

Snack food is an emerging market in China, which accounted for RMB19.9 trillion in 2019 (www.sohu.com). In retrospect, extruded snacks are among the most popular snack foods in China, generating an annual sales of RMB196 billion with 5.1 million tonnes production in 2018 (www.163.com; www.qianzhan.com).

Current extruded snacks available in the Chinese market are mainly produced using synthetic colourant and animal fats. In keeping up with the increasing health awareness among consumers, food producers are now shifting towards replacing synthetic colourant and animal fats with natural plant-based ingredients.

Thus, in this technology, red palm oil is used as a natural special oil for the production of extruded snack that provides natural colourant and nutrients to the final product.

THE TECHNOLOGY

Technologies offered are the formulation and process for the manufacturing of red palm-based extruded snacks.

Red palm-based extruded snack is healthier and it is free from synthetic colourant. The product characteristics of red palm-based extruded snack *i.e.* pH, expansion ratio (ER), specific volume (SV), water soluble index (WSI) and water absorption index (WAI) are comparable to that of commercial extruded snacks (Table 1), but with the advantage of

having carotene as natural colourant. The sensory evaluation of red palm-based extruded snack showed higher preferences than the commercial extruded snacks (Table 2).

ADVANTAGES

- Free from synthetic colourant as it already contains natural carotenes;
- Healthy, nutritious and delicious;
- Product is rich in natural carotenes which possesses a myriad of health-enhancing benefits (Marjan *et al.*, 2016); and
- Suitable to emerging market in China where more health-related products are sold premium.



Figure 1. Red palm-based extruded snacks.

TABLE 1. COMPARISON OF PRODUCT CHARACTERISTICS OF RED PALM-BASED EXTRUDED SNACK AND COMMERCIAL EXTRUDED SNACKS

Formulation	pH	ER (mm mm ⁻¹)	SV (cm ³ g ⁻¹)	WSI (%)	WAI (g g ⁻¹)	Carotene content (mg kg ⁻¹)
Red palm-based extruded snack	6.61	2.58	4.84	15.21	5.40	414.7
Commercial extruded snacks	7.12	2.00	4.12	15.12	4.98	12.1

TABLE 2. SENSORY PROPERTIES OF RED PALM-BASED EXTRUDED SNACK COMPARED TO COMMERCIAL EXTRUDED SNACKS

Samples	Colour (10 scores)	Aroma (10 scores)	Appearance (10 scores)	Texture (10 scores)	Crispiness (10 scores)
Red palm-based extruded snack	9.3	9.5	9.3	9.3	9.2
Commercial extruded snacks	8.8	9.4	9.0	9.0	9.2

NOVELTY OF THE PRODUCT

Red palm-based extruded snack is rich in natural carotenes and free from synthetic colourants.

ECONOMIC ANALYSIS

The investment to produce the red palm oil-based extruded snacks is financially feasible as shown in *Table 3*. The estimated total investment is RMB30 000 000 (RM18 450 000) with a capital asset for extrusion equipment of approximately

TABLE 3. ESTIMATED EXPENDITURE AND ECONOMIC VALUES

Item	Value
Capital asset RMB	RMB3 000 000 (RM1 845 000)
Benefit to cost ratio	1.20
Payback period, (yr)	4
Internal rate of return (IRR),%	72.24
Net present value (NPV) @10%	RMB48 370 612 (RM29 746 223)
Return of investment (ROI), %	20.3

RMB3 000 000 (about RM1 845 000). The parameters are evaluated based on the price of red palm-based extruded snack of RMB29 kg⁻¹ (approximately RM17.9 kg⁻¹).

CONCLUSION

The red palm-based extruded snack, combined with natural nutrient (*i.e.* carotenes) is a new concept for snack food with high commercial potential in the Chinese market. The product can be sold as niche product with better overall acceptance compared to the commercial extruded snacks. In addition, its processing is simple and operational friendly (without major modification to the existing plant).

REFERENCES

<http://dy.163.com/v2/article/detail/EJ5PINJR0525SJK2.html>

<https://www.qianzhan.com/wenda/detail/190403-7c2d890f.html>

http://www.sohu.com/a/297696978_100105606

Marjan, A Q; Marliyati, A and Ekayanti, I (2016). Development of food product with red palm oil substitution as an alternative functional food high in beta carotene. *Jurnal Gizi dan Pangan*, 11(2): 91-98.

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