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Economic of industrial processing of maize starch in Chhattisgarh

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Abstract
The main objective of this research was done on various products prepared from maize processing in the industry and also studied the cost return of those products. The study was conducted in Rajnandgaon city of Chhattisgarh state. In industry, starch from maize is prepared as a special product that is used in preparing food products and medicines hence it's demand in the market is always good. The primary data was collected through pre-tested structured interview schedule. Simple average and percentage methods was used for analyzing the data. The major findings of this study revealed that the total variable cost for making of 50 kg bag corn starch was to be Rs. 979.70. the benefit – cost ratio was observed to be 1:0.22 and input – output ratio was 1:1.22.

Keywords: Industrial processing of corn starch in Chhattisgarh

Introduction
Maize (*Zea mays* L) or corn is a cereal grain belonging to the family Gramineae/ Poaceae and is known as 'Queen of Cereals' because of its several uses. Maize is the most widely distributed crops of the world. Maize is an important cereal in many developed and developing countries of the world.

Maize is the most important coarse grain cereal and well known as "poor man's nutria-cereal" due to presence of contents about 72% starch, 10% protein, and 4% fat, supplying an energy density of 365 Kcal/100 g, as compared to rice and wheat, but has lower protein content. Maize provides many of the B vitamins and essential minerals. The value-added products prepared from specialty corns are traditional foods, infant foods, health foods, snacks and savory, baked products, etc. Apart from these products, maize is used to prepare industrial products such as starch, specialty chemicals, ethanol, refined corn oil, sorbitol, cake mixes, candies, carbonated beverages, and cosmetics.

Maize is third important cereal/crop after wheat and rice and has a great potential of processing due to its high nutritive value and commercial uses. Maize (also known as corn) is common name for a cereal grass widely grown for food and livestock fodder. Alongside wheat and rice, maize ranks as one of the world's chief grain crops and accounted for 2.5% of the total agricultural production in India (in MT) in 2011, according to FAO. Every part of the maize plant has economic value; the grains, leaves, stalk, tassel, and cob can all be used to produce a variety of food and non-food products. In India not only production and consumption of maize have been rising consistently, the consumption pattern has also changed over the years (Kumar *et al.,* 2012) [4]. prepared maize roti, popped maize and maize flakes from maize grains and concluded that nutritional quality of maize is improved when prepared in the form of maize roti, popped maize and maize flakes (Reddy *et al.*1991) [7].

Materials and Methods
Location of the study
Rajnandgaon district is situated in the western part of Chhattisgarh state. The district lies between latitude 20°70'-22°29' North latitude and 80°23' to 81°29' East longitude covering an area of 8222 sq.kms. Its greatest length in the north-south is about 185 kms., while its width in the east-west extends about 80 kms. Rajnandgaon is one of the major districtsin Chhattisgarh for the Maize processing industry.

Collection of the data: The data was collected through pre-tested structured interview schedule. The interview was conducted personally by the investigator / researcher with the selected corn manufacturers / maize value added industry individually.

Starch value added products of maize by manufacture

Starch can be produced from maize. There are different technologies for each raw material for recovery of starch. Starch is mostly used for industrial purposes. Starch is tailor made to meet the requirements of the end users by changing reaction condition (Temp, pH, additives) and strict process control. These specialty products are called modified starches. Modified starch has improved qualities in the starch and used for different industrial uses. Being a pure renewable natural polymer starch has many applications. Its significance as a polysacloride being able to breakdown into their monomeric and or oligomeric components leads to production of dextrose, glucose, fructose, maltose & sorbitol.

Uses of starch

Corn starch is a common food ingredient, used in thickening sauces or soups, and in making corn syrup and other sugars. It is versatile, easily modified, and finds many uses in industry as adhesives, in paper products, as an anti-sticking agent, and textile manufacturing.

