



Quality Evaluation of Various Rice (*Oryza Sativa L.*) Varieties

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Abstract

Oryza sativa L. generally known as Rice is found to one the oldest domestic available plant (crop) species that has been able to feed more people across the globe compared to all other available food crops. Being the most populace continent, Asia, is responsible for majority of the rice production across the world. *Oryza sativa* accounts for around 10% of total crop cultivated area in Pakistan, accounting for 6.1 percent of total agriculture value and 1.3 percent of GDP (gross domestic product). The samples of rice were prepared by using milling. The physical quality of the rice cultivars was calculated using micrometer by calculating length, breadth, thickness, L/B ratio and quality index. After physical analysis the samples were cooked and processed for the calculation of moisture, ash, alkali spreading, gel consistency and rice biscuits. The vitamin C and sugar levels of the rice cultivars samples were also determined. A length micrometer was used to determine the length of the rice types. Among the tested rice varieties GQTL-17 was determined to have highest length 6.69mm while that GQTL-33 was determined to have the lowest length that is 5.65mm. The average length for all the selected 50 cultivars was calculated to be 6.12mm. Similarly, the breadth was also determined for the selected varieties, among which GQTL-32 was found to have highest breadth of 2.45mm while lowest breadth was determined for GQTL-1.80. The average breadth was determined to be 2.1mm for all the selected samples. The selected 50 varieties of rice samples were subjected for calculation of thickness where GQTL-18 & GQTL-36 were having highest thickness of 1.86mm while that of GQTL-12 with 1.58mm was the lowest among the rice samples. Similarly, the average thickness calculated for all the selected rice varieties was 1.74mm. The selected rice varieties were then subjected for determination of length/breadth (L/B) ratio among which GQTL-13 cultivar was calculated to be the highest (3.50mm) while that of GQTL-2 (2.44mm) was the lowest. The average L/B ratio was calculated to be 2.85mm. The quality index of the rice cultivars was calculated among which GQTL-13 (2.11mm) was having highest quality index value while that GQTL-32 (1.36). The average quality index of all the rice samples was evaluated to 1.64mm. The moisture content determined in selected four rice samples were 10%-12%. Among the selected breed GQTL-1368 (IR1) were found to have highest moisture content 12.66% followed by GQTL-1368 (IR2) having 12.18%. The least moisture content was determined for GQTL-1368 (43) (IR1) that is 10.70%. The ash content of the rice cultivars was calculated to be 0.33.

Keywords: *Oryza sativa L*, Plant, Rice, GDP.

Introduction

Rice has been one of the world's staples foods for centuries. Consumer tastes differ by region: the Japanese prefer glutinous rice (Deshpande & Bhattacharya, 1982), The Ital-

ians, on the other hand, like Baldo and Arborio rice, which are high in amylopectin and are short-grain type that generates starch during cooking, making the risotto

soft and supple. Individuals use semi-milled long-grain rice or even brown rice, but Asian cuisine prefers spicy and aromatic basmati / jasmine rice (Lyon *et al.*, 1999).

Zizania is a wild species with a brown, white, and red indica combination. Rice is a grass seed from the species *Oryza sativa* (Asian rice) or *Oryzaglaberrima* (African rice). It is the most frequently eaten food source in many regions of the globe, particularly in Asia, because it is a grain crop. Rice, behind sugar (1.9 billion tons) and maize (1.0 billion tons), is the world's third-largest agricultural produce. In 2014, rice produced 741.5 million tons. Because most sugar and maize crops are cultivated for non-human purposes, rice is the most significant in terms of human nutrition and caloric intake, accounting for more than a fifth of the calories eaten by people worldwide. In different locations, there are several culinary and cooking alternatives and different forms, hues, and sizes of grains can be used.

Monocot rice is often grown annually, however in tropical area; it may be grown as a perennial crop and could be productive continuously up to 30 years. Rice production is best suited to nations and locations with cheap labor and abundant rainfall and requires a significant quantity of work and water. Rice, on the other hand, can be cultivated almost anywhere utilizing water-controlled platform systems, even on a steep hill or mountain range. Although, progenitor species is indigenous and parts of Africa, it has been sold and exported for millennia by various cultures across the world.

Oryza sativa, often known as Asian rice, is a plant in the *Oryza* genus. Flooding the fields and arranging the young seedlings, or later, is a traditional method of rice farming. This simple approach necessitates proper dam and water pipe planning and maintenance, but it limits the growth of weeds and pests that are less resilient and do not have a submerged growth stage, as well as pests.

