

01.	Experiment number and title	: 18.5.3.17 Title: Development and quality evaluation of jackfruit seed flour value added Biscuit Experiment has been started in October- 2022 and it is under storage study.
02.	Budget Head	B.H.12935
03.	Collaborative department, if any	NAU Bakery Shala, Navsari
04.	Location and Agro-climatic sub region	: Centre of Excellence on Post Harvest Technology, ACHF, NAU, Navsari.
05.	Investigators	: Dr. A. K. Senapati(PI), Dr.P.S.Pandit (Co-PI), Dr. Harish G. Suthar (Co-PI)) Er. F M Sahu(Associate), Dr.Dev Raj(Associates) Dr. M.D. Lad (ARE)
	Background Information	Bakery products are the most popular processed food items in the world (Caleja <i>et al</i> , 2017). Biscuits represent the largest category of snack foods among bakery products because they are made from simple, cheap and easily available raw materials. In recent years, the consumer demand has increased significantly for food product quality with taste, safety, convenience and nutrition. Thus, nutrition has emerged as an added dimension in food product chain development (Shahidi, 2002). Due to the competitive market there is increased demand for natural, healthy and functional products, as an attempt are being made to improve the biscuits nutritive value and functionality by modifying their nutritive composition. As biscuit contains high in protein and dietary fiber content for improve prebiotic characteristics (Gallagher et al., 2003). Biscuits are the most consumed bakery products due to its nature, good nutritional quality affordable cost and availability in different varieties. Different nutritionally rich ingredients can be incorporated in most of bakery products for their diversity to develop health products. biscuits vary in their shapes, sizes and composition, the three main ingredients are always flour, sugar and fat (butter or vegetable shortenings)Jackfruit (<i>Artocarpus heterophyllus</i> L.) belongs to family Moraceae is one of the largest and popular fruit in the world. It is widely grown in tropical area in world and India. The total area under jack fruit cultivation in India 157580ha with 1572870 MT production.(NHB,2018) . They have a milky, sweet taste. In many parts of India, roasted salted seed is also eaten and considered a delicacy. Roasted, dried seeds are ground to make flour which is blended with wheat flour for baking (Morton, 1987). Traditional biscuit are claimed to lack other essential nutritional components such as dietary fiber, vitamins and

		minerals, which are lost during wheat flour refinement (Choo and Aziz, 2010). So, present study is going to be undertaken with the following objectives:																																																																																								
	Objectives	<ol style="list-style-type: none"> 1. To standardize the formulation of biscuit with jackfruit seed flour and wheat flour. 2. To assess the quality parameters of prepared biscuits. 																																																																																								
06.	Year of commencement	: 2021-22																																																																																								
07.	Season	: -																																																																																								
08.	Crop and variety	: Crop: Jack fruit Variety: -																																																																																								
09.	Experiment details	<p>Treatment detail: Treatment detail: Formulation of biscuit with jack fruit seed flour and wheat flour</p> <table border="1"> <thead> <tr> <th>Treatments</th> <th>Wheat flour</th> <th>Jackfruit seed flour</th> </tr> </thead> <tbody> <tr> <td>T₁</td> <td>100</td> <td>0</td> </tr> <tr> <td>T₂</td> <td>90</td> <td>10</td> </tr> <tr> <td>T₃</td> <td>80</td> <td>20</td> </tr> <tr> <td>T₄</td> <td>70</td> <td>30</td> </tr> <tr> <td>T₅</td> <td>60</td> <td>40</td> </tr> <tr> <td>T₆</td> <td>50</td> <td>50</td> </tr> <tr> <td>T₇</td> <td>40</td> <td>60</td> </tr> </tbody> </table> <p>Detail in Proportion:</p> <table border="1"> <thead> <tr> <th>Treatments</th> <th>Wheat Flour(g)</th> <th>Jackfruit seed flour(g)</th> <th>Sugar (g)</th> <th>Ghee (g)</th> <th>Carda mom (g)</th> <th>Jack fruit Pulp(g)</th> <th>Baking Powder (g)</th> </tr> </thead> <tbody> <tr> <td>T₁</td> <td>100</td> <td>0</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>T₂</td> <td>90</td> <td>10</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>T₃</td> <td>80</td> <td>20</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>T₄</td> <td>70</td> <td>30</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>T₅</td> <td>60</td> <td>40</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>T₆</td> <td>50</td> <td>50</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>T₇</td> <td>40</td> <td>60</td> <td>40</td> <td>50</td> <td>1.0</td> <td>20.0</td> <td>0.5</td> </tr> </tbody> </table>	Treatments	Wheat flour	Jackfruit seed flour	T ₁	100	0	T ₂	90	10	T ₃	80	20	T ₄	70	30	T ₅	60	40	T ₆	50	50	T ₇	40	60	Treatments	Wheat Flour(g)	Jackfruit seed flour(g)	Sugar (g)	Ghee (g)	Carda mom (g)	Jack fruit Pulp(g)	Baking Powder (g)	T ₁	100	0	40	50	1.0	20.0	0.5	T ₂	90	10	40	50	1.0	20.0	0.5	T ₃	80	20	40	50	1.0	20.0	0.5	T ₄	70	30	40	50	1.0	20.0	0.5	T ₅	60	40	40	50	1.0	20.0	0.5	T ₆	50	50	40	50	1.0	20.0	0.5	T ₇	40	60	40	50	1.0	20.0	0.5
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		<p>(1) Sample size:1 kg per treatment (2) Packaging material: Polyethylene (3) Quantity: 200 g of biscuit per treatment per repetition</p>																																																																																								
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10.	Observations to be recorded	: <ul style="list-style-type: none"> • Physico-Chemical Characteristics {Moisture content (%), crude protein, crude fiber, fat content(%), ash contents, Carbohydrate, Water activity, Hardness (N), spread ratio Dehydration ratio, Recovery (%)} • Sensory Evaluation (Colour, Taste, Flavour, Texture, Overall acceptability) • Microbiological parameter (Total plate count) • Economics of the processed products
16.	Other information	: <p>Storage condition : Ambient Temperature</p> <p>Storage study : Storage study : 0,3, 6 Months</p>
	Results	<p>Results & Interpretation</p> <p><u>Process Flow Chart for Preparation of jack fruit seed flour:</u></p> <p style="text-align: center;">Cutting of ripened fruits</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Collect the seeds from the bulbs</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Wash seed in tap water for removal of foreign body</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Remove white aril (seed coats) from seed</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Lye peeling: Soaking of seeds in 2%NaOH warm solution for 1-2 min</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Wash it again thoroughly under running water</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Slicing of seed into 2.0 – 2.5 mm thick chips</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Drying in cabinet dryer at 60°C to constant moisture</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Grinding the dried chips to make powder</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Packed in 400 gauge polyethylene pouches</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Stored at ambient condition for further analysis and uses</p> <p><u>Process Flow Chart for Preparation of biscuit from jackfruit seed flour and wheat flour</u></p> <p style="text-align: center;">Take wheat flour and jack fruit seed flour</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Kneading by add 50% ghee</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Add sugar (40%) and baking powder (0.5%)</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Homogenize mass to prepare consistency</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Cut the pieces in different shapes with biscuit cutter</p>

			<p style="text-align: center;">↓</p> <p style="text-align: center;">Placed in baking trays and baked at 150°C to for 20 min</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Biscuits allowed cooling at room temperature</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Packed in poly ethylene and Stored at ambient condition for further analysis</p>
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