

Development and Quality of Rica-Rica as Indonesian Traditional Food: A Narrative Review

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Article Information	ABSTRACT
Article History Received : December 02, 2025 Revised : December 24, 2025 Published : January 04, 2026 Keywords: <i>Development;</i> <i>Rica-rica;</i> <i>Traditional Food.</i>	This narrative review explores rica-rica, a traditional North Sulawesi spicy dish, examining its historical roots, production process, and contemporary adaptations. Literature searches were conducted from January to August 2025 across major databases (PubMed/MEDLINE, Scopus, Web of Science, Google Scholar) and Indonesian repositories (Garuda Portal, Indonesian Publication Index), yielding 48 relevant sources. Rica-rica, characterized by intense chili heat, holds philosophical significance for Minahasan people who liken spiciness to life's inevitable challenges. The preparation involves grinding and sautéing spices, then cooking with various meats including poultry, mammals, seafood, and game animals. Meat selection significantly affects nutritional content, with protein ranging from 12.1% (broiler chicken) to 82.96% (dried snails). Game meat consumption, culturally valued by Minahasans, poses health risks from potential microbial contamination, viruses, and zoonotic diseases. Modern innovations such as instant seasonings, frozen products, and canned rica-rica, address contemporary demands while preserving culinary heritage. Although rica-rica offers culinary, cultural, and nutritional value, hygienic processing and safe ingredient selection are crucial to minimize consumer health risks. Future research should focus on empirical nutritional analysis, microbiological risk assessment along supply chains, and consumer acceptance studies of sustainable meat alternatives.

INTRODUCTION

Indonesia is an archipelago that is widely known for its natural and cultural richness. The diverse landscape, encompassing mountains, coastal areas, tropical forests, and fertile lowlands, has given rise to a diverse range of flora and fauna, which local communities utilize as food resources. This utilization not only reflects the community's ability to adapt to the environment but also creates a unique culinary knowledge system deeply rooted in local traditions and cultural values. As a result, nearly every region in Indonesia boasts a rich array of traditional culinary delights, varying in ingredients, processing techniques, and symbolic meanings.

One region with a distinctive and unique culinary heritage is North Sulawesi. The indigenous population of this region is predominantly from the Minahasa ethnic group, which, according to demographic data, comprises approximately 30% of North Sulawesi's population (Rubama et al., 2022). The term "Minahasa" first appeared in Dutch records in 1789 as a term for a village council and then expanded in meaning in 1820 to become a geographical and

ethnocultural identity referring to the people inhabiting the northern region of Sulawesi (Subekti & Yuwanto, 2023; Weichart, 2004). This historical process demonstrates the formation of a collective identity from various subethnicities that were originally linguistically and culturally separate.

The Minahasan philosophy of life is also strongly reflected in their culinary practices. One of the main characteristics of Minahasan cuisine is the large use of chilies, which impart a pungent, spicy sensation. This spiciness not only is considered a flavor element but also has symbolic meaning. The burning and painful sensation left on the tongue after consuming chilies is interpreted as a metaphor for life: that pain is an inevitable part of life that must be accepted and faced (Schlossareck & Ross, 2020). In this context, spicy food becomes a medium for expressing cultural and spiritual values.

One of the dishes that best represents this philosophy is *rica-rica*. The term "*rica*" literally means "spicy" in Manadoese and has become a signature dish of North Sulawesi cuisine, rich in chili flavor. *Rica-rica* not only is a chili sauce but is also used as a season for various meats (Surya & Tedjakusuma, 2022). For the Minahasan people, the use of chilies in *rica-rica* is closely related to the habit of consuming hunted meat, such as that of forest rats, bats, dogs, and wild boars (Wenas, 2007). Meat from game animals is known to have a "stronger" taste because it has a higher content of unsaturated fatty acids than does regular livestock meat (Djekic et al., 2023). To balance these flavors, a spice blend that can match the intensity of the flavor of the meat is needed; thus, *rica-rica* acts as a bridge between flavor and cultural identity.

However, although *rica-rica* has long been a part of Indonesia's culinary heritage, academic and scientific studies of this dish are still limited, especially internationally. Studies on *rica-rica* are generally discussed only in the context of popular culture or kitchen recipes, with little attention given to its history, food anthropology, or transformation into modern eating culture. Therefore, this review aims to further explore the role of *rica-rica* in the Indonesian culinary landscape, examine its historical roots and production process, and examine how this dish has evolved and adapted to the contemporary culinary landscape.