Although flood irrigation is not necessary in rice production, all the other irrigation

methods require additional weed and pest management as well as a separate fertilization approach during the growing season. The term "wild rice" can apply to both wild and domesticated *Zizania* and *Porteresia* species, as well as primitive or uncultivated *Oryza* varieties. Angiosperm plants, such as rice, are angiosperms. *Oryza sativa* (Watanabe, 1997), grown in Southeast Asian nations and Japan, and *Oryzaglaberrima*, cultivated in West Africa, are the only two species in the genus *Oryza* that are referred to be rice-cultivated. The first evidence of rice cultivation goes back to 5000 BC in tropical Asia. However, it has subsequently expanded to temperate areas (Watanabe, 1997). The most popular food in Asia is rice. More than 90% of the world's rice is farmed and consumed in Asia, which is home to 60% of the global population. Rice provides 35 to 60% of the calories consumed by Asia's three billion people (Guyer *et al.*, 1998).

Every year, rice is grown on about 150 million hectares, accounting for nearly 10% of all cultivable land. This amounts to almost 600 million tonnes of rice seed or 386 million tonnes of milled rice in 1999/2000. Furthermore, the worldwide population is expected to increase from 6.2 billion in 2000 to about 8.2 billion in 2030, resulting in a 765 million tons rise in world rice consumption, or 533 million tons of milled rice (FAO, 2002). Rice fields have grown at a rate of around 2.5 percent each year for over three decades.

However, by the 1990s, this figure dropped to just 1.1 percent (Riveros and Numbers, 2000). Breeding efforts and the production of hybrid rice varieties have been used to address rice yield constraints by boosting yields, insect and disease resistance, and adaptation to diverse growing environments. Since 1974, China has been developing hybrid 2 rice, which is presently cultivated in roughly 40% of the country's fields of rice (Fujimaki and Matsuba, 1997; Sasaki, 1997; IRRI, 1999). Because rice is such a vital staple food, the goal of this study is to evaluate the quality of the various varieties

of rice available in the area and identify their suitability for diverse culinary items.

Objectives

To study different physiochemical and rheological properties of rice varieties

To compare the physiochemical properties of different rice varieties.

To evaluate the variety which can better perform in making different food cuisines?

Material and Methods

Sources of Material

Rice Varieties Such As Kainata Were Kainat 1265 And Chenab Basmati 1265 B Collected From National Agriculture Research Center.

Preparation of Sample

Firstly, Samples Were Prepared By Milling In Rice Miller, Then It Can Be Physical Analyzed For Different Parameters. After Physical Analysis Sample Cooked At Required Temperature Than It Was Chemically Analyzed To Further Investigated The Better Variety.

Rice Milling

Rice Milling Remove All Or Part Of The Husked Rice's Bran And Germ For Rice. The Milled Rice Is Further Categorized In Three Classes Which Are Milled Rice, Well-Milled Rice, And Extra-Milled Rice, It May Be Further Divided Into Three Degrees. An Efficient Mill Cleans, Scours, And Polishes Grain With The Least Amount Of Breakage Possible (Iso, 1988). Rice Milled Using A Scouring Technique Is Susceptible To Oxidative Rancidity; However, Polishing Reduces This Risk.

Milling Test

- Rice samples were milled for further analysis for this purpose.
- Rice sample 200g should be taken
- Check its moisture content.
- Normal Moisture Content =10%
- Weight the sample
- Then rice sample was into Rice De-Husker for removing its outer cover.
- The Re-weight the sample = 1.480g
- After that put the sample into Polisher for polish.

- Polished rice sample were put into Test Rice Grader for grading the rice in sieve (60 No.) for 1.5minutes.
- Then it was found that the sample of both broken and un-broken rice were weight.
- 70% Un-broken and 60% broken.

Milled rice was divided into four categories based on the proportion of entire kernels and the kind of rice:

- Milled rice with long grains
- Milled rice with medium grains
- Milled rice with a short grain
- Rice processed in a mixture of short, medium, and long grain varieties

Long grain milled rice

This applies to kernels with a length/width ratio of 3.0 or more, a kernel length of 6.6mm or more, or a kernel length of more than 6.0mm and a length/width ratio of more than 2.

