Examining Public Awareness, Knowledge, and Perceptions of Green Firecrackers in Vijayawada"

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Abstract:Green firecrackers have been developed by the Council for Scientific and Industrial Research (CSIR) with the primary aim of mitigating pollution and health hazards. These eco-friendly alternatives release pollutants at a significantly lower rate, approximately 30% less than their traditional counterparts. It is crucial for all citizens to be well-informed about green firecrackers. In light of this, a study was conducted to assess public awareness, knowledge, and perceptions of these innovative fireworks.

Data for this study was gathered through structured questionnaires administered via direct interviews. A total of 201 responses were collected using a simple random sampling method, and the data was subsequently analyzed using the Statistical Package for the Social Sciences (SPSS).

The findings revealed that individuals with limited education have a lesser awareness of green firecrackers, showing agreement but lacking strong confidence in understanding what these fireworks emit and their degree of eco-friendliness. In contrast, educated individuals demonstrated a greater awareness of green firecrackers and their environmental impact.

Despite their awareness, educated individuals were less inclined to purchase green firecrackers due to their higher cost and limited variety. To promote the adoption of eco-friendly firecrackers, it is recommended that governments, social service organizations, and educational institutions actively promote and endorse them. Additionally, governments should consider offering

subsidies to manufacturers to ensure that green firecrackers are accessible to the general public in terms of pricing.

KEYWORDS: Green crackers, eco-friendly, perception, knowledge, awareness,

1. Introduction: Green crackers, developed by the Indian Council of Scientific and Industrial Research (CSIR), encompass a range of firework types, including flower pots, pencils, sparklers, and chakkars. These eco-friendly alternatives are designed to mitigate air pollution, which poses health hazards. CSIR has established partnerships with approximately 230 companies for the production and sale of these green crackers in the market.

Each year, the air quality in India deteriorates to the point where it resembles thick fog, but it is, in fact, smog, a combination of smoke and fog. The introduction of green crackers in India is poised to have a significant positive impact on air quality. Additionally, the adoption of green crackers may reduce the occurrence of accidents that often result in the loss of life, particularly among children and adults.

However, one major drawback of green crackers is that only those manufacturers who have entered into agreements with CSIR are permitted to produce them. This could potentially render traditional cracker-producing industries and small manufacturing units unemployed.

Several factors contribute to the appeal of green crackers. They are 25-30% cheaper to manufacture, requiring no facility modifications. Green crackers are expected to produce at least 30% less air pollution compared to traditional firecrackers and generate less sound pollution, benefiting animals, the elderly, and individuals with heart conditions. Furthermore, they do not contain barium nitrate, a hazardous element commonly found in regular crackers.

Green crackers are categorized into three types:

SWAS (Safe Water Releaser): These crackers release water vapor into the air, suppressing dust emissions. They do not contain potassium nitrate or sulfur, and a diluent is released to reduce gaseous emissions, resulting in approximately 30% less particulate dust.

STAR (Safe Thermite Cracker): This type also excludes potassium nitrate and sulfur, leading to reduced particulate matter disposal and a decrease in sound intensity.

SAFAL (Safe Minimal Aluminium): SAFAL crackers minimize the use of aluminum, opting for magnesium instead. This results in reduced sound compared to traditional crackers.

The benefits of green crackers are substantial. They contribute to a smog-free environment, reduce harmful gases in the air, decrease the generation of waste, safeguard the well-being of animals and pets, and lower the occurrence of fire-related accidents. By adopting green crackers,

individuals can enjoy a safer and more environmentally responsible approach to celebrating festivals.

LITERATURE REVIEW:

The study by Gyan Prakash and Pramod Pathak (2017) in the "Journal of Cleaner Production" delves into the intentions of young Indian consumers regarding eco-friendly products. The research suggests a positive consumer attitude toward such products, with a willingness to pay a premium. It highlights the need for future studies to bridge the intention-behavior gap.

William Young's 2017 article on "Sustainable Consumption" challenges the notion that green consumers alone can drive change. It emphasizes that government incentives and clear labeling play a crucial role in guiding consumer efforts. It also raises concerns about the time and space required for sustainable choices in increasingly busy lifestyles.

Madalyn Marie Smith's study (2015) explored the impact of environmentally friendly packaging on consumers' attitudes and intentions toward apparel retail brands. The findings underscore the value of eco-friendly packaging in enhancing positive consumer perceptions and intentions to patronize such brands.

The study by N. Divyapriyadharshini et al. discusses consumer awareness of green products and its impact. It highlights health concerns as a significant driver for purchasing green products.