RESEARCH METHODS

This study employed a narrative review methodology to synthesize scientific and cultural information on *rica-rica*, a traditional dish from North Sulawesi. The narrative approach was selected due to the interdisciplinary nature of the topic and the limited peer-reviewed sources that specifically address this culinary tradition. A comprehensive literature search was conducted from January to August 2025 using major academic databases—PubMed/MEDLINE, Scopus, Web of Science, ScienceDirect, Google Scholar, ProQuest—and Indonesian repositories such as Garuda Portal and the Indonesian Publication Index. Search strategies combined English and Indonesian keywords related to *rica-rica*, Indonesian traditional foods, Minahasan cuisine, chili peppers, meat processing, game meat consumption, and cultural food practices. The literature identification and screening process is presented in Figure 1.

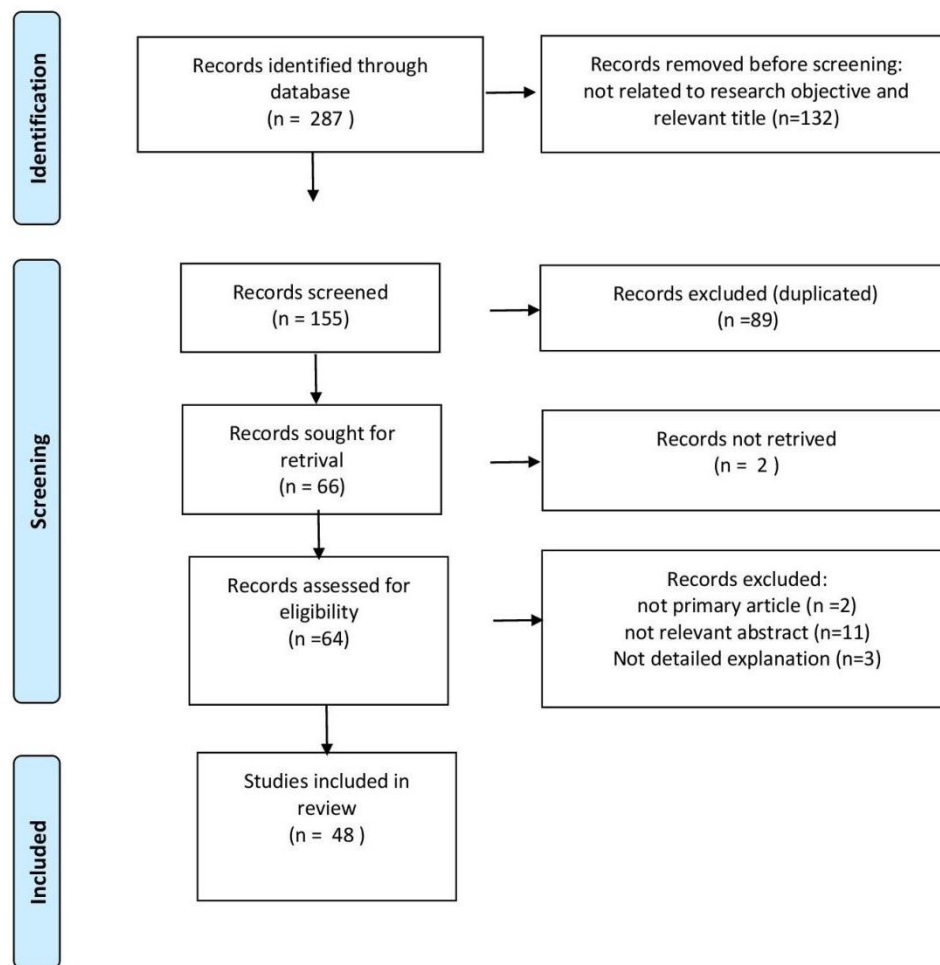


Figure 1. Literature identification and screening process

Eligible publications included peer-reviewed articles, academic books, conference papers, government reports, and accredited theses that provided relevant information on culinary history, cultural practices, nutritional composition, food processing techniques, or food safety. Non-scientific sources, promotional materials, unclear authorship, duplicates, and opinion-based writings were excluded. Following full-text assessment, 48 sources were finally included in this narrative review.