In Grades 1 through 4, long grain milled rice is defined as rice with more than 25.0 percent whole or broken long grain milled kernels and less than 10.0 percent whole or broken medium or short grain milled kernels.

Medium grain milled rice

Medium grain rice kernels have a length/width ratio of 2.0-2.9, or a length of 6.2 mm or more but less than 6.6 mm, or a length of more than 5.2 mm but not more than 6.0 mm with a length/width ratio of less than 3.

In Grades 1 through 4, rice is categorised as medium grain milled if it contains more than 25.0 percent whole medium grain milled kernels and less than 10.0 percent whole or broken long grain or short milled grain kernels.

Short grain milled rice

Short grain rice kernels have a length/width ratio of 1.9 or less or have a kernel length of less than 6.2 mm or have a length/weight ratio of less than 2.

Short grain milled rice is defined as rice that comprises more than 25.0 percent entire kernels of short, milled rice and less than

10.0 percent whole or broken kernels of long grain rice or whole kernels of medium grain milled rice in Grades 1 check.

Mixed milled rice

Mixed milled rice is milled rice that contains more than 25.0 percent whole kernels of milled rice and more than 10.0 percent of the "other sorts" listed above.

Physical Test

Two Rice varieties i.e., Kainat kernel & Chenab Basmati were procured from National Agriculture Research Centre, Islamabad, Pakistan. The sample of each variety was stored at ambient temperature for further studies.

Grain Size

Fifteen grains (with three replications of five healthy grains) of each rice variety were taken randomly and length, breadth and thickness were measured by using Vernier Caliper

Alkali Spreading Test

The alkali spreading value was calculated using the method described by Biwas and Juliano (1988).

Material

- Sample of rice grain
- Petri dish
- Incubator
- 1.7% potassium hydroxide solution

Method

Bursting of Rice

- In a petri plate containing 10ml of 1.7 percent potassium hydroxide solution, six grains of each rice sample were soaked and evenly distributed.
- The petri dish was roofed, undistributed, and maintained at 30.C in an incubator for 23 hours.
- Each grain's spreading was graded on a seven-point numerical scale.

Material

- Petri plates
- Water
- Rice
- Beaker
- Heater

Method

- Soaked the rice in water for 10 minutes
- Pure into the rice into boiling water
- When boiled then the condition of rice³Note the result in bursting and non-bursting

Aroma Test

Material

Rice Samples

- 1.7% KOH
- Paraffin

Method

- Take 0.5 g of rice powder of each of four varieties in separate test tube.
- Add 1.7% KOH (5ml) in each tube.
- Seal the test tube containing the sample with paraffin
- Allow the samples to rest for one hour
- After 1 hour smell each sample by removing the paraffin.
- Check the presence or absence of aroma compounds

Cooking of Rice

Procedure

- Weigh empty petri dish.
- Take a sample of 50 healthy rice grains.
- Add 10ml of distilled water.
- Cook for 20 minutes at 100c.
- Remove the water.
- Cool the sample.
- Weigh after cooking.
- Check its aroma.
- Check its stickiness.
- Calculate water absorption ratio.
- Separateburst rice.
- Separate curl rice.
- **Note:** the volume at scale called volume expansion.

Chemical Test

Moisture Determination

Principle

Food sample is taken in moisture dish and subjected to high temperature of 130°C for 1 hour in hot air oven. The reading is taken by weight the sample and amount of moisture removed from the sample is calculated.

Equipment

- Hot air oven

- Aluminum moisture dishes
- Analytical balance

Procedure

Aluminum moisture dishes were taken with 2 g sample

- Dried it in oven 130°C for 30 minutes
- The sample was taken out of the oven, covered with a lid, and placed in a desiccator.
- The sample was collected out of the oven, covered with a lid, and placed in a desiccator.

Determination of Amylose Content

The amylose content of each rice sample was measured using a modified Juliano method and spectrophotometric methodology (1971).

