THERAPEUTIC PROPERTIES OF "*NEELAM SAMBA*" - A TAMILNADU TRADITIONAL RICE VARIETY

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Abstract

Brown rice have rich nutrients essential for a healthy diet while parboiling rice is rich in vitamin and micronutrients. The knowledge about traditional rice varieties has not reached the public and also scientific interference about the traditional varieties. This is the time to highlight the significance of medicinal value and its properties in a scientific manner. To reveal the Bioactive compounds and its medicinal properties of traditional rice variety ***Neelam samba***, to restore our indigenous knowledge about rice, enhance the nutritional values, with a view the study is indented to analyze the Bioactive compounds and its Pharmacological activities of selected rice variety. The GCMS study revealed the Presence of antimicrobial, anti-inflammatory antioxidant, anticancer and Sex Pheromone compounds. The selected rice variety will be used for development of functional foods and various other value-added products for sustainable healthy life.

Keywords: *Neelam Samba***,** Traditional Rice, GCMS, Bioactive Compounds

Introduction

The most common rice consumed by humans is white rice, followed by brown rice; however rice genotypes with red, purple or black bran layer have been cultivated for a long time in Asia (Ahuja *et al.,* 2008). Colored rice posses unique color and flavor, therefore they are used as ingredient in many dishes. However, due to the limitation in term of hard texture of cooked colored rice, they are not popular for consumption even though it has been long known about the beneficial effects of pigment in these groups of rice. Traditional varieties had unique nutritional and medicinal qualities. These varieties are almost in the verge of extinction as the old land races are considered uneconomical compared to the new, short duration varieties. ***Neelam Samba*** is a traditional variety which is highly suitable for cultivation in areas which are prone to water logging. The plant is resistant to pests such as brown plant hopper and ear head bug. Altogether,

the cost of cultivation is very low. These facts are favourable and profitable to the rural farming community. The objective of this study was to analyse phytochemical and its Pharmacological role of organic traditional rice variety *Neelam samba*. This will facilitate further understanding of its inherent properties that will help towards optimizing its usage and make it commercially viable.

Materials and Methods

The traditional rice variety **"*Neelam Samba*"** was collected from a Thanjavur District, Tamilnadu. The paddy samples obtained were stored under -20°C in deep freezer. This paddy was taken out kept in the atmospheric condition for equalization of moisture and after allowing for a week's exposure the moisture was analyzed and the paddy was shelled in the "Satake" Laboratory model Rubber Role Sheller. After shelling it was pulverized in "Fritze" pulverizer and used for analysis.

Analysis of Bioactive compounds by GC-MS

25g of ***Neelam Samba*** rice powder was soaked in 95% ethanol for 12 hours. The extracts were then filtered through Whatmann filter paper No. 41 along with 2 g sodium sulphate to remove the sediments and traces of water in the filtrate. The filtrate was then concentrated by bubbling nitrogen gas into the solution. The extract contained both polar and non-polar phytocomponents. 2µl of this sample solution was employed for GC/MS analysis. GC-MS analysis was carried out on a GC Clarus 500 Perkin Elmer system comprising a gas chromatograph interfaced to a mass spectrometer (GC-MS) instrument.

Results and Discussion

The results pertaining to GC - MS analysis led to the identification of number of compounds from the GC fractions of the ethanolic extract of Selected sample ***Neelan Samba***. The compound prediction is based on Dr.Duke's Phytochemical and ethnobotanical Databases. The results revealed that the presence of 1,3-Propanediol, 2-ethyl-2-(hydroxymethyl)- (11.31%), 1,6-Anhydro-á-D-glucopyranose (levoglucosan) (17.25), 1,2-Benzenedicarboxylic acid, butyl octyl ester (0.9%), Hexadecanoic acid, ethyl ester (Palmitic acid, ethyl ester) (10.92%), 9,12-Octadecadienoic acid, methyl ester, (E,E)- (Linolelaidic acid, methyl ester) (10.92%), Oleic Acid (10.26%), Pentadecanoic acid, 2,6,10,14-tetramethyl- (0.81%), methyl ester, 3-Hexadecyloxycarbonyl-5-(2-hydroxyethyl)-4-methylimidazolium ion (0.80%), Didodecyl

phthalate (8.69%), 1,2-15,16-Diepoxyhexadecane (0.98%), 6,11-Dimethyl-2,6,10-dodecatrien-1-ol (1.42%), 4-Isopropenyl-4,7-dimethyl-1-oxaspiro[2.5]octane (2.89%), 1b,5,5,6a-Tetramethyl-octahydro-1-oxa-cyclopropa[a]inden-6-one (3.10%), 7,11-Hexadecadienal (3.85%), Spiro[androst-5-ene-17,1'-cyclobutan]-2'-one3-hydroxy-, (3á,17á)- (8.58%),, cis-Z-à-Bisabolene epoxide (1.23%) and 2H-Pyran, 2-(7-heptadecynyloxy)tetrahydro-(6.08%).