Source quality was evaluated based on publication type classification: peer-reviewed journal articles were considered primary scientific sources; academic books and government reports were classified as authoritative secondary sources; and theses/dissertations from accredited institutions were accepted as tertiary sources. Extracted data encompassed the cultural origins of rica-rica, traditional processing methods, ingredient profiles, nutritional characteristics of commonly used meats, safety considerations, and modern adaptations. All information was synthesized narratively and organized into five thematic categories: (1) historical and cultural context, (2) traditional preparation methods, (3) ingredient diversity and variations, (4) nutritional composition and health risks, and (5) modern adaptations and product innovations. This thematic organization allowed for a comprehensive understanding of the historical, culinary, nutritional, and contemporary aspects of rica-rica.

RESULTS AND DISCUSSION

History of Rica-Rica

Historically, chili peppers were not native to Asia but originated in South China and Central America (Makhziah et al., 2021). The spread of chili peppers to Asia, including Indonesia, is inseparable from the dynamics of the struggle for power and influence along spice trade routes during the colonial era. There are two main theories explaining the origins of chili peppers in North Sulawesi. The first theory states that the Portuguese, who had established a foothold in Maluku since 1512, began expanding their influence to North Sulawesi in 1563. They not only brought Catholicism but also introduced plants native to the Americas, including tomatoes and chili peppers. Through the spice trade routes they controlled in the 16th and 17th centuries, the Portuguese are thought to have been the first to trade chilies to various regions in the Indonesian archipelago (Kementerian Pertanian, 2017). A second theory suggests the involvement of the Spanish, who began to arrive in the region when Portuguese dominance began to weaken due to Dutch intervention, particularly in Maluku and North Sulawesi (Manus et al., 1982). In 1580, Spanish made Manado Tua Island a stopover to collect fresh water. During their stay, they planted various crops originating from the Americas, including chili peppers, and began their own spice trade. Over time, chili peppers have spread widely throughout Indonesia and have become an integral part of local culinary culture, including the typical cuisine of the Minahasa people of North Sulawesi. The Minahasa people inhabit the Minahasa Regency, North Minahasa Regency (Minut), Southeast Minahasa Regency (Mitra), South Minahasa Regency (Minsel), Manado City, Bitung City, and Tomohon City, which, by customary law, constitute Minahasa Land, as presented in Figure 2.