Material

- Volumetric Flask
- Boiling Water Bath
- Pipette
- Beaker
- Electric Balance
- Spectrophotometer

Chemicals

- 1ml Ethyl alcohol
- 1N Noah (4g/100ml)
- 1N CHCOOH (1.91g/100ml)
- 2ml Iodine solution

Method

- 0.1 g rice sample (powder) take in 100ml into a test tube
- Fill the test tube with 0.1g sample with 1 ml ethanol and 9 ml 1N Noah.
- Then heated in it boiling water bath for 10 minutes.
- Let Cool.
- Transfer to 100ml volumetric flask+ volume makeup with distilled water and mix well.
- Pour 1,2,3,4,5 mL of gelatinize stand solution into five separate volumetric flasks from a 100mL gelatinize stand solution (100ml)
- After being acidified with 1N acetic acid, 2ml of iodine solution and 1ml of potassium iodide (0.2g iodine and 2g potassium iodide in 100ml of aqueous solution) were added and allowed to sit for 30

minutes (0.2,0.4,0.6,0.8, and 1.0ml, respectively).

- A spectrophotometer was used to measure the solution's absorbance at a wavelength of 620nm. The absorbance readings were plotted versus the anhydrous amylose concentration (mg).
- The conversion calculation includes the sample's dilution factor of 20. The following formula was used to calculate the amount of amylose in dry weight:

Amylose content = optical density × slope of curve × dilution factor
Standard value = 3.68

III Fiber Determination

Principal:

Crude fiber is an indigestible organic residue that remains after dilute acid and alkali digestion. It's mostly made up of cellulose, with some lignin and hemicellulose thrown in for good measure. For crude Fiber determination the food is subjected to acid and alkali step by step, under warm temperature reflux condition, which cause digestion of all organic contents in food except fiber, the extracted fibre is separated from mother liquor through filtration, which is then dried and ignited for its quantitative determination

Equipment:

- Crude fiber digestion apparatus
- Fiber tech filtration unit
- Filtration Crucibles
- Beakers

Reagents:

- Sulphuric Acid 0.2549(6.88ml/liter)
- Sodium Hydroxide (407.42g/L)
- Hot distilled water

Procedure:

- Weighed 2-3g of each rice cookie sample into a 1 litre tall Berzelius beaker.
- The beaker containing the sample was filled with 200ml H₂SO₄.
- Boiled it in the reflux for a few minutes.
- Removed from the heat and 10 ml of Noah reagent was added.
- Boiled for additional 30 minutes.

- Separate the crude fiber (Present in the form of residue in mother liquor) by filtering through the muslin cloth
- Dried the crucible with residue at 130 C for 1 hour after washing it with hot water to remove excess alkali (check the filter with phenolphthalein).
- Weighed it as W1 after it had cooled.
- Overnight at 550°C, I ignited the residue.
- W2 crucible was cooled and weighed.

Determination of fat:

Principle:

N-hexane at its boiling point extracts the crude fat contained in the sample. The solvent is then evaporated, and the fat content is measured by weighing (AVAC Method no.2003.06)

Materials:

- n-hexane
- Thimbles
- Glass beakers

Apparatus:

- Buchi extraction system
- Analytical balance
- Tissue paper

Procedure:

- Weighed 3g of sample in duplicate, put into thimbles.
- Weighed the glass beaker on an analytical balance.
- Placed the thimbles in the extraction system at their specific site.
- Placed the beaker on the hot plate of the instrument.
- Turned the reticulating chiller on for the water supply.
- Adjusting the sensor 1 cm above the sample height in the thimbles.

- Using the digital program provided the required temperature and duration for various steps i.e., extraction, rising & drying
- After the cycle was over, the beaker having fat and some solvent trace was taken out and placed in the hot air to completely the solvent.
- Put the beaker in to the desiccators until they reach room temperature.
- Weighed the beaker on analytical balance.

Determination of Ash

Principle:

Meal is heated at temperatures between 450 and 600 degrees Celsius, causing all carbon molecules in the food to be converted to CO. The leftover inorganic part of the food is referred to as "ash," and it primarily consists of minerals. Method 923.03 of the AOAC

Equipment:

- Electrical Muffle Furnace
- Porcelain Crucible
- Desiccator
- Analytical Balance
- Spatula
- Rice sample

Procedure:

- Crucible was taken from furnace and placed in a desiccator until it reached room temperature.
- It was then placed in a muffle furnace at 550°C and allowed to incinerate till light grey as determined.
- Weight of crucible with ash was recorded

Results and Discussion

Milling of Rice Variety weight GQTL 1455 (01, 02, 03, 04)

Table 1

Sample	Paddy	Brown	Milled	Head
1455 (1)	975	666	576	546
1455(2)	978	750	612	586
1455 (3)	978	634	448	298
1455 (4)	979	740	628	534