9,12 -Octadecadienoic acid, methyl ester, (E,E)-to be a polyenoic fatty acid compound and it may be acts as an antihistaminic,hepatoprotective, hypocholesterolemic and antieczemic. Benzenedicarboxylic acid, diisooctyl ester to be a plasticizer compound, it may be acts as an antimicrobial and antifouling. 2H -Pyran, 2-(7-heptadecynyloxy) tetrahydro-to be a flavonoid fraction and it may be acts as an antimicrobial, anti-inflammatory and antioxidant. Cis -Z-á-Bisabolene epoxide is a pheromone compound, it may be acts as to increase sex hormone activity. The Biological activities of phytocomponents identified in Neelan samba was tabulated in Table 2. The presence of various bioactive compounds confirms the application of selected sample *Neelan samba* for various ailments by traditional practitioners. However, isolation of individual phytochemical constituents may proceed to find a novel drug.

Table 1 Components identified in the *Neelam samba*
[GC MS study]

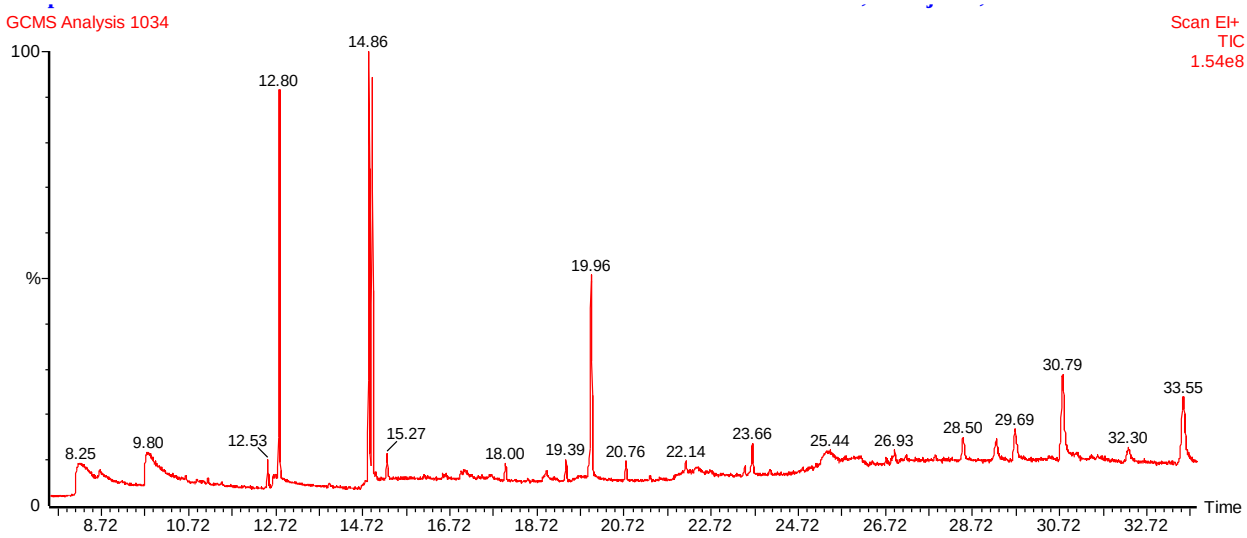
No.	RT	Name of the compound	Molecular Formula	MW	Peak Area %
1.	8.25	1,3-Propanediol, 2-ethyl-2-(hydroxymethyl)-	$C_6H_{14}O_3$	134	11.31
2.	9.80	1,6-Anhydro-á-D-glucopyranose (levoglucosan)	$C_6H_{10}O_5$	162	17.25
3.	12.53	1,2-Benzenedicarboxylic acid, butyl octyl ester	$C_{20}H_{30}O_4$	334	0.91
4.	12.80	Hexadecanoic acid, ethyl ester (Palmitic acid, ethyl ester)	$C_{18}H_{36}O_2$	284	10.92
5.	14.86	9,12-Octadecadienoic acid, methyl ester, (E,E)-(Linolelaidic acid, methyl ester)	$C_{19}H_{34}O_2$	294	10.92
6.	14.93	Oleic Acid	$C_{18}H_{34}O_2$	282	10.26
7.	15.27	Pentadecanoic acid, 2,6,10,14-tetramethyl-, methyl ester	$C_{20}H_{40}O_2$	312	0.81
8.	18.00	3-Hexadecyloxycarbonyl-5-(2-hydroxyethyl)-4-methylimidazolium ion	$C_{24}H_{45}N_2O_3$	409	0.80
9.	19.96	Didodecyl phthalate	$C_{32}H_{54}O_4$	502	8.69
10.	22.14	1,2-15,16-Diepoxyhexadecane	$C_{16}H_{30}O_2$	254	0.98
11.	23.66	6,11-Dimethyl-2,6,10-dodecatrien-1-ol	$C_{14}H_{24}O$	208	1.42