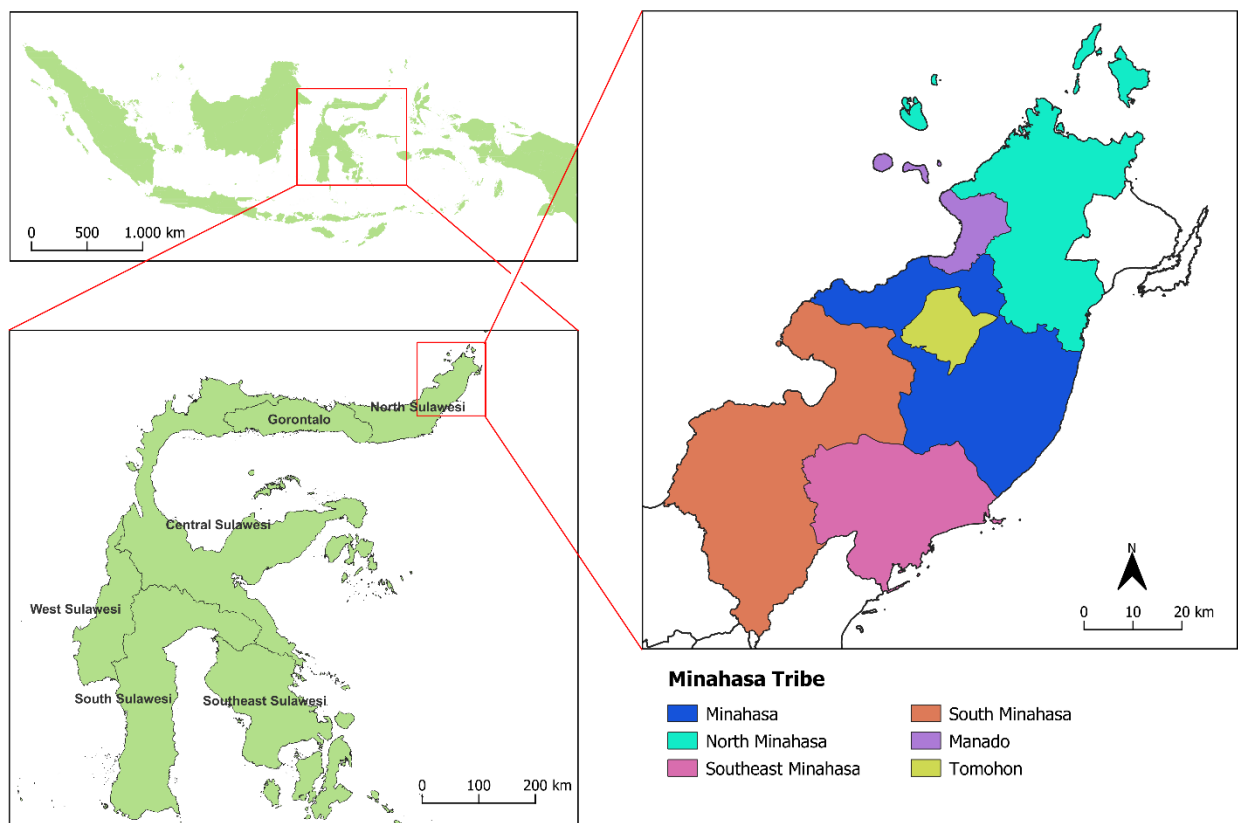


Figure 2. Distribution of Minahasa Tribe

Making Rica-Rica

There are two main steps in making rica-rica. The first step is preparing and processing the rica-rica seasoning. The composition of this seasoning varies but generally consists of shallots, garlic, candlenuts, and red chilies, which are ground first. Once the base is ready, the next step is to sauté the ground spices in a small amount of hot oil in a pan. When spices begin to smell fragrant, slices of ginger, galangal, and lemongrass are added to enhance their aroma and flavor. This process is generally modified, with some adding sliced or ground ginger, galangal, and lemongrass along with the previous ingredients. The sauté process is completed by adding enough granulated sugar, lime juice, and sliced spring onions and lime leaves. Whole bird's eye chilies and basil leaves are also added to provide the spicy sensation and distinctive aroma that are the main characteristics of rica-rica. Once the spices are cooked and thoroughly mixed, the second step is carried out, which involves cooking the main ingredients, such as meat or fish, with the prepared rica-rica seasoning (Mappa et al., 2022). The process of making rica-rica is presented in Figure 3.



Figure 3. The process of Making Rica-rica

VARIETIES OF RICA-RICA

Variations of rica-rica are generally distinguished by the type of main ingredient cooked with the spices, ranging from various poultry, such as chicken, Muscovy duck, and goat, to various seafood, such as fish and shrimp, and wild animals, such as monitor lizards, pigs, frogs, bats, rats, snakes, and monkeys. Each ingredient has its own distinctive flavor, texture, and aroma that influence the preparation process and the final taste of the dish.

- **Chicken Rica-rica**

Chicken is the most common ingredient in rica-rica dishes. Chickens are more popular because of their wide availability, affordable price, and versatility as a raw material for making rica-rica (Jayaraman et al., 2013). The chicken rica-rica is not only a favorite in its native region, North Sulawesi but also loved by people in various regions in Indonesia. The process begins by sautéing ground spices until fragrance, then adding lime leaves, pouring water, and cooking the chicken for approximately 30 minutes until the spices are absorbed and the amount of water is reduced. The final stage is marked by the addition of basil leaves, which are cooked until they wilt before use (Swara & Kusuma, 2014).

- **Duck Rica-rica**

Ducks constitute another type of poultry that is no less popular among the public. Owing to its chewy meat and distinctive aroma, this type of meat is also suitable for making rica-rica. Ducks contain less meat, especially in the breast muscle, and a higher percentage of skin with subcutaneous fat (da Silva Costa et al., 2023). The muscovy duck type rica-rica is a typical dish in the Bukit Mulia slope area, Kudus, Central Java (Hazami, 2019). Given the cold region, consuming spicy rica-rica ducks will warm the body. In addition, this dish is often served during celebrations such as breaking the fast, Eid, or during family gatherings. The process of cooking ducks with rica-rica generally begins with boiling first to tenderize the meat and then continues with sautéing with rica spices until the spices are completely absorbed, as shown in Figure 2. The spicy taste and sharp aroma of spices help reduce the distinctive smell of ducks while adding flavor.

- **Pork Rica-Rica**

Pork is also often used as the main ingredient in rica-rica dishes, especially in areas in North Sulawesi where the majority of the population is non-Muslim. Pork is widely favored for its tender texture and high intramuscular fat content, which makes it savory and juicy when cooked (Wang et al., 2023). For the Minahasa ethnic community, consuming foods containing high saturated fatty acids is a habit and is the most commonly served dish at various celebrations, such as traditional parties, thanksgiving events, birthdays, death anniversaries or other celebrations (Kandou, 2009a). One of the most consumed dishes is pork garo rica, which is a typical menu on various occasions (Kandou, 2009b).