Moisture of different rice variety 1455(01, 02, 03, 04)

Table 2

Sample	Grain Moisture Meter	Digital Grain Moisture Tester
1455(1)	13.1	12.4
1455(2)	12.7	12.5
1455(3)	12.5	12.9
1455(4)	13.8	13

Physical quality analysis of QTL 1455(01)**Table (1)**

Replications	Length	Breadth	L/B	Thickness	Quality Index
R1	7.07	2.09	3.382775	1.76	1.922031
	7.09	2.01	3.527363	1.71	2.062785
	7.11	2.26	3.146018	1.75	1.797724
	7.48	2.09	3.578947	1.73	2.068756
	7.36	2.01	3.661692	1.7	2.153936
Mean	7.222	2.092		1.73	2.001047
R2	7.29	2.05	3.556098	1.69	2.1042
	7.59	2.25	3.373333	1.82	1.85348
	7.47	2.06	3.626214	1.82	1.992425
	7.61	2.04	3.730392	1.78	2.095726
	7.06	2.16	3.268519	1.7	1.922658
Mean	7.404	2.112	3.510911	1.762	1.993698
R3	7.39	2.23	3.313901	1.67	1.984372
	7.49	2.08	3.600962	1.8	2.000534
	7.39	2.17	3.40553	1.77	1.924028
	7.53	2.21	3.40724	1.71	1.992538
	7.33	2.19	3.347032	1.76	1.901723
Mean	7.426	2.176	3.414933	1.742	1.960639

QTL 1455(02)**Table (2)**

Replication	length	breadth	L/W	thickness	Quality index
R1	6.61	1.94	3.407216	1.71	1.992524
	6.91	1.99	3.472362	1.76	1.972933
	6.94	2.09	3.320574	1.79	1.855069
	6.98	2.04	3.421569	1.67	2.048843
	6.86	1.8	3.811111	1.6	2.381944
Mean	6.86	1.972	3.48657	1.706	2.05026
R2	7.28	2.11	3.450237	1.71	2.017682
	6.72	1.94	3.463918	1.75	1.979381
	6.87	1.95	3.523077	1.68	2.09707
	7.06	2.09	3.37799	1.68	2.010709
	6.83	1.94	3.520619	1.71	2.058841
Mean	6.952	2.006	3.46717	1.706	2.03274

R3	6.77	1.95	3.471795	1.66	2.091443
	7.08	2.04	3.470588	1.71	2.029584
	6.49	1.99	3.261307	1.68	1.941254
	6.71	1.95	3.441026	1.68	2.04823
	6.5	2	3.25	1.65	1.969697
Mean	6.71	1.986	3.37894	1.676	2.01604

GQTL1455 (03)

Table (3)

Replications	Length	Breadth	L/B	Thickness	Quality Index
R1	8.17	1.93	4.233161	1.79	2.364894
	7.48	1.92	3.895833	1.69	2.305227
	8.18	1.87	4.374332	1.6	2.733957
	7.86	2.12	3.707547	1.79	2.071255
	7.41	1.84	4.027174	1.75	2.301242
Mean	7.82	1.936	4.047609	1.724	2.355315
R2	7.77	1.98	3.924242	1.74	2.255312
	7.89	1.9	4.152632	1.71	2.42844
	7.03	1.97	3.568528	1.78	2.004791
	7.87	2.01	3.915423	1.71	2.289721
	8.23	1.83	4.497268	1.73	2.599577
Mean	7.758	1.938	4.011619	1.734	2.315568
R3	7.54	1.98	3.808081	1.76	2.163682
	7.35	1.87	3.930481	1.75	2.245989
	7.45	2.05	3.634146	1.73	2.100663
	7.7	2.03	3.793103	1.82	2.084123
	7.97	2.01	3.965174	1.77	2.240211
Mean	7.602	1.988	3.826197	1.766	2.166934

GQTL 1455(04)

Table (4)

Replication	length	breadth	L/B	thickness	Quality index
R1	6.79	1.94	3.5	1.63	2.147239
	6.12	1.81	3.381215	1.5	2.254144
	6.27	1.71	3.666667	1.59	2.30608
	6.24	1.81	3.447514	1.57	2.195869
	6.64	1.93	3.440415	1.5	2.29361
Mean	6.412	1.84	3.48716	1.558	2.23939
R2	7.97	2.08	3.831731	1.75	2.18956
	6.65	1.91	3.481675	1.58	2.203592
	6.64	1.89	3.513228	1.65	2.129229
	6.12	1.91	3.204188	1.63	1.96576

