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Abattoir blood and its potential role in reducing food waste

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INTRODUCTION

- Nearly one-third of the food produced globally is wasted each year, posing significant economic, environmental, and food security challenges.
- The red meat industry generates large amounts of by-products such as blood, which remain underutilised or discarded despite their nutritional potential.
- Improper disposal of blood contributes to organic pollution and increases the biochemical oxygen demand (BOD) of abattoir wastes.
- Impacting wastewater systems and the environment.
- Properly collected and processed blood can be transformed into functional food ingredients.
- Contributing to sustainable production and waste reduction.

(Ofori & Hsieh, 2014; Álvarez-Castillo et al., 2023)

CHEMICAL COMPOSITION OF ABATTOIR BLOOD

Table 1: Chemical composition of abattoir blood from different animals on dry matter

Parameters	Chicken	Duck	Pig	Cattle
Proximate composition of dried blood (%)				
Moisture	2.83	2.71	2.19	6.85
Protein	88.27	89.70	90.97	79.18
Carbohydrates	1.65	0.41	0.36	*
Fat	0.15	0.43	0.86	*
Ash	9.93	9.45	7.81	4.13
Mineral content (mg/kg)				
Iron	1816.62	1803.06	1490.14	195.46
Mg	387.67	471.15	309.93	16.50
Cu	26.32	20.74	36.71	*
Zn	42.53	41.50	33.26	*
Cr	0.78	0.61	1.07	*
Mn	49.75	2.89	3.33	*

(Sorapukdee, & Narunatsopanon, 2017; Csurka et al., 2021; Chiroque et al., 2023) *not reported

BLOOD COLLECTION AND STORAGE CONDITIONS

Open System:

- Blood drains freely into open containers placed beneath the carcass during slaughter.
- Inexpensive and straightforward, but it carries a high risk of contamination from airborne particles, dust, and contact surfaces.
- Generally unsuitable for food-grade applications / can be used for technical or non-edible purposes (e.g., biogas, fertiliser production).

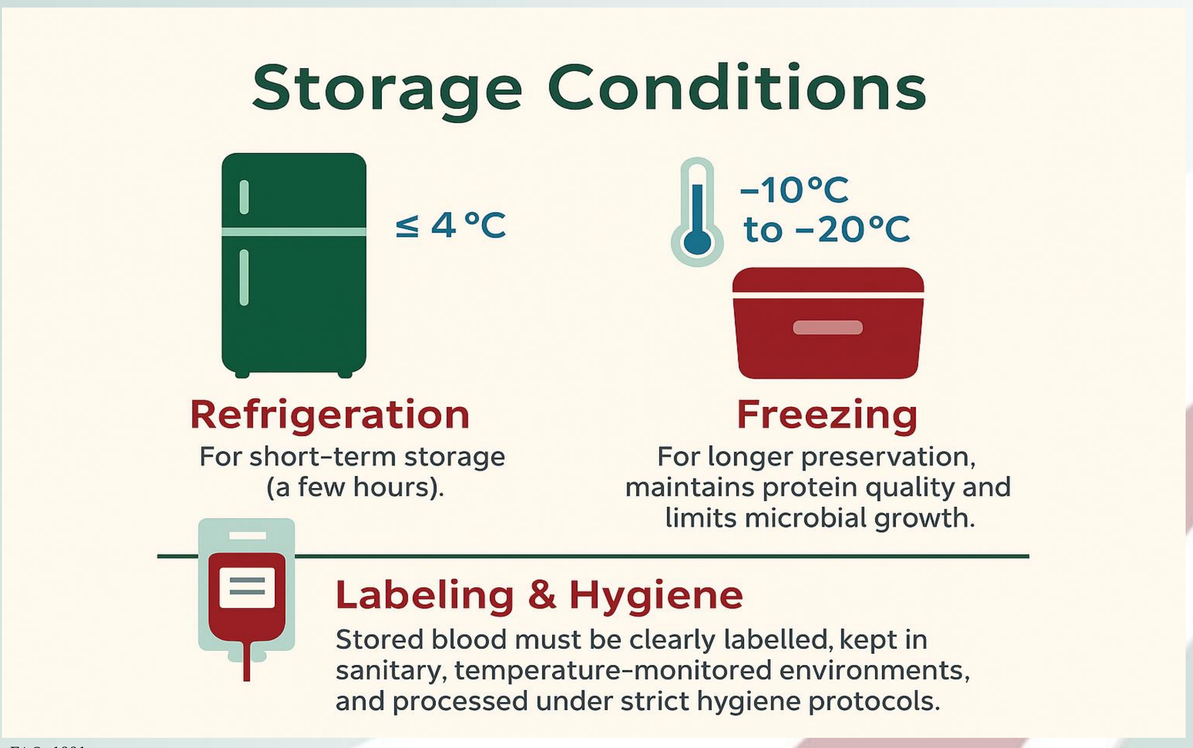
Closed System:

- Blood is collected through a sterile hollow knife inserted into the carotid–jugular vein.
- The knife collects blood directly into a sealed stainless steel/ this minimises microbial contamination.