- **Fish and Shrimp Rica-rica**

Fish and shrimp are the main ingredients in rica-rica, which are most commonly used by coastal communities, especially in North Sulawesi, as the abundance of seafood makes it an easily accessible source of animal protein (Santoso & Harmayani, 2024). Commonly used fish include skipjack tuna, mackerel, mackerel, and milkfish, which are usually cleaned, cut to size, fried or smoked before being cooked with the rica-rica spices. The use of smoked fish in rica-rica gives it a distinctive smoky flavor and extends the shelf life of the dish. Shrimp, on the other hand, is favored because it is easy to process, inexpensive, has a soft texture, produces many meats and has an attractive shrimp color, although some people are allergic to shrimp (Wijayanto et al., 2021). In the process of making shrimp rica-rica, the shrimp are deheaded and deveined, the skin is peeled, and any black dirt is removed. After that, the shrimp are cooked with rica-rica spices.

- **Beef Rica-rica**

Beef, recognized as a high-quality source of protein, is one of the preferred types of meat used in the preparation of rica-rica. Its tender texture and juicy flavor are the primary reasons for its selection (Miller, 2020). The preparation process of beef rica-rica is relatively simple, involving sautéing the spices until aromatic, adding the beef pieces, then incorporating water and cooking until the meat is thoroughly done. The dish is then ready to be served

- **Goat Rica-rica**

Goat meat is a source of red meat for humans (Gawat et al., 2023), although goat meat has a distinctive aroma called a "goaty flavor", which influences consumer acceptance of goat meat. (Aung et al., 2023). Efforts to reduce the aroma and improve the taste of the final product can be made by adding spices during the processing process (Choi et al., 2024). One common method is to boil goat meat with bay leaves and ginger until it is cooked to remove the fishy smell, cut it thinly, cook it with sauteed rica-rica spices, add water, and then cook it again until the spices are absorbed. In various regions in Indonesia where the majority of the population is Muslim, especially during the Eid al-Adha celebration, goats are sacrificial animals that are often slaughtered, and their meat is often processed into various dishes, including rica-rica goats.

- **Monitor Lizard Rica-rica**

Monitor lizard meat, although relatively uncommon, is one of the ingredients used in rica-rica dishes by certain communities, especially North Sulawesi and several other regions in Indonesia. This meat has a dense and slightly tough texture but has a taste that some people consider similar

to that of chickens, while others, such as goat meat, have a distinctive aroma. Water monitor lizards (*Varanus salvators*) are usually cleaned, skinned, and cut into pieces before cooking (Firdaus, 2019). To reduce the distinctive aroma and soften the texture, lizard meat needs to be boiled with spices such as bay leaves, ginger, lemongrass, shallots, and garlic. Monitor lizard meat is very commonly cooked with rica-rica spices because the spicy taste can mask the distinctive aroma of monitor lizard meat. Some people believe that monitoring lizard meat has health benefits, such as increasing stamina and treating skin diseases or respiratory disorders. (Arida et al., 2021) The popularity of rica-rica monitoring lizards has also increased along with the trend of exotic culinary dishes and the increasing sales of monitoring lizard meat on digital platforms (Nisa et al., 2014). In addition to the taste factor, the habit of consuming unusual meat is associated with tradition or inherited customs. In North Sulawesi, for example, the Tomohon Market sells unusual meats, including monitor lizards, dogs, cats, lizards, snakes, bats, frogs, and others (Mesra et al., 2022).

- **Frog Rica-rica**

Frog meat is another ingredient used in rica-rica dishes, primarily because of its high nutritional value. This meat is known to be low in fat, rich in protein, and contains essential amino acids that are important for the body. (de Oliveira et al., 2017). Frogs are generally skinned, cleaned, and cut into pieces before being cooked with rica spices. The combination of spicy, spicy rica-rica spices and soft frog meat makes this dish popular with the public. Research conducted by Musigapan et al. revealed that the use of spices in processed frog meat can increase the nutritional value and flavor of the product so that the dish is quite popular among the people of Chiang Mai, Thailand (Musigapan et al., 2022). In addition to the delicious taste of frog meat, some people believe that consuming frog meat can cure various diseases, such as healing wounds and speeding up recovery when sick (Talukdar et al., 2020).

