*Unexplored Food Plants (ISBN: 978-81-958404-6-5)*

# Nutraceutical potential of Palua: a tribal food

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**Abstract**

*Palua is a very popular and nutritious food used by the tribal communities of Odisha state. It is a processed powder (starch) from the rhizome of Curcuma angustifolia. The chapter highlights the importance of Palua as a nutraceutical agent along with its pharmacological potential. The present study also highlights the value of tribal food in our health care systems and sustainable utilization of our bioresources.*

*Keywords: Nutraceutical, ethnic food, Curcuma, rhizome*

## 1. Introduction

Palua is the byproduct of *C. angustifolia*. It belongs to the family *Zingiberaceae*. It is commonly available in the moist deciduous sal and mixed forest of Madhya Pradesh, Chhattisgarh, Jharkhand, North-East, Western coastal plains, Odisha, and hills of India. It is a slender branched herb grows up to 90 to 180 cm in height. It is a flowering plant having small spiked inflorescence and flowers are usually seen in rainy seasons. The length of leaves ranges from 35 to 40 cm in length and 7 to 9 cm in width (Sasikumar 2005). Many herbal remedies have been reported in Ayurveda based on *C. angustifolia*. Due to presence of diverse bioactive

compounds, it has been used as panacea to cure many health problems. Different parts of the plants have been orally taken as a dietary aid in gastrointestinal disorders and applied on the skin to cure painful irritation (Rout et al. 1999; Reddy et al. 2007; Saikia and Borthakur 2010). Tribal people use the rhizome to make a traditional medicinal food- Palua. The powder of the rhizome (Palua) is taken with honey on the mucous membrane of the oral cavity in stomatitis and stomach ulcers. It is extremely beneficial in diarrhea, dysentery, and colitis as it is an astringent and as a nourishing food for infants. Primarily Palua is used as a cooling agent for the stomach and human body and prevents the chances of dehydration. It is used as a primary ingredient for preparation of cake, pudding, and biscuits too (Doble et al. 2011). Due to highly beneficial nutritional and medicinal properties, it has been also cultivated by the tribal people (Present study). The consumption of Palua juices, beverages and cold drinks was found to reduce the morbidity and mortality caused by degenerative diseases as antioxidants are known to play a key role in the protective influence exerted by plant food or rhizome (Liyana-Pathirana et al. 2006). Palua contributes significantly in sustaining the lives of tribal people and a common source of income in tribal of Odisha state too. Keeping this importance of Palua, the present study has designed to evaluate the pharmacological potential to make it a sound nutraceutical.

## 2. Methodology

**2.1.** The study was carried out during 2021-2022 in Keonjhar, Sundargarh and Mayurbhanj districts of Odisha, India. Information is collected on Palua by direct interactions with local tribal communities of study areas and Palua (Figure 1) is prepared in traditional way.

**Preparation of Palua**

The raw material is collected from the study area (Mayurbhanj). Rhizomes of plants were dug out from the soil. The rhizomes were washed thoroughly with running water and stored in room temperature for 2 to 4 days. After 2 to 4 days, the rhizomes were rubbed by

stone using hand continually and a semi solid milky solution was formed. The rhizome extract was collected, filtered and the unwanted part like skin, fibers and flakes were removed by using a clean cotton cloth. After washing the starch present in the earthen pot, was socked for twenty to twenty-four hours in room temperature. Milky white semisolid starch mass was collected. The thick semisolid mass was spread on a large plate in a thin layer. The plates were kept under the sunlight for two to three days. The thick semisolid starch mass was dried under the sunlight then the crystal white stone parts were formed. The dry large parts were collected and crushed. The starch pieces or powder was filled in a transparent polythene bag. The Palua bags were stored at room temperature in dry and dark place for further use (Present study).

### 2.2. Qualitative test

The collected dried materials were crushed to powder with the help of mortar and pestle. Qualitative test was done by using powder. The qualitative analysis of phytochemicals was carried out using standard method (Kumar et al. 2012).

### 2.3. Quantitative test

Quantification of carbohydrate, lipid, starch, and protein is estimated using standard methods of Sadasivam and Manikum (2010) and qualitative analysis of secondary metabolites using method of Kumar et al. (2017).

### 2.4. Test for antioxidant activity

About 0.5 g of dry powder of Palua rhizome extract was added with 5 ml of solution of Aqueous, methanol, acetone and was kept as such for 20 minutes. Then about 0.2 ml of frozen (5 mM) was added to the extract solution and was incubated at room temperature for 10 to 15 minutes. 0.5 ml (5 mM) ferric chloride solution was added and left as such for another 20 minutes at room temperature. Butylated hydroxytoluene (BHT) was taken as standard solution and readings were taken at 562 nm in spectrophotometer (Kumar et al. 2017).

### 2.5. Cytotoxicity test

*Artemia salina* was used to know the toxicity of Palua extract (Aqueous) using standard method of Kumar et al. (2012).

## 3. Results and discussion



In the present study, it was observed that Qualitative analysis of Palua extract showed the presence of lipid, reducing sugar and carbohydrate. It was also observed that tannin, phenolic compound and reducing sugar is present in aqueous extract. Likewise, saponin and tannin present in methanolic extract whereas only tannin is found in acetone extract. Same result was observed in Sahu and Saxena (2014), where they have reported ten phytochemicals (carbohydrate, proteins, starch, and amino acids, steroid, glycoside, flavonoid, alkaloid, tannin and saponin) from methanolic extracts of rhizomes of the species. According to the percentage of yield, methanol extract gives more percentage, whereas acetone extract gives less percentage as observed in Rajesh et al. (2013). From present study antioxidant activity of Palua is mostly observed in aqueous and acetone extract but scavenging activity is less in methanolic extracts at both 100 µg/ml and 50 µg/ml concentration. The brine shrimp assay was carried out. In the present study maximum inhibition was noted in aqueous, methanol, acetone, and ethanol extract. Methanol, ethanol, acetone solution with rhizome extract of *C. angustifolia* also showed potential antioxidant which could be exploited in preparation of herbal drugs with modern standard and safety (Assumi et al. 2017).

