



QUALITY AND ANTIOXIDANT CHARACTERIZATION OF A CHICKPEA-BASED VEGAN MEAT ANALOGUE

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Abstract: Driven by increasing concerns regarding personal health, environmental sustainability, and animal welfare, plant-based nutrition is rapidly gaining global traction. Consequently, vegan meat analogues—particularly those replacing processed meat products—have become the focus of rigorous scientific investigation. This study describes the formulation and characterization of two chickpea-based vegan pariser analogues: a plain version (CBVB1) and a variant incorporated with beetroot powder as a natural colorant (CBVB2). The products were evaluated for total polyphenol content (Folin-Ciocalteu method), antioxidant potential (DPPH assay), proximate composition, and sensory attributes (5-point hedonic scale). Results indicated that both formulations contained substantial total polyphenols, with CBVB2 exhibiting the highest concentration. Both products demonstrated superior antioxidant capacity, maintaining significant DPPH radical scavenging activity even at high dilutions (1:100 and 1:1000), with the strongest antiradical performance observed in CBVB2. Proximate analysis revealed negligible nutritional and energetic differences between the two variants. Compared to conventional meat-based pariser, these chickpea analogues were cholesterol-free, lower in lipids and proteins, and reduced in caloric density, while being significantly enriched with dietary fiber. Sensory evaluation showed that the beetroot-enhanced variant was the most preferred by panelists. While the plain version received a "satisfactory" rating for color, all other organoleptic characteristics for both formulations were highly rated, suggesting that chickpea-based pariser is a viable and health-promoting meat alternative.

Results and discussions

Bologna analogue assortment	CBVB1	CBVB2
Ingredient (%)		
Chickpea flour	20	20
Water	67	66
Garlic powder	0.3	0.3
Black pepper	0.3	0.3
Dried thyme	0.3	0.3
Sweet paprika	0.3	0.3
Soy sauce	0.8	0.8
Olive oil	10	10
Salt	1	1
Beert root powder	-	1

Sample	Total polyphenols content (mg GAE/100g)
Chickpea flour	61.08 ± 1.02
Garlic powder	511.23 ± 4.05
Black pepper	645.11 ± 3.78
Dried thyme	1108.71 ± 9.56
Sweet paprika	218.72 ± 2.26
Soy sauce	141.15 ± 1.88
Olive oil	138.34 ± 1.29
Beetroot powder	338.64 ± 2.86
CBVB1	28.14 ± 0.44
CBVB2	30.47 ± 0.51

Sample	Dilution	RSA (%)
Chickpea flour	1:100	15.11 ± 0.19
Garlic powder	1:100	88.14 ± 0.38
Black pepper	1:100	90.42 ± 0.40
Dried thyme	1:100	93.35 ± 0.44
Sweet paprika	1:100	44.81 ± 0.24
Soy sauce	1:100	25.61 ± 0.22
Olive oil	1:100	21.42 ± 0.16
Beetroot powder	1:100	86.62 ± 0.33
CBVB1	1:10	91.86 ± 0.48
	1:100	61.33 ± 0.24
CBVB2	1:1000	28.14 ± 0.12
	1:10	96.04 ± 0.50
	1:100	64.82 ± 0.29
	1:1000	30.16 ± 0.11



CBVB1 CBVB2
 Chickpea-based vegan bologna analogues

Conclusions

The chickpea-based vegan analogues developed in this research demonstrate a harmonious balance between nutritional density and high sensorial acceptability. The manufacturing process is characterized by technical simplicity and a reduced environmental footprint, offering a sustainable alternative to conventional meat-based processing methods. By aligning with contemporary trends aimed at mitigating meat consumption, these innovative formulations serve as viable dietary solutions for vegan, vegetarian, and flexitarian populations