	6.31	1.87	3.374332	1.59	2.122221
Mean	6.738	1.932	3.48103	1.64	2.12207
R3	6.85	2.02	3.391089	1.74	1.948902
	6.14	1.85	3.318919	1.58	2.100582
	6.51	1.78	3.657303	1.6	2.285815
	6.17	1.83	3.371585	1.57	2.147506
	6.65	1.92	3.463542	1.59	2.178328
Mean	6.464	1.88	3.44049	1.616	2.13223

Alkali Spreading

Table 1

Score	Spreading	Alkali Digestion	Gelatinized Temp
01	Kernel not affected	Low	High
02	Kernelswallowed	Low or Intermediate	High
03	Kernelswallowed collar complete or narrow		High or Intermediate
04	Kernelswallowed collar complete or narrow and wide		Intermediate
05	Kernel split or segmented		Intermediate
06	Kernel dispersed, merging with roller	High	Low
07	Kernel completely dispersed and intermingled	High	Low

GQTL: CODE 1455 (01) A

01	Kernel not affected	Low	High
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GQTL: CODE 1455 (02) B

06	Kernel dispersed, merging with roller	High	Low
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Bursting of Rice Analysis of different rice varieties

Table 4

Variety	Sample(grains)	Sound rice	Bursting rice	Ratio %
1455(01)	50	46	4	92%
1455(02)	50	44	6	88%
1455 (03)	50	42	8	84%
14455(04)	50	48	2	96%
1455(1)	1455(2)			
Empty Petri Dish = 53.0435g		Empty Petri Dish = 38.3493g		
Sample = 0.9267g		Sample = 0.8204g		
Soaking time = 20mins		Soaking time = 20mins		
Distilled Water =10ml		Distilled Water =10ml		
15min cooked at 100 °c		15min cooked at 100 °C		
After Cooking Wt. =56.6513g		After Cooking Wt. = 41.7838g		
W.A.R =3.893		W.A.R = 4.1863		
Curling = 4%		Curling = 2%		
Bursting = 4%		Bursting = 6%		
Volume Expansion = 10.1mm		Volume Expansion = 8.9mm		
Aroma = strong		Aroma = strong		
Stickiness = 2/5		Stickiness = 4/5		

Bursting of Rice Analysis of different rice varieties

Table 4(b)

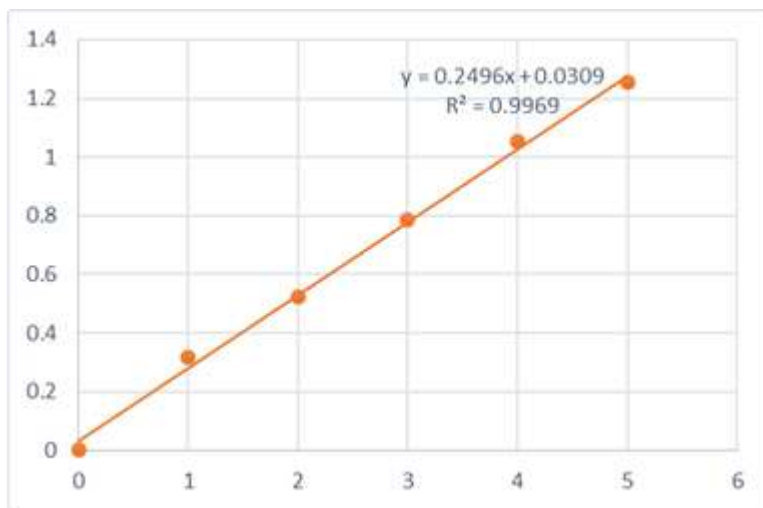
1455(3)	1455(4)
Empty Petri Dish = 45.2791g	Empty Petri Dish = 53.0493g
Sample = 1.0556g	Sample = 0.7278g
Soaking time = 20mins	Soaking time = 20mins
Distilled Water =10ml	Distilled Water =20ml
15min cooked at 100 °C	15min cooked at 100 °C
After Cooking Wt. = 49.4536g	After Cooking Wt. = 55.6545g
W.A.R = 3.9546	W.A.R = 3.5795
Curling = 4%	Curling = 2%
Bursting = 8%	Bursting = 2%
Volume Expansion = 10.6mm	Volume Expansion = 8.9mm
Aroma = low	Aroma = low
Stickiness = 4/5	Stickiness = 3/5