Recommended for edible and research purposes

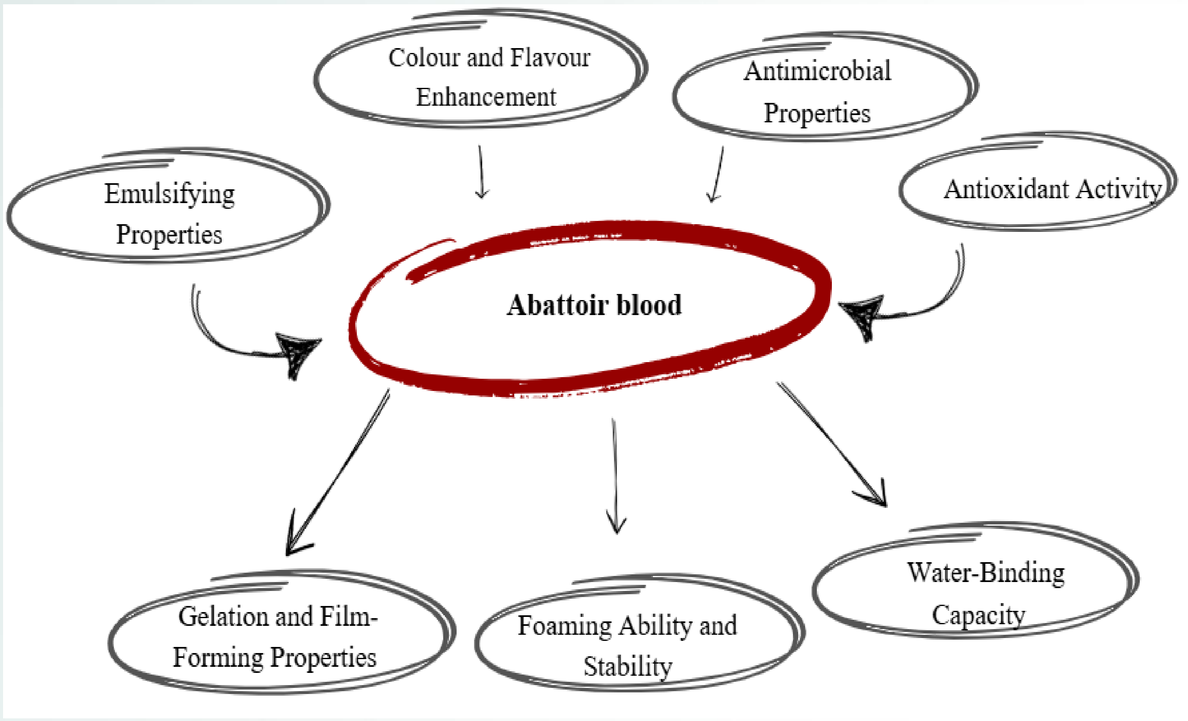
Note: During collection anticoagulants (e.g. sodium citrate) are added to prevent clotting

(Bah et al., 2016)



FAO, 1991

FUNCTIONAL PROPERTIES OF ABATTOIR BLOOD



(Gupta et al., 2024)

CURRENT USES OF ABATTOIR BLOOD IN FOOD

- Abattoir blood has gained global attention as a valuable food ingredient.
- Many European and Asian countries have advanced blood protein processing for food fortification
- These support circular economy models and reduce abattoir waste.

Toldrá et al. (2021)

- In South Africa, abattoir blood usage remains limited.
- It is mostly discarded or processed into blood meal.
- With regulatory gaps and limited technology for processing.
- However, the Agricultural Research Council-Animal Production (ARC-AP) has initiated research on the use of abattoir blood for human consumption.
- This research was conducted on the development of blood sausages using pig and cow blood
- The developed products received at least 66 % overall acceptability from consumer tasting panel


Pig blood sausage in a natural casing


Sliced cured cow blood sausages

FUTURE PROSPECTS

- Future research should focus on improving consumer awareness regarding the utilisation and consumption of abattoir blood products.
- Experiment with individual blood components to better understand their functional properties and potential applications
- Initiating regulations to enable broader use of blood in food systems.

CONCLUSION

Effective utilisation of abattoir blood supports waste reduction, resource efficiency, and sustainable protein recovery within the meat value chain

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