- **Bat Rica-rica**

Bat meat is a source of protein for the Minahasa people and is associated with hunting traditions (Patgiri, 2020). Initially, prey was only used for personal consumption, but since the 1970s, local people have begun selling their prey to traditional markets for economic gain. Survey results show that the Minahasa and Sangihe ethnic groups dominate this trade, representing 97% as sellers and 85% as buyers of bats (Sheherazade & Tsang, 2015). The high demand for bat meat is also inseparable from the tradition of serving various unique meat dishes at celebrations or special events. Outside of celebrations, most residents consume bats at least once a month (Sheherazade & Tsang, 2015). Bat rica-rica dishes are among the most popular dishes, with a taste rating on par with those of beef, chicken, and skipjack tuna (Ransaleleh, 2016). In addition to their delicious taste, people consider bats to be clean animals because they consume only forest fruits, so they are not bothered by the smell or appearance of bats (Sheherazade & Tsang, 2015). People also believe that consuming bat meat can cure various ailments, such as asthma, coughs, diarrhea, and epilepsy (Tackett et al., 2022).

- **Rat Rica-rica**

Rat meat is a common daily food for Minahasans. The species hunted is typically the white-tailed rat, which has a distinctive white tail tip and consumes only fruit, bamboo, and other plants found in the forest (Masala et al., 2020). Locals call it kawok. (Ramadhan, 2018). The tradition of hunting forest rats is carried out at night via air guns, after which the hunted results are sold to collectors to be marketed to traditional markets or to food stall owners who sell menus made from rat meat. For people who live around the forest, rat meat is usually consumed as a side dish for the family (Laatung et al., 2019). Rat meat processing begins by burning the rat to remove fine hairs, followed by washing, cutting into smaller pieces, and frying. After frying, it is then seasoned with rica-rica spices. Rat meat is nutritionally very suitable for consumption and does not pose a risk to human health if processed properly (Fiedler, 1990).

- **Snake Rica-Rica**

Snake meat is a popular food in Asia, including North Sulawesi, because its taste is similar to that of chickens (Taran et al., 2024). In some areas, such as the Langowan, Kawangkoan, Tomohon, and Karombasan markets, approximately 15 kg of snake meat is sold daily. The most

commonly hunted snakes are pythons, which are found in swamps, forests, and rice fields (Latinne et al., 2020). Snakes are caught manually by hand or by using snares typically set for wild boar or bandicoots. (Taran et al., 2024). In the processing process, the snake is first grilled until the meat and outer skin are dry and then grilled again over low heat so that the blood and skin are completely charred. After that, the snake meat is cut into medium-sized pieces and then cooked by sautéing the rica-rica spices until fragrance; adding sugar, salt, lime leaves, bay leaves, and ground pepper; adding pieces of snake meat; and adding water until the meat is perfectly cooked.

- **Monkey Rica-rica**

Monkeys are endemic species found in North Sulawesi and are widely consumed for their flavor (Maulany, 2006). They eat a variety of foods, including plants and small insects (Kurniawan Ritonga et al., 2022). Monkeys are caught by setting snares or cutting down nesting trees, yielding 20–40 individuals in one night (Latinne et al., 2020; Rantung et al., 2015). Approximately 7–11 vendors in traditional markets sell the captured monkey meat (Latinne et al., 2020).

- **Dog Rica-rica**

In some areas in Indonesia, dog meat consumption is common, although in some areas, a ban on the consumption of dog meat has been implemented, such as in Karanganyar, Salatiga, Sukaharjo, Semarang, Malang, Purbalingga, Bali, Medan, and Blitar (Sabrina, 2023). However, cultural aspects encourage the continued consumption of dog meat, including for the Minahasa community, as evidenced by the Tomohon Market, which sells dog meat (Medyawati et al., 2022). Dog consumption was initially carried out by the Minahasa ethnic group when hunting was scarce and only dogs were left to be consumed (Maya, 2020).

- **Snail Rica-rica**

Snails, which were originally known as plant pests in various regions, including North Sulawesi (Leu et al., 2021), are known to have high protein content; thus, in a number of regions, they are used as food ingredients, one of which is processed into rica-rica snails. The processing process begins by washing the snails to remove dirt, then soaking them in saltwater or lime water to reduce mucus, and adding lime juice or vinegar to remove the fishy smell. After that, the snails are boiled for 30–45 minutes with bay leaves, lemongrass, galangal, and ginger. The boiled snail meat is then separated from the shell and cooked with rica-rica spices until the spices are absorbed.

