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Past Investigations on Chemical and Mechanical Properties of Scallion (Spring Onion Leafs)

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Abstract: *The use of Scallion (onion leaf) in cementitious materials can contribute to the improvement of technological properties and environmental issues related to the reuse of agro-industrial waste. In our country Onion production is approximately 31.12 million tons per year, generating large environmental impacts, because the disposal in landfills . The objective of this research was to evaluate the potential of reusing the Scallion as Binding element in eco- friendly mortar for the purpose of recovering building structures committed to coastal environments, in addition to avoiding the disposal of this waste in landfills. The Scallion were characterized physically, morphologically and chemically, in the treated and untreated (natural) condition, for further technological evaluation of mortars in the fresh state, such as consistency, specific mass, incorporated air and water retention. Comprehensive studies of the hardened state were also carried out to study mechanical strength (compressive and tensile), water absorption due to capillarity and immersion, sorptivity as well as durability by evaluating mass loss and mechanical strength after exposure conditions. The results showed that the Scallion treatment process improved its characteristics for application in mortar with addition of 0.25%, 0.5%, 0.75%, 2.5%, 5%, 7.5%, 10%, 15% in cement mass, causing the better in the technological and durability properties, and a proposed new means of disposing of agro-industrial waste, contributing to a circular economy.*

Keywords: Scallion

I. INTRODUCTION

In India other than paddy, wheat, cereals, pulses the most of the areas cultivating shallots. Around 90 percent of India's shallots is produced in Tamil nadu and Karnataka. Shallot is a popular onion variety in Tamilnadu, and the major Shallot-producing districts are Dindigul, Tiruppur, Perambalur, Trichy, and Namakkal. These shallots have for nearly 75 percent of the total onion produced in Tamil Nadu, with a productivity of 12 tonnes per hectare. The producing districts are majorly exporting the shallots throughout the country and all over the world. During exporting they are separated into shallot and scallion. The scallion is also known as spring onion. They are minimal usage in the Indian cuisine. The scallion are dried in two to three days. so, they are cheap in market. In exporting areas they are throw it in garbage and burn it.so, we research these scallion having higher fiber content. Thus our primary objective is to convert waste unusable materials into useful products as well as researching about new things. so,we will decided to use it as a additional properties of the mortor. In our project we use it scallion in dry powder additionally added with cement mortor. and the chemical properties and components of the scallion is to be analysed. Based on their components we will decide the ratio of the proportions is to added in mix design of the specimens. And we will analyze whether it will improves the strength characteristics of cement mortor or not.

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II. CRITICAL REVIEW ON THE INVESTIGATION OF INCINERATED BIOMEDICAL WASTE ASH IN CONCRETE

2.1 QUDSIYA ZAHERA HAIDRY et.al investigated that,

Performance of Controlled Low Strength Materials Using Onion Peel Ash.

The onion peel ash is light in weight compared with conventional fill material so it can be used effectively as an alternative fill material over week and sensitive areas.

2.2 Sumit Chakraborty et.al showed that,

The physical and mechanical properties of cement mortar with polymer modified alkali treated jute fibre as a reinforcing agent had been studied.

Chopped fibres of 2-5 mm length treated in 0.5% dilute solution of sodium hydroxide and the solid polymer content in emulsion in variations between 0.0252% and 0.205% were being added in a combined state by a novel processing methodology.

The study showed that the optimal polymer content in emulsion (0.0513%) is found to increase the compressive strength, modulus of rupture and flexural toughness respectively as compared to control mortar with a decrease in flexural modulus

2.3 Kittipong Kunchariyakun et.al investigated that,

The wood fibre waste (WW) reduced the dry density, compressive andflexural strengths approximately 4-3%, 10-70% and 3-65% respectively under normal curing, low heat curing and autoclave curing

Compared to normal curing and low heat curing, the autoclave curing shows relatively low values of flexural compressive strength ratio.

The mortar with 5% of wood fibre waste by weight under normal curing at 28 days shows highest flexural-compressive strength ratio

2.4 Mareike Thiedeitz et.al investigated on:

Agriculture by product rice husk ash as supplementary cementitious material is tested in this study Scanning electron microscopy (SEM) & X-ray diffraction (XRD)analysis, compressive strength and durability properties were examined, and theirresults were compared with control mux

Carbonization resistance and capillary suction in durability investigation have aincreased performance.

