



Development of anthocyanin microcapsules from black rice bran and its nutraceutical-based coconut water jelly



Introduction

India is the second-largest rice-producing country in the world and the crop contributes over 42% to the annual food grain production of the country, Manipur being the highest producer of black rice in India. The by-product (black rice bran) contains a robust source of several bioactive compounds which includes polyphenols, γ -oryzanol, vitamin E (α -tocopherol, γ -tocopherol, and δ -tocopherol), etc. and are known to provide antioxidant activities. These compounds are very promising and are also known to possess a wide range of potential nutraceuticals and promote health characteristics such as anti-microbial, anti-cancer, antidiabetic, antiproliferative, anti-inflammatory activities, etc. It has been playing a significant role in the socio-cultural practices of some the indigenous community in India. Traditionally, puffed rice, steamed rice, preparation of sweets and very few locally available ready-to-eat products are being prepared from black rice. Consumers demand has been addressed for commercialization for food fortification and its nutraceutical applications due to increasing health awareness among end-users. There is also a need for promotion of this rice as functional foods as well as for sustainable ecosystem.

Problems Statement

- ❖ The bioactive compounds are highly susceptible to degradation in different environmental conditions as well as long term storage condition.
- ❖ No corrective actions has been taken up to preserve its quality.
- ❖ Exploration regarding nutraceuticals-based food products from black rice bran has not established.
- ❖ There is an urgent need for a ready to eat product which is convenient and cost friendly.

Results

- ✓ By-product (rice bran) were successfully utilized for the development of microcapsules using double emulsion complex coacervation.
- ✓ Encapsulation efficiency were found high indicating the process was effective.
- ✓ However, the microcapsules need to be packed in an impermeable containers due to its high hygroscopicity nature.
- ✓ Development of coconut water jelly incorporated with microcapsules were produced.
- ✓ Jellies enriched with anthocyanin (antioxidant) can be a source of stable nutraceutical.

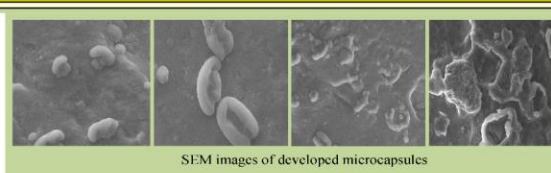
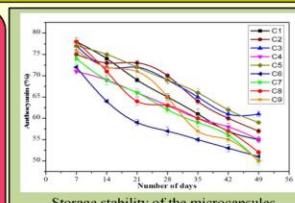
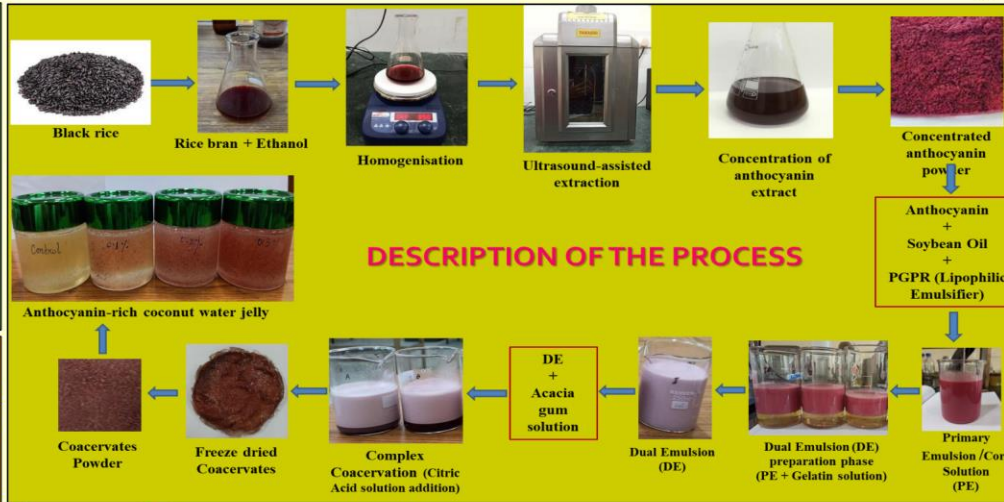
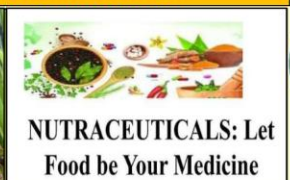
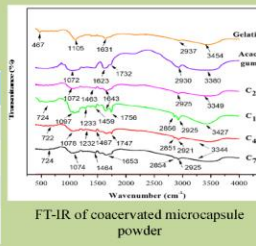


Table 1. Physico-chemical properties of anthocyanin-rich coconut water jelly

Jelly	Sample	Acidity index (%)	TSS (*Brix)	pH	Firmness (N)	L*	a*	b*
J _c	Control	0.372±0.01	73.67±1.53	3.55±0.02	2.73	35.69±0.97	0.31±0.19	3.38±0.90
J _i	0.1 % C _i	0.285±0.01	75.00±1.00	3.52±0.04	4.54	31.17 ± 1.23	2.36±0.19	2.43±0.65
J _j	0.2 % C _i	0.345±0.01	75.67±1.53	3.53±0.17	3.18	36.74±2.20	5.23±0.55	4.01±1.30
J _k	0.3 % C _i	0.384±0.01	77.33±0.58	3.54±0.05	4.09	31.09±0.69	3.09±0.95	1.89±0.91



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