Nutritional Content and Health Risk

The nutritional content of rica-rica dishes is strongly influenced by the type of meat used, as shown in Table 2. The protein in rica-rica generally comes from raw meat, with variations in content depending on the species and processing method. Dried snails, for example, have a much higher protein content than their fresh counterparts do because the drying process reduces the water content, which is the largest component of meat, thus increasing the nutrient concentration. Tuna also have a very high protein content (54.19–68.35%), far exceeding that of most other meats, with a relatively low water content (7.93–12.16%), making it a potential source of nutrient-dense protein. Moreover, pythons (61.7%), monkeys (29.8%), and skipjack tuna (25.29%) are included in the group of ingredients with high protein content, although some of them are rarely used in general cuisine due to cultural or regulatory factors. The human body requires protein for growth, maintaining immune system function, transmitting nerve impulses, and performing cell repair (12). More common meats, such as goats, muscovy, pork, and broiler chickens (12.1%), present significant variations in fat content, ranging from low (<2%) in mackerel to high (13.8%) in ducks. Fat acts as a major structural component of cell membranes and is a source of energy, in addition to providing essential fatty acids and facilitating the absorption of vitamins A, D, E, and K. (Meijaard et al., 2022). The choice of meat for rica-rica should consider the balance between protein and fat content, which is tailored to the nutritional needs and health conditions of consumers. In general, high-protein sources with low fat contents, such as dried snails, tuna, skipjack, and milkfish, are more nutritionally beneficial. However, availability, consumer acceptance, and food safety factors are also factoring to consider when selecting the meat used.

In some regions, myths and beliefs regarding health benefits encourage people to continue consuming game meat. Game meat, such as bats, lizards, forest rats, or dogs, is often processed into rica-rica not only for its distinctive flavour but also because it is believed to have certain benefits, such as increasing stamina, curing skin diseases, or facilitating recovery from certain illnesses. Furthermore, the high protein content of game meat makes it an alternative food source when conventional food supplies are limited, such as during the lean season or in remote areas.

However, consuming game meat is not free from various health risks. Various dangerous pathogens, such as *Escherichia coli*, *Salmonella spp.*, *Vibrio cholerae*, *Trichinella spp.*, and rabies virus, can be found in dog meat or other wild animals (Reski Ray Ayu & Afrianty Gobel, 2022). This zoonotic risk is even greater if the handling and processing process is carried out with low sanitation and hygiene standards, allowing disease transmission through the animal's blood, organs, skin, and bodily fluids (Crosmary et al., 2024). In addition to the risk of infection, the high saturated fat content in some types of game meat can also increase the potential for degenerative diseases, particularly coronary heart disease (Kandou, 2009b). Therefore, although game meat can be a source of nutrition, its consumption requires careful handling and education about the accompanying health risks.

Table 2. Nutritional content of the meat used as a raw material

Type of Meat	Moisture (%) wet basis	Protein (%)	Fat (%)	Ash (%)	Carbohydrate (%)	Source
Goat	69.4-76.3	20.0-22.8	2-10.5	0.9-1.0	-	(Gawat et al., 2023)*
Broiler chicken	74.6	12.1	11.1	1.0	1.2	(Soriano-Santos, 2010)
Duck	70.8	12.8	13.8	1.2	1.4	(Soriano-Santos, 2010)
Muscovy duck	72.39-74.65	20.81-25.46	6.38-9.26	1.11-1.24	-	(Lima e Silva et al., 2025)
Pig	73.51-74.31	21.20-23.30	1.76-3.83	0.86-1.09	-	(Ivanović et al., 2021)*
Python snake	21.0-37.4	61.7	16.7	17.8	-	(Kölle et al., 2022)**
Mouse	63.01-63.09	24.15-24.51	2.45-2.64	6.57-7.10	1.44-1.49	(Oyeyinka et al., 2019)*
Bat	67.21	20.48	-	-	-	(Ransaleleh, 2016)
Dog	69.61	21.19	6.01	1.00	2.19	(Reski Ray Ayu & Afrianty Gobel, 2022)
Frog	79.41-80.51	13.19-15.80	-	3.06-4.03	-	(Ayres et al., 2015)***
Monkey	17.97	29.80	7.12	2.34	-	(Amponsah et al., 2024)****
Milkfish	70.78	24.18	0.85	1.40	2.78	(Hafiludin, 2015)