The result from this durability is like decreased crystalline phase with XRD and lowwater absorption resulting in less capillary pores

2.5 Kirupairaja Thanushan et.al interrogated on,

The cement stabilized soil blocks reinforced with Banana fibre and coconutfibre were tested for compression,flexural bending, water absorption, sorptivity, acid and alkaline attack, wet drying, freezing and thawing.

Banana fibre shows better post-peak behaviour in compression and coconut coir fibre shows better post-peak behaviour in flexural

Both fibre reinforced blocks show enhanced durability against acid andalkaline attack, wet-dry weathering and freeze-thaw weathering.

The coconut fibre shows better durability compared to banana fibre.

2.6 Sasha Rai P et.al investigated that,

The Compressive strength of palmyra fibre reinforced concrete reduced fibre content up-to 2% of varying length.

Increase in split tensile strength, flexural strength, and shear strength withincreased fibre content.

2.7 ValeriLaverde et.al discovered that,

The effect of fibre length on the mechanical properties of the reinforced composites.

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And the result shows that the short fibres increase the flexural, tensile and toughness of fibre-reinforced cementitious composites (FRCC).
And also, the long fibres which are used as an external reinforcement increase the compressive strength of textile-reinforced cementitious composites (TRCC)

2.8 Chandrashekar S. Malalli et.al investigated that,
The Natural fibre-reinforced polymer composites (NFRP) are used in medical devices and various engineering applications due to high specific strength, low thermal conductivity and biodegradability.
Also reports that the natural fibre PALF-sisal reinforced polymer composites have better mechanical performance than the synthetic fibre reinforced polymers

2.9 Xun Gao et.al investigated that,
The mechanical strength of the bamboo fibre is contributed by alternately arranged thin and thick layers.
Thermoset polymer-based bamboo fibre composites give higher mechanical strength than thermoplastic-based fibre composites.
The short bamboo fibre has a greater reinforcing effect in cement mortar than in concrete
Boiling bamboo fibre in distilled water, and then treating in NaOHsolutiongives long term performance bamboo fibre reinforced cement mortar composites.

2.10 R. Borinaga-Treviño et.al investigated on,
The physical, thermal and mechanical properties of cement mortar which isbeing reinforced with recycled brass fibres.
Brass fibres of length 10mm, 15mm and 25mm had been used in different percentages to correlate the strength characteristics of each with the control mortar
The study revealed that the addition of recycled brass fibres provided a better flexural strength while the compressive strength got decreased. Also, thermal conductivity increased. It is suggested that using short fibres (10 mm) of highest percentage gave considerable flow ability. On the other hand, without considering flow ability the use of long fibres provided the largest improvement in mechanical properties.

2.11 G. Ramakrishna & T. Sundararajan investigated on,
Highest impact strength was absorbed by reinforcing 2% of coir fibre in mortar slab.
Coir fibre reinforced cement mortar slab specimen gave average increase in crack resistance ratio on comparing with other fibre involved specimen suchas sisal, jute & hibiscus.
Coir fibre reinforced slab specimens have the highest residual impactstrength ratio among the various types of natural fibres

2.12 M. Vaishnavi et.al studied on,
As fibre like nylon, coir, sisal and cotton have good resilience and extensibility, they show higher mechanical and durability properties.
Comparing with other fibres nylon have opposite character, have increasingworkability with increase in fibre %.
As per studies increase in aspect ratio decreases compressive strength.
Addition of fibre bring out drastic change in improvement of mechanical and durability properties

2.13 Emad Booya et.al experimented on,
The study is based on the comparison between mechanically and chemically treated kraft pulp fibre.
As observed the TF have less permeability character, shrinkage strain and compressive character comparing with UTF.
This study found that these specially designed fibre (MMF and CTF) can be used for durability enhancement.

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2.14 Ons Hamdaoui et.al investigated on,

Simplified models of cement paste reinforced with Posidonia Oceania fibres for studying the thermal mechanical properties with conventional one.

The range of 5-10% of fiber reinforcing have improve mental behaviour in above mention properties and above that there is a sudden decrease in those characters.

A noticeable increase in toughness of about 65% for 20% of fibre reinforcing

2.15 Sandra Juradin et.al concluded that,

The influence of harvesting time, fibre processing method, fibre length and amount of fibres on the mechanical characteristics of cement composite with Spanish broom fibre have been studied.