Amylose Content of Rice Varieties

Table 5

Amylose		
Amylose Standard	0	0
	1	0.315
	2	0.525
	3	0.784
	4	1.052
	5	1.253

Equation $Y = x-0.0309/0.2496$



Reading From Spectrophotometer						
Sample	Reading	From	Value	from	Dilution Factor	Average
	Spectrophotometer		Equation		20	
1	R1	0.469	1.7552		35.104	30.216
	R2	0.347	1.2664		25.329	
2	R1	0.399	1.4748		29.495	29.575
	R2	0.401	1.4828		29.655	

3	R1	0.352	1.2865	25.729	25.008
	R2	0.334	1.2143	24.287	
4	R1	0.49	1.8393	36.787	35.505
	R2	0.458	1.7111	34.223	

Aroma Estimation of Rice Varieties

Table 7

Sample	Amount of sample	Aroma
1455(01)	0.9267g	Strong
1455 (02)	0.8204g	Strong
1455 (03)	1.0556g	Low
1455 (04)	0.7278g	Low

Ash of Different Rice Varieties

Table 8

Sample 1455(01)	Sample 1455 (02)
Initial weight= 21.3263	Initial weight= 21.1026
Sample= 3.0144	Sample= 3.0025
Final weight= 21.3372	Final weight= 21.1096
Result= 0.3615	Result= 0.2331
Sample 1455 (03)	Sample 1455 (04)
Initial weight= 19.8622	Initial weight= 20.2947
Sample= 3.0458	Sample= 3.0273
Final weight= 19.8707	Final weight= 20.2997
Result= 0.2790	Result= 0.1651

Discussion

The milled weight of paddy, brown, milled and head of 1455(04) was the highest in all three samples. Length, breadth, and thickness of the 1455(01) were higher than the 1455(02). Higher length (7.61) was observed in 1455(01) and highest breadth (2.25) was observed in 1455(01) as compared to the other varieties of rice and also thickness (1.82) as shown in table 1,2. Highest alkali spreading value was found in all the varieties of rice and high alkali spreading value corresponds to low gelatinization temperature as shown in table 1. Amylose content in Rice 1455(01) and in 1455(02), 1455(03) 1455(04) shown in table 5 was observed by Kumar and Kush (1986). Moisture's content (12.4%) was observed in 1455(01) was low compared to 1455(04) (13.8%) shown in (table 2). Sensory score for the color, order taste, texture, and overall acceptability of rice than commercial product. Order, taste texture and overall acceptability were not found to be significantly different compared with commercial product when proportion of rice

flour (Huang *et al.*, 2005). The last of the three types of Asian brown rice is available in Germany, and its overall smell is the most unique of the three. Another study found that the quality of rice grains when cooked and eaten is one of the most serious problems in many rice-producing countries around the world. In this work, we genetically analyzed three traits: amylose (AC) concentration, gel consistency (GC), and gelatinized temperature (GT) using molecular markers (GT). For the quality of cooking and eating rice grains, these qualities are the most important. In the study, key components of F2 seeds, F2: 3 populations, and F9 recombinant self-propelled populations, all created from parent crosses of the most extensive hybrid variety planted "Shanyou 63" were used in rice production in China (Mondal. *et al.* 2021). *Oryza sativa*, often known as Asian rice, is a plant in the *Oryza* genus. *Oryza sativa* contains two major subspecies: the sticky, short-grained japonica or sinica variety, and the nonsticky, long grained indica rice variety. SPL 14/LOC4345998 is a gene that

regulates the overall architecture/growth habit of the plant. Some of its epialleles increase rice yield. Rough rice, also called paddy rice, which is the whole rice grain with a hull. It is the coarser product than brown rice, which is the rice grain without the hulls but still containing the bran and polished rice, which is the rice without the bran.

Conclusion and Recommendation

Among the selected breed GQTL-1368 (IR1) were found to have highest moisture content 12.66% followed by GQTL-1368 (IR2) having 12.18%. The least moisture content was determined for GQTL-1368 (43) (IR1) that is 10.70%. The ash content of the rice cultivars was calculated to be 0.33. Thus, the variety 1455(04) is recommended due to desirable brown color, more yielding and excellent milling quality to the farmers and consumers.

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