Sharon's study in 2015 focuses on labeling effects on consumer acceptance, indicating that education and awareness about low carbon footprint and eco-friendly labeling are essential for promoting green products.

Swetha Sinha and Kavitha Goyal's discussion on the evolution from conventional to green crackers in India highlights the transition toward eco-friendly fireworks. Green crackers are designed to be less hazardous, producing less smoke and ash, and they reduce the use of hazardous materials like barium nitrate. Various agencies are promoting their adoption as a safer alternative.

Research gap

To date, numerous researchers have extensively explored consumer behavior and perceptions regarding eco-friendly products such as cosmetics and the use of single-use plastics. They have also delved into health hazards associated with chemical products and the government's initiatives to ban plastic, leading many companies to transition to eco-friendly alternatives and adapt their business practices to align with environmental concerns. While these studies have

been conducted across various countries and regions, there remains a significant research gap in the context of Vijayawada.

Surprisingly, limited research has focused on green crackers, and their full-scale implementation is yet to be realized in this region. This gap in the existing body of research presents a unique opportunity to gain a deeper understanding of the attitudes and perceptions of consumers in Vijayawada, particularly concerning green crackers. This study aims to provide a comprehensive overview of consumer attitudes and opinions within the city, shedding light on this relatively unexplored aspect of eco-friendly practices and products.

OBJECTIVES OF THE STUDY:

1) To study the different types of green crackers in India

2) To examine the awareness , perception of public towards green crackers

3) To examine the influence of demographical factors towards purchase of green crackers

HYPOTHESIS

H0:opinions on green crackers are eco-friendly is independent of age.
H1:opinions on green crackers are eco-friendly is dependent on age

H10: opinions on green crackers are independent of education

H11: opinions on green crackers are dependent on education

H20 : consumption behaviour of green crackers is independent of gender

H21: consumption behaviour of green crackers is dependent on gender

H30: consumption behaviour of green crackers is independent if price is high

H31: consumption behaviour of green crackers is dependent if price is low

H40: Green crackers are harm less and reduce air pollution is independent on education

H41: Green crackers are harm less and reduce air pollution is independent on education

2. Research of methodology

This study employed a descriptive research methodology, utilizing a combination of convenient and judgmental sampling techniques. A structured questionnaire was distributed to 1600 respondents, resulting in 201 valid responses. The study focused on the general public of Vijayawada city. Data analysis was conducted using the SPSS software. In addition to primary

data, secondary data was gathered from journals, magazines, and newspapers to enhance the research findings.

3.   Results and Discussion

HYPOTHESIS TESTING

1. HYPOTHESIS TEST FOR AGE AND OPINION ON GREEN CRACKERS ARE ECO FRIENDLY

Null Hypothesis:

Opinions on green crackers are eco-friendly is independent of age.

Alternative Hypothesis:

Opinions on green crackers are eco-friendly is dependent on age.

TABLE: 1

Count

		GREENCRACKERSAREECOFRIENDLY				Total
		STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	
AGE	BELOW 18	5	13	2	2	22
	18-25	35	88	20	3	146
	25-35	1	15	0	0	16
	35-45	2	10	0	0	12
	ABOVE 45	1	2	2	0	5
Total		44	128	24	5	201

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.976	12	.116
Likelihood Ratio	19.731	12	.072
Linear-by-Linear Association	.034	1	.855
N of Valid Cases	201		

CHI-SQUARE TEST

Here we test the hypothesis that opinions on green crackers are eco-friendly is dependent on age or not.

For this hypothesis the significant value (0.116) is greater than the level of significance (0.05), **we accept our null hypothesis**. Therefore, opinions on green crackers are eco-friendly is independent of age.

TABLE: 2

2.   HYPOTHESIS TESTING ON EDUCATION AND OPIONONS ON GREEN CRACKERS

Null Hypothesis:

Opinions on green crackers are independent of education

Alternative Hypothesis:

Opinions on green crackers are dependent on education

EDUCATION   *   GREENCRACKERSATLEAST30PERCENTEMISSION Crosstabulation

Count

	GREENCRACKERSATLEAST30PERCENTEMISSION				Total
	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	
INTER	11	19	0	3	33
degree	22	72	16	6	116
PG	13	20	11	2	46
PHD	2	4	0	0	6
Total	48	115	27	11	201

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.346	9	.082
Likelihood Ratio	20.102	9	.017
Linear-by-Linear Association	.139	1	.709
N of Valid Cases	201		

CHI-SQUARE TEST

Here we test the hypothesis that opinions on green crackers are dependent on education or not.

For this hypothesis the significant value (0.082) is greater than the level of significance (0.05), we accept our null hypothesis. Therefore, opinions on green crackers are independent of education.