The results of strength after 28 days and 56 days of curing were absorbed. Summer harvested groom gave high yield than fall harvested groom.

Study shows it provide high flexural & tensile (980Mpa) and low compressive strength

III. CONCLUSION

This current literature review focused on significant observation by various researchers in the field of onion leaf and natural fibre on cement mortar. Based on the review of literature, it can be concluded that onion leaf(scallion) may be gives the ideal choice of natural fibre in cement mortar.If onion leafs used in correct proportion and manner there will be a significant improbement of properties of cement mortar such as compresion , sorpitivity , water abosotption. The onion leafs (scallion) has other advantages like it is completely biodegradable, and easily available at negligible cost.

REFERENCES

[1]. QUDSIYA ZAHERA HAIDRY ,Performance of Controlled Low Strength Materials Using Onion Peel Ash. May 2022,ISSN 23496002 .

[2]. MareikeThiedeitz. Benjamin Ostermaier, Thomas Krankel "Rice husk ash as an additive in mortar Contribution to microstructural, strength and durability performance" 2022 10.6 Volume 184, September 2022,106389

[3]. Afonso R. Azevedo, ThuanySLima, Raphael H.M.Reis, Michelle S.Oliver, Verónica S. Candido, Sergio N.Monteiro "Guaruman fiber A promising reinforcement for cement-based mortars" Volume 16, June 2022

[4]. KirupairajaThanushana&NavaratnarajahSathiparan "Mechanical performance and durability of banana fibre and coconut coir reinforced cement stabilized soil blocks" Volume 21, March 2022, 101309

[5]. Jawad Ahmad &Zhiguang Zhou "Mechanical Properties of Natural as well as Synthetic Fiber Remforced Concrete A Review" Volume 333, 23 May 2022, 127353

[6]. SashaRaiPHarshithaN.KavyaD.V.SujathaUnnikrishnanChandrashekar "Mechanical strength and water penetration depth of palmyrafibre reinforced concrete" 20 May 2022

[7]. Valeria Laverde, Angie Marin, Jose M Benjumes, Mauricio Rincon Ortiz- "Use of vegetable fibres as reinforcements in cement-matrix composite materials: A Review - 1 May 2022, Volume 340, 18 July 2022. 127729

[8]. ChandrashekharS.Malalli, BR Ramji "Mechanical characterization of natural fibre reinforced polymer composites and their application in prosthesis A Review"-22 April 2022

[9]. Xun Gao, Deju Zhu Shutong, MdZillur Rahman, Shuaicheng Feng Chen - "Structural and Mechanical Properties of Bamboo Fibre/Bundle reinforced Composites: a review"-11 May 2022. Volume 19, July-August 2022, Pages 1162-1190.

[10]. Ray GovindChandrasekaran, G Ramakrishna, "Experimental investigation on mechanical properties of economical local natural fibre reinforced cement mortar", (2021), Volume 46, Part 17, 2021, Pages 7633-7638

[11]. R. Borinaga-Trevino, A. Orbe, J. Canales, J. Norambuena-Contreras, "Thermal and mechanical properties of mortars reinforced with recycled brass fibres", (2020-2021), Volume 284, 17 May 2021, 122832

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[12]. BojanPoletanovic, Ivan Janotka, Marian Janck, Michal Bacuveik, IldikoMerta, "Influence of the NaOH-treated hemp fibres on the properties of fly-ash based alkali-activated mortars prior and after wet/dry cycles", (2021), Volume 309, 21 November 2021, 125072

[13]. R.SathiaR.Vijayalakshmi - "Fresh and mechanical property of caryota- urensfibre reinforced flowable concrete"-28 September 2021 Volume 15, November-December 2021. Pages 3647-3662.

[14]. Markos TsegayeBeyene, Michael El Kadi, TameneAdugniaDemissie, Donny Van Hemelrijick, Tine Tysmans "Mechanical behavior of cement composites reinforced by aligned Enset Fibres"-15 August 2021 Volume

[15]. Sandra Juardin, Ivica Boko, IvankaNetingerGrubesa. Drazan Jozic, SilvijaMrakovcic - "Influence of Different treatment and amunt of spanishbroomand hemp fibres on the mechanical properties od reinforced cemant mortars " -12 November 2020. Volume 273, 1March 2021, 121702.