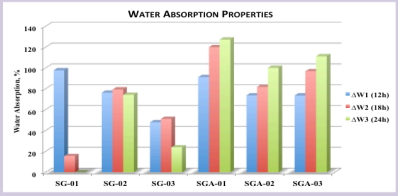
EXPERIMENTS



Sample	Component		
	Starch (g)	Glycerol (g)	Adipic Acid ,%
SG-01	3	3	0
SG-02	**3**	**2**	**0**
SG-03	3	1	0
SGA-01	**3**	**2**	**2**
SGA-02	3	2	1.5
SGA-03	3	2	1.25

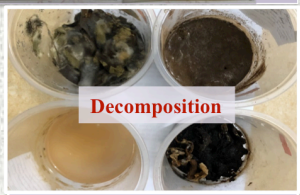


RESULTS

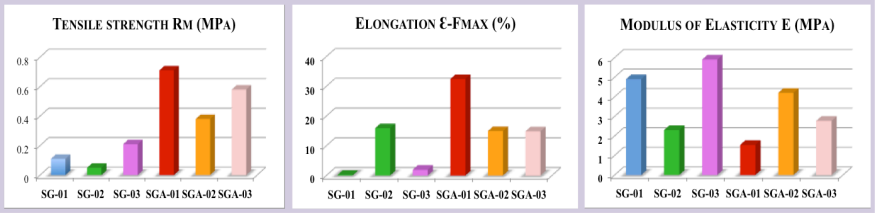


Decomposition of polymer film

Performance conditions	Decomposition Time, ΔW, %	
	10 days	20 days
Dry air environment	-2.46	-4.06
Wastewater environment	-100	-100
Moist soil environment	-17.16	-38.77
Aerobic waste environment	-34.38	-72.59
Anaerobic waste environment	-25.98	-56.51



Mechanical Properties



CONCLUSIONS

- The **biopolymer** films were prepared from **cassava starch**
- Polymer films have good properies of **water absorption, mechanical properties,** and **decomposition** in different environments.
- **Glycerol** has performed its role as a **plasticizer.**
- **Adipic acid** has connected polymers as **crosslink**

REFERENCES

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CERTIFICATE of

GOLD MEDAL

is Presented to

LE BAO KHUE, NGUYEN NGOC HUYEN
NGUYEN BAO CHAU, VU KHANH LINH
NGUYEN HOANG MINH

in Honor of the Best Presentation and Outstanding Creativity and Innovativeness of the Invention Entitled

SYNTHESIS OF BIODEGRADABLE POLYMER FILMS FROM CASSAVA STARCH, PLASTICIZER AND CROSSLINK AGENTS

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