12.	28.50	4-Isopropenyl-4,7-dimethyl-1-oxaspiro[2.5]octane	$C_{12}H_{20}O$	180	2.89
13.	29.27	1b,5,5,6a-Tetramethyl-octahydro-1-oxa-cyclopropa[a]inden-6-one	$C_{13}H_{20}O_2$	208	3.10
14.	29.69	7,11-Hexadecadienal	$C_{16}H_{28}O$	236	3.85
15.	30.79	Spiro[androst-5-ene-17,1'-cyclobutan]-2'-one, 3-hydroxy-, (3á,17á)-	$C_{22}H_{32}O_2$	328	8.58
16.	32.30	cis-Z-à-Bisabolene epoxide	$C_{15}H_{24}O$	220	1.23
17.	33.55	2H-Pyran, 2-(7-heptadecynyloxy)tetrahydro-	$C_{22}H_{40}O_2$	336	6.08

No.	Name of the compound	Biological Activity
1.	1,2-Benzenedicarboxylic acid, butyl octyl ester	Anti- inflammatory (Li et al., 2004) and antibacterial activity (Modupe et al., 2010).
2.	Hexadecanoic acid, ethyl ester (Palmitic acid, ethyl ester)	Antioxidant, Hypocholesterolemic Nematicide, Pesticide,Lubricant, Antiandrogenic, Flavor, Hemolytic 5-Alpha reductase inhibitor (Rajeswari *et al., 2012*)
3.	9,12-Octadecadienoic acid, methyl ester, (E,E)-(Linolelaidic acid, methyl ester)	Antiinflammatory, Hypocholesterolemic, Cancer preventive, Hepatoprotective, Nematicide Insectifuge, Antihistaminic, Antieczemic, Antiacne, 5-Alpha reductase inhibitor Antiandrogenic, Antiarthritic, Anticoronary, Insectifuge (Rehana Banu and Nagarajan 2013)
4.	Oleic Acid	Antitumor effect (Carrillo *et al., 2012*)
5.	Didodecyl phthalate	Antimicrobial activity (Ushadevi, 2008; Philip et al., 2011; Senthilkumar et al., 2011; Shafaghat et al., 2012) Vasodilator, Antihypertensive,Angiotensin AT2 receptor antagonist, Uric acid excretion stimulant and Diuretic (Mallikadevi *et al., 2012*)
6.	1,2-15,16-Diepoxyhexadecane	Cytotoxicity (Murugesan Amudha and Shanmugam Rani 2014)
7.	6,11-Dimethyl-2,6,10-dodecatrien-1-ol	Antimicrobial Activity (Mohan Das *et al., 2013*)
8.	cis-Z-à-Bisabolene epoxide	To increase sex hormone Activity (Amutha Iswarya Devi and Kottai Muthu 2014)

9.	2H-Pyran, 2-(7-heptadecynyloxy)tetrahydro-	Antimicrobial , Antiinflammatory and Antioxidant (Anand and Gokulakrishnan 2012)

GCMS Chromatogram



Conclusion

Traditional rice has many significant implications on the human health not only in terms of food but also as a medicine. Its role especially in Preventing cancer and Tumour is very important in the context of the Current Scenario. Knowledge of different forms of its use as food and in simple Nutraceutical formulations can serve as a tool in self medication and in curing many ailments and disease conditions among the population.

This study explores the goodness of the sample *Neelan samba* which has a commendable sense of purpose and can be advised as a plant of phytopharmaceutical importance. There is a need to now promote native food as food and medicine. The finer aspects of these foods could further be used in designing functional foods.

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