## TABLE OF CONTENTS

Chapter	Title	Page No.
1	INTRODUCTION	1-9
2	REVIEW OF LITERATURE	10-26
2.1	Rice-based extrusion cooking	10-15
2.2	Extrusion cooking of sweet-potato	15-18
2.3	Extrusion cooking of yam	18-20
2.4	Extrusion cooking of various crops and vegetables	20-25
2.5	Extrusion cooking using twin-screw extrusion	25-26
3	MATERIALS AND METHODS	27-38
3.1	Materials	27
3.2	Methods	27-38
4	RESULTS AND DISCUSSION	39-64
4.1	Experimental design and statistical analysis	39-42
4.2	Properties of 20 extrudates of rice and sweet potato blends	42-47
4.3	Selection of best-5 extrudates based on appearance	48-49
4.4	Properties of the selected 5 extrudates	49-54
4.5	Development of rice extrudates under optimized conditions	54-56
4.6	Properties of the rice extrudates prepared under optimized	57-64
	conditions	
5	SUMMARY AND CONCLUSION	65-67
5.1	Summary	65-67
5.2	Conclusion	67
5.3	Future scope of work	68
6	BIBLIOGRAPHY	69-73
	Annexure 1	74

## **LIST OF FIGURES**

Figure	Title	Page No.
No.		
3.1	Photo of greater yam(Dioscorea alata)	28
3.2	Photo of sweet potato(Ipomoea batatas)	28
3.3	Photo of rice (Oryza sativa) used in the study	29
3.4	Photo of single screw extruder used in the study	29
3.5	The L, a, b scale used in Hunter Color Lab	31
4.1	3-D graphs showing changes in EI, BD and BS wr.t.changes in screw speeds(SS),barrel temperatures(BT) and feed composition(FCM).	45-46
4.2(a-e)	Photographs of extrudates of rice and sweet potato (RS-1 to RS-5)	49-51
4.3	RVA graph showing changes in viscosity against time of samples RS-1 to RS-5	52
4.4	Sensory graph of samples RS-1 to RS-5	54
4.5(a-c)	Photographs of extrudates of rice incorporated with sweet potato, yam, tomato and chilli powder.	55-56
4.6	Graph showing amylose content of various samples	60
4.7	Graph showing proximate composition of samples RS, RY and RST	61
4.8	Graph representing sensory profile of samples RS, RY and RST	62
4.9	Graph showing the DPPH results of samples RS, RY and RST	63
4.10	Graph showing the FRAP results of samples RS, RY and RST	64

## LIST OF TABLES

Table No.	Title	Page No.
3.1	Profile for Std.1 of RVA	30
4.1	Experimental design for extrusion experiment with coded	40
	and actual variable levels	
4.2	ANOVA results for fitted models of product properties	41
4.3	Optimized parameters in the response optimizer	41
4.4	Optimized solution obtained using the response optimizer	42
4.5	Color profile of the 20 extrudate samples made from rice	43
	flour and sweet potato	
4.6	Physical properties of the 20 extrudate samples made from	44
	rice flour and sweet potato	
4.7	WAI and WSI properties of the 20 extrudate samples made	47
	from rice flour and sweet potato powder	
4.8	Appearance-based scores given to the 20 extrudates of rice	48
	and sweet potato	
4.9	Change of sample codes	49
4.10	RVA profile of samples RS-1 to RS-5	52
4.11	Sensory Profile of samples RS-1 to RS-5	53
4.12	Feed composition for extrusion under optimized conditions	55
4.13	Colour profile of samples RS, RY and RST	57
4.14	Texture profile of samples RS, RY and RST	57
4.15	RVA profile of samples RS,RY and RST	58
4.16	Water Absorption and solubility indices of samples RS,RY	59
	and RST	
4.17	Amylose content of various samples	59
4.18	Proximate profile of samples RS, RY and RST	61
4.19	Sensory Profile of of samples RS, RY and RST	62
4.20	Antioxidant profile of samples RS, RY and RST	63

## LIST OF ABBREVIATIONS

H.P.-Horse Power AOAC- Association of Official Analytical Chemists DPPH-2, 2-diphenyl-1-picrylhydrazyl FRAP- Ferric Reducing Antioxidant Property TPTZ-2,4,6-tri(2-pyridyl)-1,3,5-triazine **PV-** Peak Viscosity HV-Hold Viscosity FV- Final Viscosity **BD-Breakdown TSB-** Total Setback P.T.- Pasting Temperature WAI- Water Absorption Index WSI- Water Solubility Index SS- Screw speed **BT-Barrel** Temperature FCM-Feed composition **EI-Expansion Index BD-**Bulk Density

BS- Breaking Strength