### 3.1. Traditional uses

Tribal people of study areas use the stored starch of Palua as food, medicine, and home remedies. They prepare many traditional foods in Odisha like kheer, palua jhara, barfi, palua cakes, palua bhaja and many sweet its use as a primary ingredient. Most of the people take it in fasting time, which give nutrition to the body. Palua is a cooling agent, so it is used as a drink in summer. The Palua starch recommended for infants, weak children, and septuagenarian to protect from malnutrition.

## 4. Conclusion

Food is an essential thing for organisms and we human beings discovered lots of organic food from ancient times. Due to modernization, we are forgetting our traditional systems of food and getting lots of novel diseases and disorders. In this aspect, the present study brings attention towards traditional food. The results revealed that Palua, a product of *C. angustifolia*, is good for our health and we must start using it and other traditional foods for sound health. The antioxidant and cytotoxicity value activity indicate its hidden pharmacological potential. Further work is needed for making them an optional food for all.

## 5. Acknowledgement

Authors are thankful to the local communities of study areas.

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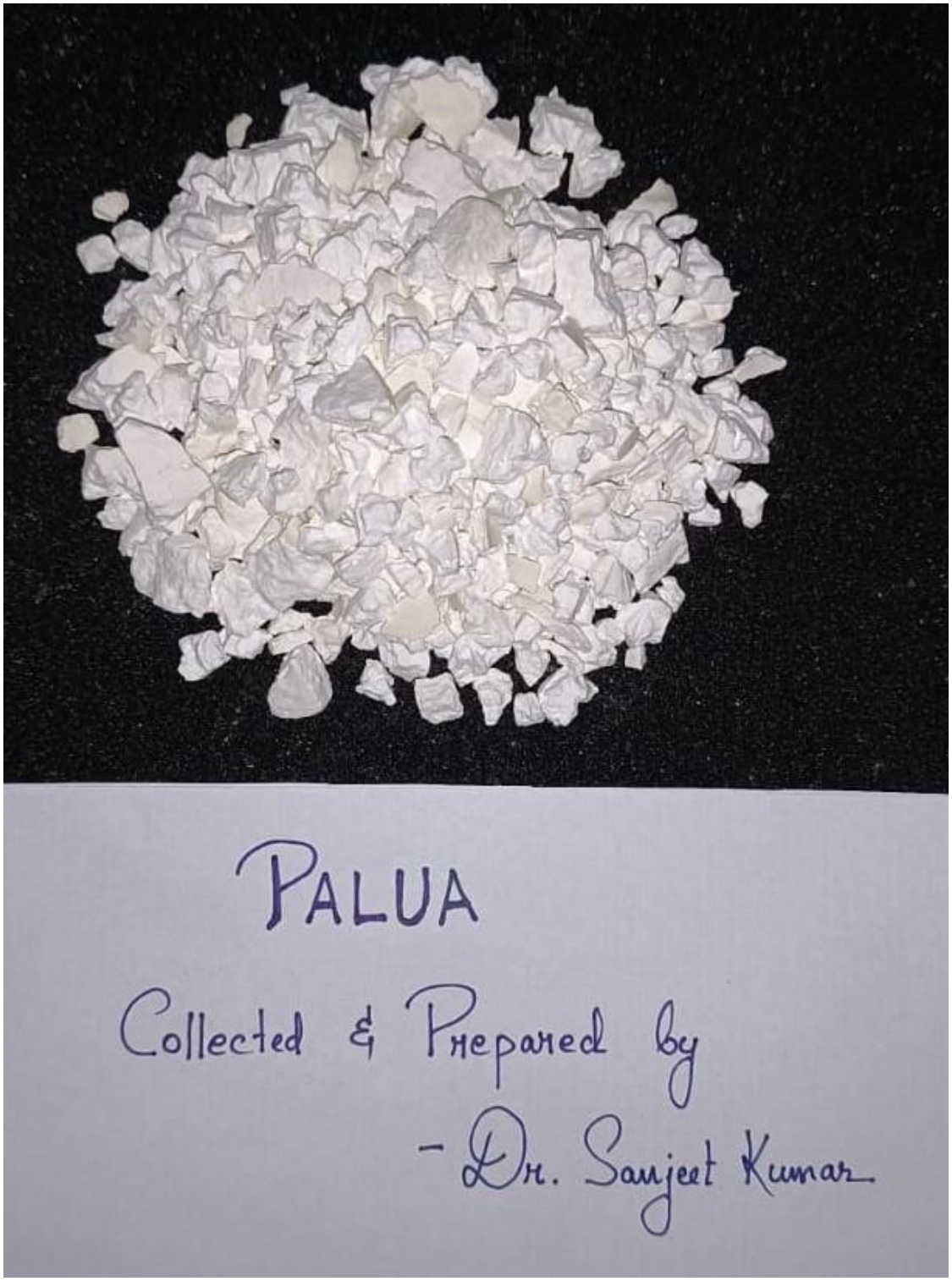



*Figure 1: Prepared Palua for experimental works*