TABLE: 3

3 . GENDER – CONSUPTION OF GREEN CRACKERS DEPENDING ON GENDER

		WILLYOUBUYGREENCRACKERSIFTHEPRICESAREHIGH			Total
		YES	NO	MAYBE	
GENDER	MALE	35	21	21	77
	FEMALE	41	43	40	124
Total		76	64	61	201

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.136	2	.209
Likelihood Ratio	3.118	2	.210
Linear-by-Linear Association	2.111	1	.146
N of Valid Cases	201		

CHI-SQUARE TEST

Here we test the hypothesis that consumption behaviour of green crackers is dependent on gender or not

Null Hypothesis:

consumption behaviour of green crackers is independent of gender

Alternative Hypothesis:

consumption behaviour of green crackers is dependent on gender

For this hypothesis the significant value (0.209) is greater than the level of significance (0.05), we accept our null hypothesis. Therefore, consumption behaviour of green crackers is independent of gender.

TABLE: 4

4. WILL YOU BUY GREEN CRACKERS IF THE PRICES ARE

Null Hypothesis:

consumption behavior of green crackers is independent on price

Alternative Hypothesis:

consumption behavior of green crackers is dependent on price

Count

		WILLYOUBUYGREENCRACKERSIFTHEPRICESAREHIGH			Total
		YES	NO	MAYBE	
INCOME	BELOW 1LAKH	29	27	22	78
	1-5LAKH	29	27	28	84
	5-10LAKH	14	7	7	28
	10-15LAKH	4	1	4	9

	ABOVE 15 LAKH	0	2	0	2
Total		76	64	61	201

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.769	8	.362
Likelihood Ratio	9.342	8	.314
Linear-by-Linear Association	.035	1	.851
N of Valid Cases	201		

CHI-SQUARE TEST

Here we test the hypothesis that consumption behaviour of green crackers is dependent on price

For this hypothesis the significant value (0.362) is greater than the level of significance (0.05), we accept our null hypothesis. Therefore, consumption behaviour of green crackers is independent of price

TABLE:5

5 **EDUCATIONS AND GREEN CRACKERS ARE HARMLESS AND REDUSE POLLUTION**

Null hypothesis : Green crackers are harm less and reduse air pollution is independent on education

Alternative hypothesis : Green crackers are harm less and reduse air pollution is independent on education

Count

		GREENCRACKERSDONOTHAVEHARMFULCHEMICALSANDREDUCEAIRPOLLUTION				Total
		STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	
EDUCATION	INTER	7	22	1	3	33
	DEGREE	32	60	15	9	116
	PG	15	21	7	3	46
	PHD	6	0	0	0	6
Total		60	103	23	15	201

Source: Field survey

Chi square test	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.083	9	.017
Likelihood Ratio	21.248	9	.012
Linear-by-Linear Association	2.418	1	.120
N of Valid Cases	201		

CHI-SQUARE TEST

Here we test customers knowledge weather the green crackers will reduce air pollution or not depending up on education

For this hypothesis the significant value (0.17) is greater than the level of significance (0.05), we accept our null hypothesis.

Findings: The study revealed that a significant majority of the respondents, approximately 69.6%, were students, indicating a predominantly educated sample.

Interestingly, the research found that the purchasing behavior related to green crackers was not significantly influenced by income levels or age.

Furthermore, the likelihood of green cracker consumption was notably influenced by the perception of their eco-friendliness, indicating a strong connection between environmental consciousness and product preference.

It was observed that individuals with lower levels of education exhibited less awareness about green crackers, often expressing agreement without a strong and confident understanding of the products and their eco-friendly attributes. In contrast, educated individuals demonstrated a higher level of awareness regarding green crackers and their underlying causes.

4. Conclusions: It is evident that green crackers offer an eco-friendly alternative that contributes to the reduction of air pollution. However, the study underscores a significant lack of awareness among the majority of the population regarding green crackers and their composition. To address this, there is a pressing need for government-led initiatives aimed at raising awareness about green crackers and their societal and eco-friendly benefits.

Furthermore, even among educated individuals, the research indicates a limited inclination to purchase green crackers due to their relatively higher cost and limited variety. To promote the adoption of these eco-friendly products, it is recommended that governments, social service organizations, and educational institutions collaborate to encourage the use of green crackers. One effective strategy could involve government incentives, such as subsidies for manufacturers, to ensure that the prices of green crackers are accessible to a wider range of the public, thereby facilitating a shift towards more sustainable and environmentally responsible celebrations.

ACKNOWLEDGMENTS:

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