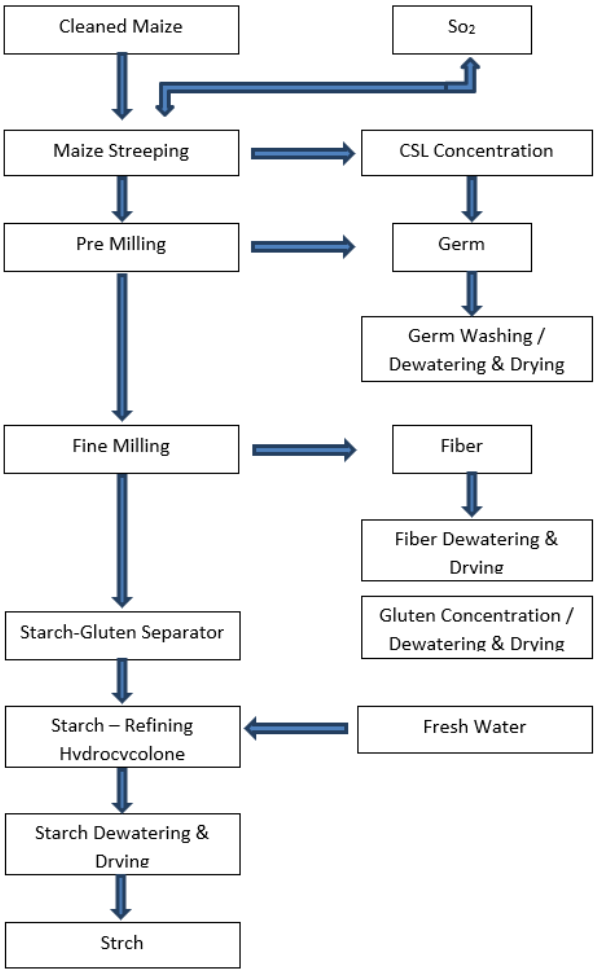


Fig 1: Manufacturs of starch from maize

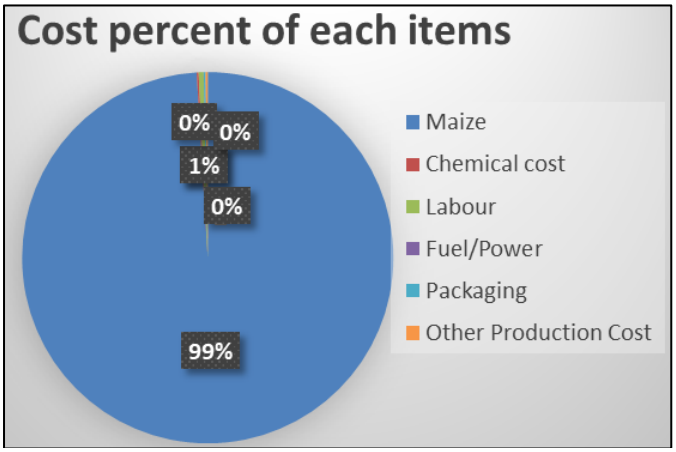
Results and Discussion

Economics of Maize starch (50 kg bag) at Rajaram Maize Products is presented in table 1. It reveals that the total variable cost for making of 50 kg bag corn starch was to be Rs. 979.70 The major cost was raw materials about 99.02 percent of the total cost. The cost benefit ratio was observed to be 0.22 and input output was 1.22.

Table 1: Economics of Starch at Rajaram Maize Product.

S. No.	Items	Quantity	Average Cost of 50Kg bag (in Rs.)	Average Cost of 1Kg (in Rs.)	%age of Total cost
1.	Raw Materials:				
2.	Maize	74.63kg	970.19	19.40	99.02
3.	Chemical cost		1.75	0.035	0.17
4.	Labour	-	4.5	0.09	0.43
5.	Fuel/Power		0.013	0.0002	0.001
6.	Packaging		2	0.04	0.16
7.	Other Production Cost		1.25	0.025	0.19
8.	Total Cost		979.70	19.59	100
9.	Sale price (Total return)		1200	24	
10.	Net return/Benefit		220.30	4.41	
11.	C/B ratio		0.22	0.22	
10.	Input – output ratio		1.22	1.22	

***Source*:** Personal survey



Graph 1: Economics of corn starch

Conclusions

The total variable cost for making of 50 kg bag corn starch was to be Rs. 979.70 The major cost was raw materials about 99.02 percent of the total cost. The benefit – cost ratio was observed to be 1:0.22 and input – output ratio was 1:1.22.

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