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Production of Polyvinyl Alcohol (PVOH)) By Yeast from Parthenium Hystoporous and Its Instrumental Analysis

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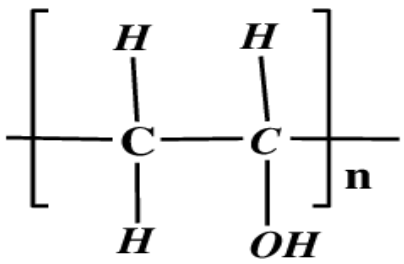
Abstract

Poly (vinyl alcohol) (**PVOH**, **PVA**, or **PVAl**) is an artificial polymer. It is water-soluble having formula $[CH_2CH\ (OH)]_n$. Mainly used for paper making, textiles, and a variety of coatings. It is white (colorless) and odorless. The present work deals with extraction of polyvinyl alcohol from *Parthenium hysterophorus* .The presence of alcohol is then confirm by instrumental analysis .
Key words*: Parthenium hysterophorus,* Polymers, polyvinyl alcohol, Plastic.

Introduction

Parthenium hysterophorus is a species of flowering plant in the aster family, Asteraceae.
Parthenium hysterophorus is a weed of semi-arid, subtropical, tropical and warmer temperate regions. It is **found** in riparian zones (banks of watercourses), on roadsides, along railways and in pastures, seasonal floodplains, grasslands, open woodlands, waste areas, disturbed sites, lawns, gardens and crops. This weed is considered to be a cause of allergic respiratory problems, asthma, bronchitis contact dermatitis, mutagenicity in human and livestock. Regular contact with the plant, usually over a prolonged period, produces allergenic dermatitis and asthma in humans.

Polyvinyl alcohol is a synthetic polymer containing many molecules all strung together. It starts its life as ethylene, a natural gaseous hormone given off by plants that causes the fruit to ripen. In this case, the ethylene is synthetically produced (but nature identical), then turned into vinyl acetate through a chemical reaction with oxygen and acetic acid (in diluted form known as vinegar), then polymerized (bonded to form repeating molecules) and then dissolved in alcohol to become a water-soluble polymer.PVA has oodles of uses from strengthening textile yarns and making paper more grease and oil resistant to creating children's play slime and contact lens lubricant.



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Methodology --Production of Biopolyethylene

PVOH is made from ethanol. The ethanol is a product of Parthenium hysterophorus fermentation. Alcoholic fermentation results from bacteria or yeast activity. The dehydration of ethanol results in ethylene, an unsaturated hydrocarbon. Finally, the ethylene is polymerized into chains to form polyethylene.

The methodology employed in the study has been to review the published research on bio-degradable plastics, assess other literature available in the public domain.

To obtain Bio Polymer following steps is proposed:

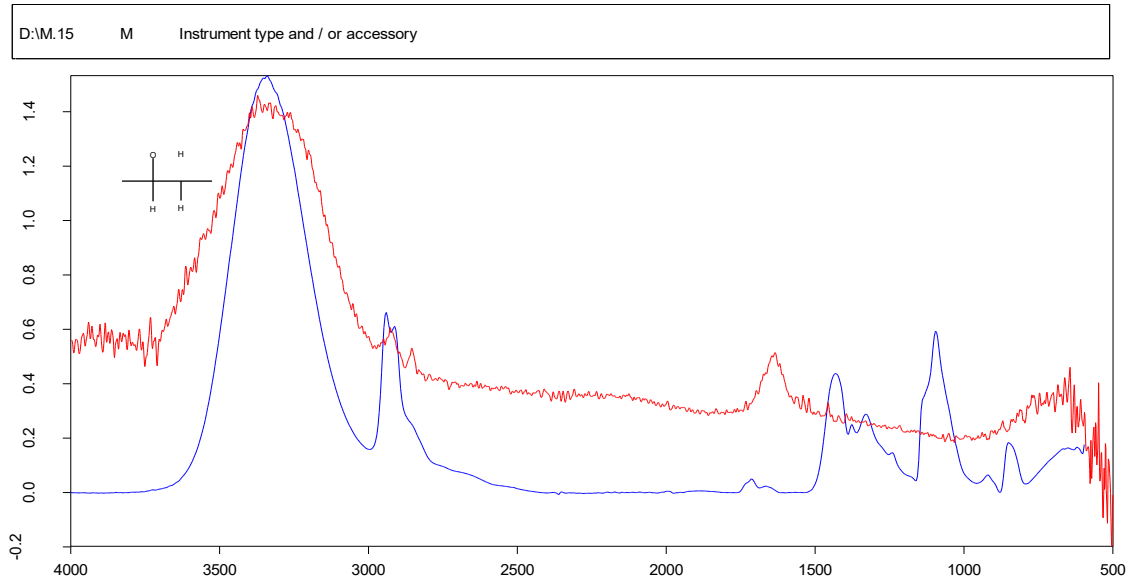
Preparation of row material →Pretreatment of row Material→Saccharification of Pretreated

Substance → Fermentation of sugar to alcohol → Distillation of alcohol → dehydration of alcohol →

Ethylene -→ ethylene Glycol →vinyl alcohol →polyvinyl alcohol.

Result and Discussion

The chemical structure of the distillate is monitored by the FTIR**,** Figure 1 represents FTIR spectrum of the sample. The FTIR analysis of sample revealed typical PVA spectra that are in harmony with the literature.The presence of a large peak at 3400 cm−1 is linked to the stretching of O–H from the intermolecular and intermolecular hydrogen bonds. The peaks observed at 2840 cm−1 and 2920 cm−1 are respectively related to the symmetric and antisymmetric stretching vibrational of C–H from alkyl groups.



Hit No.	Hit Quality	Compound Name	Entry No.	Lib. Index	Molecular formula	Molecular w
1	607	POLY(VINYL ALCOHOL)	348	1	C2H4O1	
2	599	Zinc selenide	45	2	Se1Zn1	144.33
3	551	GLYCEROL	106	1	C3H8O3	92.1
4	546	ETHYLENE GLYCOL	35	1	C2H6O2	62.07
5	526	1,3-BUTANEDIOL	129	1	C4H10O2	90.12

Compound information	
Compound Name	POLY(VINYL ALCOHOL)
Molecular Formula	C2H4O1
Molecular Weight	
CAS Registry Number	9002-89-5
Sample Preparation	KBR PELLET
Comment	molecular formular means constitutional repeating unit

Page 1/1

ISSN: 2278-4632
Vol-10 Issue-6 No. 13 June 2020

Conclusion

Lignocellulosic biomass like Parthenium hysterophorus could be a good source of vinyl alcohol that could be used for further production of polyvinyl alcohol. PVA is an odorless, nontoxic, water-soluble, and fully biodegradable polymer that presents good film-forming capacity, resistance to greases and oil, good mechanical properties, and good barrier to oxygen and aroma.

References

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