Skipjack tuna	71.77	25.29	0.60	1.49	0.86	(Ekawati et al., 2014)
Mackarel tuna	7.93-12.16	54.19-68.35	1.8-5.6	2.49-3.29	-	(Hafiludin, 2011)*****
Mackerel	74.20	20.91	1.38	1.66	-	(Pratama et al., 2022)
Shrimp	72.97-77.57	12.33-15.09	0.48-0.73	1.33-2.07	-	(Liu et al., 2021)
Snail (<i>Achatina achatina</i>)	6.58	82.96	3.98	3.22	3.26	(Engmann, 2013)*****
Cow	66.0	18.8	14.0	1.2	-	(Maiyena & Mawarnis, 2022)

- Not measured

*differences are caused by breed type and muscle type

** differences are due to age; the older the person is, the higher the water content.

***differences are due to differences in frog size

****Smoking treatment

*****differences in types of meat (red and white meat mackerel)

*****in dry form

Development of Rica-Rica

Rica-rica is generally consumed directly with warm rice and has a relatively short shelf life. Although it originates from the culinary culture of the Minahasan people, rica-rica's popularity has spread, and it is enjoyed by various groups in Indonesia. Lifestyle changes that demand practicality in food preparation have also driven innovations in the form of processed rica-rica products, such as instant rica-rica seasoning, frozen rica-rica, and even canned rica-rica with a longer shelf life.

Instant seasoning itself is a mixture of various types of herbs and spices that are processed and packaged in a specific composition. Instant seasoning is generally performed in two forms: paste (wet) and powder (dry) (Juwita et al., 2015). For rica-rica products, the instant seasoning available on the market is generally in paste form because it dissolves and blends more easily during the cooking process. Instant seasoning in paste form has a shorter shelf life than in powder form because of its relatively higher water content. Research shows that the shelf-life of instant seasoning in paste form is approximately 12 weeks (Murathathunyaluk & Jindawanich, 2019).



Figure 4. Rica-rica instant seasoning



Figure 5. Rica-Rica Frozen Duck



Figure 6. Rica-rica in a can

Many rica-rica products in frozen packaging have appeared on the market and are stored at -18 °C. The freezing process can increase the shelf-life of the product because it can suppress microbial growth or chemical reactions (Hasani et al., 2022). In addition, rica-rica fish products

are also available in canned packaging, which can last up to 7.5 months at room temperature (Syarif et al., 2023). According to Tangke et al., the production process for canned rica-rica fish starts with selecting raw materials, washing, sorting the size, weeding, smoking, reducing the size, sautéing the spices, mixing the fish and spices, exhausting, seaming, and sterilization (Tangke et al., 2018). The fish smoking process aims to improve the taste, aroma, and color of the final product. Smoke produced from burning wood or charcoal contains compounds such as phenol, nitrite, and formaldehyde, which play important roles in the distinctive characteristics of smoked fish. (Andhikawati & Pratiwi, 2021) The exhausting process at a temperature of 100 °C for 10 minutes aims to create vacuum conditions (removing air from the can), which can reduce the oxygen content in the packaging, maintain the shape of the can, and extend the shelf life of the product. (U.S Environmental Protection Agency, 1995). Next, the seaming process tightly closes the can and continues with the sterilization process at 121–125 °C for 25 minutes, which aims to kill microorganisms and spores that have the potential to damage the product, as well as inactivate enzymes that cause damage, so that the safety and quality of the product can be maintained for longer (Kurniawan & Junianto, 2021). The canned product is then cooled with pressurized clean water to a certain temperature to prevent overcooking and the growth of heat-resistant thermophilic microorganisms. (Rather et al., 2017). After the final process, the cans are labeled and stored at room temperature for distribution and consumption.

CONCLUSION

Rica-rica, a North Sulawesi specialty, is widely known throughout Indonesia for its distinctive spicy flavor and nutritional content. Over time, this traditional dish has adapted to the needs of modern society, which prioritizes practicality. This has led to the emergence of various product innovations, such as instant seasonings, frozen rica-rica, and canned rica-rica, which have longer shelf lives. These processed forms not only simplify the preparation process but also have the potential to expand market reach, preserve culinary heritage, and increase the product's economic value. However, these innovations need to be balanced with the implementation of good quality and food safety standards to maintain the rica-rica flavor and nutritional content.

Future research should focus on empirical nutritional analysis of rica-rica prepared with various meat types, microbiological risk assessment throughout the supply chain (particularly for game meat products), consumer acceptance studies of sustainable meat alternatives, environmental impact evaluation of different production systems, and optimization of processing parameters for innovative rica-rica products with extended shelf life and enhanced food safety characteristics.

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